Genre Cycling: The Infrastructural Function of an Operational Assessment Review and Reporting Process at a Federal Scientific Supercomputing User Facility

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ABSTRACT

This paper reports on the first phase of a study of technical documentation and reporting at a scientific supercomputing user facility. This paper proposes a new conceptualization of how multiple genres interrelate to coordinate and mediate the functioning of an organization. Based on the case of the operational assessment review and reporting process, this paper strives to differentiate the function of organizational genres to maintain the infrastructural operations of an organization from the function of genres to mediate the production of an organization's mission-based output. The theory-informed analytical tool proposed by this case study, the genre cycle, proposes parameters for further inquiry into the generalizability of the concept.

Categories and Subject Descriptors

K.4.3 [Computers and Society]: Organizational Impacts – computer-supported collaborative work.

General Terms

Documentation, Design, Human Factors.

Keywords

Genre, Assemblage, Genre Cycle, Mediation, Coordination, Organization, Infrastructure, Supercomputing

1. INTRODUCTION

This paper proposes a new conceptualization of how multiple genres interrelate to mediate the functioning of an organization. Based on the case of the operational assessment review process at a federally funded scientific high performance computing facility, this paper strives to differentiate the function of organizational genres to maintain the infrastructural operations of an organization from the function of genres to mediate the production of an organization's mission-based output. This conceptualization further brings into focus the function of assemblages of texts as operational infrastructure for an organization, more akin to the HVAC systems that keep industrial buildings habitable and functional than the specialized toolboxes

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that workers use to produce knowledge products. The case study reported here proposes parameters for further inquiry into the generalizability of the concept.

The value of conceptualizations for how genres interrelate to coordinate and mediate work for organizations for scholars, and more importantly, for industry stakeholders, is the objectification of often tacit and routine workplace practices. Making these work practices visible within their larger structural instantiation enables an understanding of the value, function and efficacy of these practices that is not accessible from the practitioner's daily, on-the-ground point-of-view. This understanding is particularly useful for writing activity that contributes to maintaining the operations of the organization. In the scholarship about knowledge work and knowledge workers very little focused attention has been paid to writing activity that does not contribute directly (especially epistemically) to an organization's product or mission.

2. THE FUNCTIONS OF GENRE ASSEMBLAGES

In the genre theory literature, and within the area of business and technical communication in particular, theorists agree that genres, understood as typified social action [23, p. 14], function as assemblages [15]. The work to describe how genres function as assemblages has been central to the scholarship that has made visible how knowledge work across academia, government and industry is the outcome of collaborative, and often distributed, action that is coordinated [23] and/or mediated [14] by genres. Useful for this paper because of its focus at the level of the organization, although also limiting because of its focus on social interaction as communication, is the notion of genre as an "organizing structure" or as an "institutionalized template for social interaction" [23, p. 15]. This notion of genre encourages an organizational-level scope of analysis of how multiple genres interrelate to function for organizations.

Theorists have developed multiple conceptualizations of the nature of interrelationship between and among the genres of the assemblage. These conceptualizations include genre sets [2], genre systems [23], genre repertoires [10], and genre ecologies [14, 17]. In general, these conceptualizations explain how coordinated assemblages of genres coordinate, mediate and/or constitute the knowledge of, the practices of and the functions of the academic disciplines, professions and organizations. These four conceptualizations share characteristics and also vary in significant ways that have been examined along five axes [15]. These five axes are: 1. Model of action (communication or

mediation); 2. Agency (individual or distributed agency); 3. Foregrounded genres (official and/or unofficial genres); 4. Perspective (individuals, communities or activities); and 5. Relationship between genres (sequential or overlapping). Key variations among these frameworks relevant to this paper are variations in the perspective and the relationship between genres. This paper will not reiterate the characteristics of each framework [see 15], but will summarize key characteristics as necessary for explicating the proposal of this paper.

This paper proposes an additional conceptualization of a genre assemblage called a genre cycle, which presupposes a process called genre cycling. A genre cycle shares characteristics with existing models of genre assemblages, but also accounts for functions of genres for organizations previously unaccounted for. Crucially, this model distinguishes between the genre assemblages that constitute and mediate the main product or service of an organization and the genre assemblages that function to *maintain* the continuous operations of the organization. As essential to the maintenance of an organization, genre cycling performs an infrastructural function that enables, but does not directly contribute to, the organization's mission.

3. THE STUDY

This paper reports on the first phase of work of a larger ethnographic study being launched at a new field site. The name of the study is Writing at a Supercomputing Center. The site is a federally funded supercomputing center that supports scientific research. At the supercomputing facility, scientists from academia and industry are granted time on the supercomputer to process large-scale amounts of research data, including data from research to develop new aerospace technologies, to advance drug design and to explore the structure of the universe. Scientists from academia and industry are the *users* of the facilities. The primary product of the facility is the amount of computing time that is dedicated to scientific research, and, ultimately, the results of the scientific research.

The supercomputing facility is part of the system of federally funded national laboratories, and is one of four supercomputing user facilities. Importantly for the case study central to this paper, the relationship of the facility to its funder, a division of the federal government, is defined as "Government Owned, Contractor-Operated" (GOCO). What this means is that national laboratories are managed by a Management and Operating (M&O) contractor, such as a university, a non-profit or an industry contractor and are not operated directly by the federal government. The implication of this special relationship is that the sponsorship and funding of the federal government has to be maintained via a stewardship process that is part of the mission statement of the federal division that sponsors the labs and their user facilities. This stewardship process provides the exigence for the case of genre cycling examined in this paper.

3.1 Research Questions

The larger ethnographic study is motivated by questions at the intersection of Science and Technology Studies (e.g., 6, 8) and Writing Studies (e.g., 7, 22). In scope, the questions start at the macro-level and work down to the micro-level, from the function that a supercomputing facility has for science and society to the functions of the routine writing activities of the facility's staff for the operations of the organization.

The first phase of the study addressed questions at the meso- and micro-levels of scope:

1. How do the daily writing activities of workers constitute and enable the facility's contributions to science and society?
2. How do the processes and products of writing at the facility shape and constitute the operations and/or mission-based outcomes of the facility?

The difference between these questions is the focus on either the workers' writing *activity* (1) or the writing *processes* and *products* (2). This distinction always presents a healthy tension in technical communication research. The prior view invites an activity-theory-based analysis [e.g., 13], whereas the latter view invites a perspective that supplies agency to non-human actors, such as actor-network theory [e.g., 1, 6]. These theories are often coordinated in technical communication scholarship to reconcile these perspectives. In this paper, given the available data, the perspective is primarily weighted towards the latter view.

3.2 Data Collection and Analysis

Primary collection of ethnographic field data for the larger study has not begun as IRB approval has not yet been granted. The first phase of work has been to establish rapport at the field site and to identify technical documentation and reporting processes for the larger study. In addition, the first phase of work has functioned to develop a theoretical framework that will be an analytical tool for later phases of the study. The findings reported here are the result of document collection and analysis from the 2014 operational assessment review process and the professional knowledge and experience of the authors with these documents.

Table 1. Documents Collected

Document Name	Genre and/or media	# of pages
"CY13 Department of X, Office of X High Performance Computing & Networking Facility Operational Assessment & Facility Metric Updates December 2013"	Document Template (MS Word)	16
"Draft Operational Assessment Report"	Formal Report (MS Word)	68
"Operational Assessment Report March 2014"	Formal Report (MS Word)	124
Operational Assessment Reports of Peer Institutions (2)	Formal Reports	206
"Advancing Computer-Aided Drug Design" and similar others	Glossy One-Page Information Sheets (full color)	11
"OAR Site Reviewer Peer Review Form"	Peer Review Form	3
"Director's Response to Recommendations"	Table (informal document)	10
"Site Review Presentation"	MS Powerpoint	161 slides
"Distinctive Characteristics of the U.S. Department of Energy's National Laboratories"	Public Information Website	4

The methodology of the first phase was a case study of documents collected for single technical reporting process at the facility. Data collected from the study documents included their content, rhetorical purpose, generic function and for the genres that precede and succeed each document. In addition, the data collected about the documents was triangulated with the professional knowledge and experience of author 2. During analysis the relationships among the genres of the documents collected and their functions for the organization were compared with theory-based analytical constructs from the literature.

3.3 Phase One

The first phase of the larger study still in the development stages has functioned to establish rapport with the field site and to provide parameters for the study. At the suggestion of the Director of the supercomputing facility, the first phase of this research focused on an annual review process that the facility must undergo with its federal sponsor and funder: Operational Assessment Review.

The review process as it is described here is common to the four high performance computing user facilities within the purview of the federal funding agency. The review process is a six-month annual process beginning in December and extending to May. Biannually the review includes a site visit by reviewers from peer facilities. In this paper the operational assessment review detailed is that of a site-visit year.

3.3.1 *Exigence for the Review: Stewardship*

The review process is the response to the exigence of stewardship claimed by the federal funding agency in its mission statement on its public website:

“[The federal funding agency] must provide clear guidance on performance expectations and direct actionable performance feedback as an essential part of assuring that the management and operations of the [federal agency’s] laboratories result in effective stewardship of these essential national assets, the safety and security of the people who work at them, protection of the communities in which they reside, and the appropriate protection of information and materials.”

The scope of stewardship includes maintaining the laboratory infrastructure, such as the research facilities, instrumentation and supporting infrastructure and reviewing and assuring management and operations performance. This statement of stewardship is general to all of the national laboratory facilities under the purview of the federal agency.

The local exigence of stewardship is provided by the division of the federal agency that directly oversees the high-performance computing user facilities. The stewardship function of the Operational Assessment Review is described in a review document as “a management tool used to assess the status and quality of operation of scientific user facilities.” This statement, however, belies the function of the review process reporting documents as more than straight forward reporting. Beyond being strictly a reporting mechanism, the review process is also a process of negotiation between the user facility, the funder and the peer national laboratory user facilities to establish what constitutes “reasonable measures” for the assessment of the facility in future reviews. In this sense, the operational review process can be construed as an ongoing, cyclical dialogue between the funder and its sponsored organizations.

4. THE GENRES OF THE OPERATIONAL ASSESSMENT REVIEW

The main reporting tool of the Operational Assessment Review (OAR) process is the OAR Report. The OAR Report is the longest and most complex official document product of the review process; however, its completion falls at the midpoint, rather than the beginning or the end, of the review process cycle [Fig. 1]. The genres that succeed the report function as commentary on the report. This commentary is processed through the federal agency administrative structures and ultimately reported to the facility director, who has a chance to respond. The genres that precede the report have incorporated the previous cycle’s commentary and therefore define the parameters of the statement, or argument, that the current-year OAR report substantiates with facility data. For descriptive expedience, the genres of the operational assessment review are presented here beginning with the OAR Report; however, the OAR Report does not represent the beginning of the review process.

4.1 The OAR Report

The final draft of the OAR Report is a professionally designed and edited full-color print document collaboratively written by the facility’s senior management and supporting staff. The 2014 report was 126 pages long, including all front matter and back matter. In function, the OAR Report is an extended statement about how the facility has successfully met or exceeded the negotiated metrics set for the facility by the federal funding agency based on the previous year’s review process. Importantly, the structure of the report incorporates responses to the commentary from the previous year, the statement and substantiating data from the current year, and proposals for future metrics and targets for the upcoming reviews. This function is explicit, and is expressed on the first page of the Template and Guidance provided by the funder:

“The OAR should include target performance numbers already agreed upon for Calendar Year 2013 and proposed for Calendar Year 2014, against which the actual performance data will be compared in the [review processes] taking place in 2014 and 2015.”

In this sense the report is both backward looking and forward looking.

4.1.1 *Table of Contents of the OAR Report*

Each section of the OAR report addresses an aspect of facility operation and is framed by a charge question that focuses the assessment. The bulk of each section is data-driven evidence substantiating the statement of the section. Each section of the report opens with a “Response” section. The purpose of this section is a summary of how the facility has positively met the challenge of the charge question. These statements [Table 2] set up the argument substantiated by the data presented in the report.

Table 2. Sections of the 2014 OAR Report

Section #	Statement
Executive Summary	“The [facility] has proudly met or exceeded all metrics set for the facility”
Section 1: User Support Results	“[The facility] has established processes in place for effectively supporting customers, resolving problems, and performing outreach.”
Section 2: Business	“[The facility] has exceeded the metrics of system availability, [computing] hours

Results	delivered and capability hours delivered. For the reportable areas...[the facility] is on par with the other facilities and has demonstrated acceptable performance.”
Section 3: Strategic Results	“The scientific accomplishments of [the facility’s programs for high performance computing in science] clearly demonstrate the impact [the facility] is having in supporting scientific breakthroughs.”
Section 4: Innovation	“Listed below are the innovations and best practices carried out at [the facility] during CY 2013.
Section 5: Risk Management	“[The facility] has clearly demonstrated successful risk management in the past year for both project and operation risks.”
Section 6: Site Office Safety Measures	“[The facility] has an exemplary safety record.”
Section 7: Cyber-Security	“The [National Lab] Authority to Operate, which includes [the facility] is included below.”
Section 8: Summary of the Proposed Metric Values for Future OARS	“[The facility] and the [federal funding agency] have agreed to the 2014 metrics and targets as proposed in the April 2013 OAR report. These metrics and targets are reasonable measures of the facility performance that are consistent with metrics and targets used at other facilities.”
Appendix A: Calculations	Explanations of calculations for quantitative metrics
Appendix B: [Facility] Director’s Discretionary Projects	A list of the projects funded at the facility director’s discretion.
Appendix C: Strategic Result Slides	Slides explaining key scientific contributions that are the outcome of users’ work on the super computers.

4.2 OAR Guidance/Template

The release of the current year Guidance and Template to the facility director kicks off the current year OAR process. This document is sent by the federal agency Division OAR Coordinator to the Director of the facility in early December. The same Guidance and Template document is sent to the facility’s three peer user facilities, which are also undergoing peer review at the same time. The guidance is structured around charge questions, which focus the reviewers’ attention on the major aspects of the facility’s operations, such as user support, the operations of the supercomputer and risk management. These questions are similar year-to-year, but prior to the release of the guidance document the Division OAR Coordinator works behind the scenes with the facility directors and the oversight committee at the federal Division to frame the questions around issues of current relevance to all of the facilities. In some cases these questions are influenced by comments and recommendations from the previous years’ OAR process. When the guidance document is released, there are no surprises for facility Directors regarding the charge questions or the metrics for operations assessment. In this sense the guidance document is the product of the negotiation and coordination process that has already taken place via the channels of unofficial genres.

The guidance document outlines the Table of Contents detailed in section 4.1.1 and includes additional guidelines and tips for writing each section of the report.

In addition to providing the informational structure for the report, the Guidance also includes table templates that stabilize how the current year’s actual metrics data is compared to the targets set for the metric, as well as how the data compares to the previous year’s target and actual metric data. The Guidance also includes formulas for computing the metric data for assessing the operational performance of the supercomputer.

The Guidance and Template provide both rigidity and flexibility to the facility in its preparation of the report. On the one hand, the Guidance is rigid in the sections required of the report, their function and the standards for presenting data; on the other hand, the Guidance leaves openings for customizing the report to the particular circumstances and accomplishments of the facility in a given year.

4.3 Slides of Science Accomplishments

The Director of the facility engages in a continuous process of developing slides that represent the scientific accomplishments made using the facility’s resources. While the timeline chart included in the guidance document places the development of these slides in December and preceding the OAR report, these slides are actually produced continuously. These slides present the accomplishments—or the mission-based product—of the facility. These accomplishments cannot be assessed against quantified metrics, but are chosen given factors such as where the science was published, its impact on the advancement of science, the interests of the federal funding agency and the facility peer reviewers, and what will make the facility look good. The number of slides is not fixed and varies from year to year. These slides have a role in the operational assessment review, but they also have an ongoing function that exceeds the review process.

These slides are used by federal program managers to represent the science accomplished at the four federal supercomputing user facilities. They are used in keynote presentations at conferences and on the Hill in Washington to promote their accomplishments and contributions to science and society. Each facility contributes to the library of slides that program managers have to pull from. Science stories, as represented by the slides, are chosen based on their relevance to current Washington politics and national and global events.

4.4 PPT Presentation to Site Reviewers

The slide presentation for site reviewers is based on the final OAR report. It is only produced every three years when the operational assessment process includes an on-site visit by reviewers. In intervening years peer review of the facility is done remotely via documentation only.

The form of the presentation echoes the table of contents of the OAR report [Table 2], however, sections are reordered in order to accommodate the length of sections to the schedule of breaks and lunch.

The presentation slides include many of the same tables as the report and much of text is copied over. Of course, much text is omitted, or longer points are summarized or paraphrased in a line or two. The slides are presented by the authors of the respective sections. Presentations are followed by questions from the visiting peer reviewers and any necessary discussion follows.

4.5 OAR Panel Reviewers' Reports

Each member of the peer review panel completes a peer-review form for their respective area of review (one of the eight sections of the OAR report) [Table 2]. For each section, the peer review form includes a yes/no assessment of whether the facility has successfully responded to the charge question that the statement of the OAR report sections responded to affirmatively [Table 2]. The review of each section includes reviewers' comments on the findings of the section, including identification of areas for improvement or recognition of improvement. The peer review form also includes any recommendations that reviewers have. Recommendations are requests for specific changes in the operational processes of the facility. Importantly, in most cases recommendations require a response from the Director of the facility and a subsequent review of the response by the federal division overseeing the review.

4.6 OAR Panel Review Report

This report is the formal response of the peer review panel to the OAR report (including the presentation to site reviews in an on-site review year). It includes more complete forms of each of the peer review forms described in Section 4.5. The report also includes an executive summary, a table of contents, the names of the review committee (in a year when there is a site review so that peer reviewers are known), a list of charge questions for the review, the directions to the peer reviewers and the signature of the chair of the peer review panel.

4.7 Response to Recommendations

This document is produced by the Director of the facility in order to coordinate the reviewers' comments and recommendations, the facility's response and the program manager's response. The main purpose of this document is to reconcile with the federal program manager which of the reviewers' recommendations require a formal response from the facility. Based on the 2013 calendar year cycle operational assessment review, there are recommendations that the federal program manager can deem need no formal response because of the peer reviewers' role in the review, or other reasons. This document is prepared by the Director and then discussed via phone conversation with the program director.

5. CHARACTERIZING THE OAR GENRE ASSEMBLAGE AS A GENRE CYCLE

Figure 1. Characterizing the OAR Genres as a Cycle

The relationships among the genres of the operational assessment review process assemblage extend beyond that of intertextuality [2] and sequentiality [23]. The genres also interact cyclically and continuously [Fig. 1], because the final genres of the previous year's cycle motivate the initiation of the succeeding year's review process. In this sense there is a cycling momentum generated by the shifting function of the review cycle genres from initiating and structuring to reporting and reconciling to commenting and recommending to responding and re-initiating (Table 3). Each annual cycle is constituted by the same sequence of official genres, excepting the on-site review presentation that occurs every three years. The overall function of the cycle is that of a negotiated stewardship process that warrants the continued operation of the federally funded supercomputing user facility.

Table 3. Review Cycle Genre Functions

Function for Genre Cycle	Stage of Genre Cycle (1-6)
Initiating	1
Structuring	6, 1
Reporting	2, 3, 4
Commenting	5
Recommending	5, 1
Reconciling	6
Responding	3, 6

Table 3 makes visible how the functions of the genres overlap at several places in the chronologically ordered cycle. Most interestingly, the Template and Guidance document (1) share the structuring function with the final genre of the cycle (6), the Director's Response to Recommendations. Based on the collective responses to recommendations from the four computing user-facilities, the federal program manager makes a negotiated decision with the facility directors about which charge questions will be the focus of attention for the following cycle. These charge questions are then distributed via the Guidance and Template document for the succeeding operational assessment review process.

The metaphorical construal of the relationships among genres as cyclical is also resonant with the existing notion of document cycling [4, 5, 11, 20]. A document cycle, or document cycling, is a phenomena and an activity that provides a stabilized and sequentially organized framework for textually mediated communal actions, such as the creation of monetary policy [4], the provision of accountability and redundancy in risk management [20] or the production of engineering knowledge [11].

However, document cycling in the above cases and genre cycling at the supercomputing center can be distinguished by the function of the cycle for the organization and its stakeholders. While monetary policy or engineering plans are the main *product* of their organizations, the operational assessment review process *maintains* the operations of the supercomputing center. Document cycles provide frameworks for workers to "incrementally collaborate" [5, p. 367] on a knowledge product. The operational assessment review process, however, enacts a negotiation of expectations and standards between the organization and its sponsoring stakeholders. In other words, the perspective that makes a genre cycle meaningful is at the level of the organization,

not at the level of the activity of the individual worker. While a document cycle is normally a framework for a collaborative epistemic process of knowledge creation, a genre cycle is an ontological process of maintaining the organization's operations to enable the epistemic processes sponsored by the organization.

5.1 Analysis of Genre Cycles Along Five Axes

The examination of the proposed conceptualization of a genre assemblage of a genre cycle can be assessed along the five axes previously developed to differentiate models of genre assemblages [15].

5.1.1 Model of action (communication or mediation)

The model of action proposed by genre cycles is both communicative and mediational. Importantly, this statement is made due to the controlling perspective (see 5.1.4) of the model, the organization. In the case of the operational review process the genres function to mediate the relationship with the facility's funder and peer facilities in the sense that this process is one among several that constitute these official, negotiated relationships. In addition, the genres of the operational review process also create a sequential communicative chain, similar to that of a genre system [15, p.12], that transacts communicative interactions among the organizational stakeholders in the process.

5.1.2 Agency (individual or distributed agency)

Given that the perspective of the genre cycle is that of the organization, agency is attributed at the level of the organization (the supercomputing facility, its peers and its funder). To the extent that each organization is really a blackbox of extensively networked (meaning intermediated) people, technology and other actors, agency is actually distributed among the interrelations of these organizational actors. This notion of agency has significance for the infrastructural function of the genre cycle discussed later.

5.1.3 Foregrounded genres (official and/or unofficial genres);

Genre cycles do not necessarily foreground either official genres (such as the OAR report) over unofficial genres (the IM conversations, phone conversations, email threads, marginalia, draft comments and personal notes generated during the report authoring process) by definition. The granularity of the representation of the genre cycle is a matter of choice and access to data.

A genre cycle represented with a low-degree of granularity (Figure 1) makes visible only the genres that have functional meaning within the context of the relationships among the supercomputing user facility, its peer institutions and the federal funder. A genre cycle represented at a higher-degree of granularity (data not available for the first phase of research) would include unofficial and process genres that would visualize the mechanism of the cycle; for example, drafting and editing processes and phone and email conversations where the terms of the OAR are negotiated. Such a visualization would make visible the contingency [16] inherent to the operational assessment review process which is masked by a view that includes only the official genres. To extend the industrial metaphor of the HVAC system, a representation of a genre cycle might include only the main components of the system, such as the furnace, the blower and the ducting; or, a finer-grained representation might include the inner workings of the furnace, including places where a short-term repair awaits a new part. We might also say that a representation with a low-degree of granularity blackboxes the

mechanisms (and rhetorical-political settlements) that power the genre cycle.

5.1.4 Perspective (individuals, communities or activities)

Given the five-axis rubric, the defining axis for genre cycles is that of perspective. The genre cycle assumes that the perspective is set at the level of the community, or the organization. Genre cycles function in relationship to organizations, coordinating and mediating the relationships among organizations. In the case of the operational review process, a genre cycle assumes that the organization of the high-performance computing user facility is a meaningful functional unit, as is the division of the federal government that funds it, as well as the facility's peer institutions. However, given how so many contemporary knowledge-work organizations are decentralized, internetworked and porous, it is possible that the stability of the boundaries around the organization are not the key to the functioning of the genre cycle. Additional studies will have to test this idea. Alternatively, it is possible that genre cycles are evidence that an organization is operating as a functional unit because, by definition, the existence of a genre cycle presupposes the recognition of the organization by other organizations.

5.1.5 Relationship between genres (sequential or overlapping)

Given the case of the operational assessment process, genres are both sequential and overlapping. They are sequential in the sense that the operational assessment process, and the production of the official genres, proceeds according to a chronological time frame. They are overlapping in the sense that many of the genres are intertextually related. In addition, the process is cyclical, meaning that the genres of the previous year's cycle motivate and shape the current year's cycle, which in turn anticipates and shapes the successive year's cycle.

The cycling *action* is definitional of the relationships among genres in this model.

5.2 The Infrastructural Function of a Genre Cycle

What is definitional for a genre cycle is its function for the organizational unit. It is definitional that the genre cycle enables, by generating a continuous cycling momentum, the maintenance of the operations of the organization. To extend the industrial metaphor, a large office building, computing machine room or warehouse is not functional if its HVAC system is disabled; in fact, the people and machines (computing machines in particular) in the facility have to be evacuated or turned off. The consequence for the organization is that it can no longer function to produce the products or services that define its mission.

The proposal of this paper is that assemblages of texts that function as genre cycles constitute essential infrastructure for an organization. Unlike what the industrial metaphor might suggest, however, the concept of infrastructure has been taken up in studies of information systems and knowledge work to construe more than a material "substrate" that "sinks into an invisible background" [18, p. 112] upon which something else operates. This notion of the term, however essentializing, is initially productive for the study of genres because it foregrounds how genres are *materially* instantiated as tool-mediated social actions [13] and as circutable inscriptions [1]. To analogically link assemblages of genres with industrial infrastructure is productive

at an intuitive level, especially to industry stakeholders for whom the genres constitute their normal work activities.

Even more helpfully, the term infrastructure has been taken up in technical communication and writing studies [3, 12, 21] as a relational concept that foregrounds how infrastructure dynamically shapes practices and organizational structures [18, 19]. The unit of analysis is the “when,” which presupposes infrastructure as something that emerges for people in practice as it is connected to activities and structures [19, p.112]. For example, for a cook the infrastructure of the water system is meaningful because it is integral to making dinner, not because it exists in general [p. 113].

The association of texts with infrastructure has also been discussed in terms of how texts function as instruments of coordination [21]; that is, how texts are infrastructure. Texts can create an infrastructure of uptake [p.131] in the context of rhetorical reuse in which recycled content and its associations mediate the uptake of the new content. This perspective on texts and infrastructure, however, is construed from the perspective of the individual engaged in the activity of reuse. In the case of the genre cycle, the controlling perspective is that of the organization, which is certainly comprised of individuals and other actors, but whose perspective is not the definitional one in this case.

More useful for the case under consideration in this paper is the notion that infrastructure arises from the need to reconcile localized needs and practices with globalized standards [19, p. 112]. Specifically, infrastructure occurs when the tension between the local and customized needs of an organization and its need to relate to more globalized standards to ensure continuity has been resolved [19, p. 112, p. 114]; or, more accurately, is in the *process* of being resolved. In other words, for the supercomputing facility to exist as an organization, to be recognized as an organization, and to continue to exist or operate, it must exist in the context of other organizations that sponsor, support and compete with it. These relationships must be enabled, negotiated and maintained by cycles of genres that grind around as long as the exigence for operating the organization is maintained.

In this study the objects of infrastructure are not elements of information systems, but an assemblage of rhetorical structures called genres. To recast Star & Ruhleder’s relational concept of infrastructure into rhetorical terms is to say that infrastructure in the form of genre cycles arises from the exigence to create standards and continuity such that the local and customized operations of an organization can be reconciled with the external, or globalized, structures that regulate and sponsor it.

6. PROBLEMS AND LIMITATIONS

This paper is a report on the first phase of a larger study. Data collected in the ethnographic phase of the study will be able to fill-out and refine the theoretical framework proposed in this paper.

This paper also begins the hard theoretical and empirical work of developing and reconciling the theories of genre and infrastructure. The purpose of this work is to persuasively differentiate the functioning of the genre-mediated and coordinated processes essential to the operations of an organization from the mission-defined products of the organization. In the end, genre cycles function somewhere in between the notion of infrastructure as the machinery that enables the operation of organizations and the notion of infrastructure as a relational concept that ultimately conflates genre and infrastructure as one in the same. The purpose of this paper has

been to introduce the notion of genre cycling and to suggest its infrastructural function; many of the theoretical possibilities of construing genre as infrastructural remain to be developed by the larger study.

Another open question remaining is whether this distinction between genre assemblages essential to the operations of an organization and genre assemblages that constitute the mission-based product of the facility has functional validity and use, or whether it unnecessarily proposes a closed system of genre interrelationships that only applies to a limited set of sites. In general, rhetorical theory has privileged theoretical structures for genre that are open rather than closed and that do not contribute to delimited classification systems or taxonomies [Miller 1984].

7. DIRECTIONS FOR FURTHER WORK

The paper proposes a new conceptualization of the genre assemblage. It is based on a single case study and existing theoretical literature. This study suggests that additional case studies of potential genre cycles should be undertaken in order to more fully test and refine the concept and to establish its validity. Additionally, a single case study cannot account for the multivalence of many genres—the fact that genres can be mobilized in different relationships to play different roles. Ethnographic data gathered in the next phase of research, as well as access to additional genre cycles at the facility, will be able to address this issue.

More specifically, this paper anticipates further case studies from the supercomputing facility. The facility’s operations are likely enacted by other genre cycles beyond that of the operational assessment review; for example, the contractually-based process that mediates the operations and maintenance of the supercomputing hardware. The supercomputer itself is a complex machine developed at the edge of innovation in the field of parallel computing. Its ongoing successful operation is a dynamic, negotiated process between the supercomputing facility, the users and the vendor of the machine. This process requires stability and continuity and is another site where the localized, customized constraints of the facility are reconciled with the standardization and efficiencies of the supercomputing industry more broadly. This process may be another site of a genre assemblage that has an infrastructural function for the supercomputing facility.

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