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A theoretical framework

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Abstract. We studied how project groups in a pharmaceutical organization configure a new Web-based communication medium to communicate project content. The project groups are geographically dispersed and operate in different time zones. In such environments, synchronous or geographically bounded modes of communication (e.g., face to face meetings, telephone) are not always viable options. As such, computer-based communication media become surrogate conduits for day-to-day project communication and exchange of project-related content. In the study, content communicated via the Web-based medium varied between different projects groups in the organization. To explain these variations, we develop a theoretical framework based on genre theory and augment this with perspectives from media richness theory. We illustrate how the augmented framework can explain the variations in communication within two project groups. We find that substantive medium use is likely when there is a fit between an institutionalized communication genre, perceived nature of content, and medium configuration. When there is a poor fit between genre, content and medium, we find evidence that communicators seek to achieve a better fit by manipulating one of these three constructs. We also outline some practical implications for the configuration of Web-based media that support dispersed project groups.

Key words: Organizational communication genre, media richness theory, configuration, web-based communication, case study.

1 Introduction

Coordination and collaboration across organizational boundaries are vital activities in project-based enterprises (Kerzner 1984). In global project-based organizations, expertise tends to be distributed not only across a variety of geographically dispersed units and functions, but also across the extended enterprise of international partners (Tapscott 1999). In such contexts, the effective application of media to support project communication and coordination becomes a crucial consideration (DeSanctis and Monge 1999; Majchrzak et al. 2000).

We conducted an in-depth case study to examine how project groups in a global pharmaceutical research organization create and exchange project content among their members. The project groups are geographically dispersed and operate in different time zones. In particular, we focused on the groups' configuration and use of a Web-based medium to communicate project content within the projects. The confidential nature of project work in the pharmaceutical sector presented an interesting context to examine the configuration of media when content is deemed sensitive and open to interpretation.

Historically, significant research attention has been devoted to the use of electronic media in organizational communication from both individual and organizational perspectives. From an organizational perspective, genre theory has been applied to study communicative action (Crowston and Williams 2000; Erickson 2000; Yates and Orlikowski 1992; Yates and Orlikowski 2002; Yates et al. 1997). Organizational communication genres are recurrent patterns of communication and can be seen as institutional templates for interaction. Communication genres are invoked when individuals make sense of new communicative media. The concept of communication genre is hence useful to assess potential problems with the integration of new communicative technologies that may be inconsistent with deeply institutionalized patterns of communication in the organizational context. Genre theory reconciles two opposing schools of thought in the literature: one arguing that different circumstances and needs lead to certain media choices, and the other which argues that communication media influences the way organizations communicate.

For a malleable communication medium such as the Web, a further question becomes how this should be configured to foster effective project communication, given an organization's institutionalized patterns of communication. Here genre theory

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offers useful insights about the introduction of new media in a given organizational context where pre-existing communication genres repertoires are present (Yates and Orlikowski 2002). In project-based organizations, one can expect a genre repertoire that includes genres such as Project plans, Meeting minutes, Work-in-progress reports, and Marketing plans.

In this paper we develop a theoretical framework based on genre theory, and augment this with perspectives from Media Richness Theory (MRT) (Daft and Lengel 1986; Daft et al. 1987). Given the malleability of the Web-based medium, certain aspects of MRT are useful to explain additional considerations that arise from individuals' communication needs and the capabilities or materiality of a particular medium configuration.

The need for a new theoretical framework to understand media use in this case derives from the following. First, media choice is limited due to the geographic dispersion of project teams (i.e., certain channels such as face-to-face communication are not always practical). Second, a wide range of possible configurations of the Web-based medium exist. Lastly, pre-existing norms and patterns of organizational communication shape and are shaped by the new communication medium.

The paper is structured as follows. First, we review perspectives on media choice and organizational communication from the literature. Based on this, we propose our theoretical framework, drawing primarily on genre theory, and augmenting this with perspectives from media richness theory. We then present the case study and use the theoretical framework to explain project group communication in two pharmaceutical development projects in the organization. We highlight key findings based on the notion of fit between genre, medium, and content. Based on the findings, we conclude with avenues for further research, as well as some practical implications for configuring Web-based media in other settings.

2   Perspectives on Organizational Communication and Media Use

In this section, we review literature pertaining to media use in organizational communication. We focus mainly on genre theory as a useful theoretical perspective to inform medium use and collective communicative behavior in an organizational context. Given the wide range of configuration possibilities associated with Web-based communication media, we also review media richness theory (MRT). MRT provides additional background for understanding how differences in media configurations could influence the materiality or capabilities of the medium and thus the type of communication it may support.

2.1 Genre Theory Applied to Organizational Communication

The notion of context is a recurring theme in much of the literature that seeks to explain media use (Watson-Manheim and Bélanger 2007). It has been argued that media use depends on the context in which the communication is taking place (Fulk et al. 1992; Nardi and O'Day, 1999; Nicolajsen and Bansler 2007). This suggests a duality between medium and context (Leonard-Barton 1988; Orlikowski 1992); the use of a medium is both dependent upon the context in which it is used, but it also creates new context. For example, as further discussed below, patterns of organizational communications denote and reflect different genres such as memos, business letters, etc. (Yates and Orlikowski 1992; Yates et al. 1997). At the same time, new genres can emerge as a result of the use of a certain communication technology. The symbolism associated with the form/genre of the communication (signaling the degree of formality, urgency etc.) represents a further influence on the appropriateness of using given media (Sitkin et al. 1992). Or as McLuhan (1964) argued, the medium is part of the message.

In the theory of organizational communication genres it is argued that most communication that occurs in organizations follows institutionalized patterns. The definition of a communication genre by Yates and Orlikowski (1992) is:

> a typified communicative action invoked in response to a recurrent situation. The recurrent situation or socially defined need includes the history and nature of established practices, social relations and communication media within organizations.

Organizational communication genres are thus recurrent patterns of communication which are used on a regular basis, and which serve as institutional templates for interaction. Genre theory has been developed to integrate two opposing views; one arguing that different circumstances and needs lead to a certain medium choice and another arguing that communication media influences the way organizations communicate (Yates and Orlikowski 1992, p. 305)[1]. In this argumentation Yates and Orlikowski draw on Giddens' (1984) structuration theory, emphasizing the duality between a larger social structure that shapes individual actions and how these actions reaffirm or change the very same social structures (norms and values).

In practice a communication genre addresses both content and form (Yates and Orlikowski, 1992). More specifically an organizational communication genre addresses the purpose, the content, time, participants, location and form by asking why, what, when, who, where and how. In this understanding technology is seen as a structuring device (Yates and Orlikowski 2002). A genre thus structures communication by creating shared expectations about the interaction, easing the burden

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of both production and interpretation (Erickson, 2000). Genres evolve over time through the ongoing interaction in the different communities of an organization (Yates and Orlikowski, 2002). This also means that variations of a genre can occur in different parts of an organization. Crowston and Williams (2000) have argued that communication genres develop as part of interaction in a network of social actors. This means that communication genres operate and make sense within a given context. Some genres are shared across the whole organization, while some may only exist in smaller groups. Some genres are widely recognized in society. The use of IT to drive organizational change is well recognized (Markus, 2004). However Barley (1986) argues, the result is highly dynamic and cannot easily be foreseen. The implementation of new communication technology and the evolution of genre can be seen as a structuring process which is interrelated. Communication technologies hold possibilities that are often not anticipated during their introduction, but which emerge over time as understanding grows (Nicolajsen 2005; Orlikowski and Gash 1994).

The evolving nature of communication genres is described in later work of Yates and Orlikowski. In this work they relate the implementation of new technology in organizations to processes of change which they term structuring (Yates and Orlikowski 2002; Yates et al. 1999). They identify two different types of structuring: implicit and explicit. The implicit form is what happens unconsciously when individuals draw on their existing communication genres and migrate or adapt these to make sense of a new communication technology. The explicit forms of structuring are conscious, planned and deliberate changes including copying, modification (where bigger and more profound changes are made), and opportunistic modification (which denotes purposeful changes which could lead to unexpected outcomes). Implicit structuring evolves as part of practice. Explicit structuring (or engineering) holds the promise of larger and more strategic changes, but may be more challenging to integrate into the practice of a network of social actors (who may also reject the change). It may require significant work and willingness on the part of users to integrate a new communication medium into their communicative practice (Bansler and Havn, 2004). Mark (2002), in her study of distributed groups who cooperated by means of shared electronic folders, found that it was extremely difficult to establish new common communication norms and to abandon existing norms. In that study, distributed groups returned to their well-established ways of communicating. Ciborra is reporting likewise in his studies in the pharmaceutical industry, arguing that people stick to their old familiar modes of communication when possible (Ciborra 1996a). Existing genres can thus significantly constrain the integration of new communication technology in a particular community. Davidson (2000) has argued that these implementation problems are likely to occur when a new medium contradicts a community's institutionalized genres. Yates and Orlikowski however also

argue that these institutional norms may enable the adoption of new communication media. In instances of contradiction, explicit structuring becomes necessary, where the implementation of new technology can act as a trigger to refine or develop new communication genres (Crowston and Williams 2000; Yates and Orlikowski 1992). In such cases, technology mediators (Bansler and Havn 2004; Davidson and Chiasson 2005; Orlikowski et al. 1995) are needed to assist with the configuration of the technology to fit with practice and to make organizational changes in order to better use the technology (technology use mediation).

2.2 Media Richness Theory

Media richness theory (MRT) (Daft and Lengel 1986; Daft et al. is one of the most discussed theories on medium use and media choice in organizational contexts. This theory has been developed from the perspective of managers' choice of medium, given the nature of an intended message. In MRT it is argued that media differ in their ability to handle multiple information cues, facilitate rapid feedback and establish a personal focus. The mix of these qualities presents a ranking of how rich the different communication channels are. Face-to-face communication is regarded as the richest medium (in terms of multiple cues, rapid feedback etc.), followed by media such as the telephone and voice mail. Correspondingly, media such as the written memo and email are regarded as lean. In this respect, MRT seeks to assess the effectiveness of managers' communication, given the nature of the message and their choice of medium. It is argued for messages that are equivocal in nature and which are hence open to interpretation, rich media should be chosen (e.g., face-to-face). Similarly, for routine messages, lean communication media such as written memos or email should be chosen.

These normative guidelines in MRT are widely criticized (Markus 1994; Robertson et al. 2001). In an extensive critique of MRT, Ngwenyama and Lee (1997) present different theoretical perspectives on communication. Ngwenyama and Lee use this to demonstrate that even a lean medium can suffice when the context of sender and receiver is considered as part of the communication act. As such, the communication act aims at creating a mutual understanding in context. This implies treating the recipient not merely as a passive receptacle, but as a responsive being, who can transform even lean words and cues that are received (e.g., via email) into a rich understanding of what the sender originally meant (Ngwenyama and Lee, 1997). The idea of rich versus lean is confronted due to the lack of contextual issues; the theory still argues that certain capabilities of the medium (e.g., rapid feedback) make it more or less suitable in different communication situations.

In this paper, we steer clear of MRT's main points of controversy. We are not focusing on individual media choice per se, but rather media *usefulness* in a given context. As outlined below, more recent contributions that focus on the materiality of media encompass broader considerations than merely matching the richness of a medium with the nature of the communication (which MRT focuses on).

2.3 Media Materiality

More recent contributions on media use have explored the combination of capabilities or services for communication that a given medium can support (media materiality). This is probably related to the fact that today's communication media are often malleable in terms of the numerous different configuration options either when implemented or while in use (Mørch, 1997). For example, Bafoutsou and Mentzas (2002) as well as Clark and Brennan (1991) along with Daft and Lengel (1987) define different forms of capabilities that can be used to describe a given medium and its characteristics or the services it provides. These material properties of media remind us that the usefulness and choice of media is not merely about matching a medium with the message. Instead, usefulness includes different communication needs such as the desire for transient communication or the need to have a persistent record of what is communicated along with the richness (Culnan and Markus 1987; Lipnack and Stamps 1997; Skovholt and Svennevig 2006).

3 Theoretical Framework

Given the context of the case organization and industry, we propose a theoretical framework that combines the salient constructs of genre theory with an understanding of the usefulness of media as conveyed in media richness theory (and media materiality). We believe the proposed framework is especially pertinent in situations where media choice is limited. This could be due to management encouraging use of a particular medium, when confidentiality of communication is a concern, or when alternative media choices are limited due to geographical dispersion (e.g., face-to-face and other same-place media are unpractical options). In such scenarios, our framework helps explain the creative ways in which users seek to achieve fit between institutionalized patterns of communication, configuration of the medium, and the nature of the content.

The proposed framework is depicted in Figure 1. We argue links exist between the organizational patterns and norms on communication explained in genre theory

affecting both what to communicate and how to communicate, as well as content and media, which again is related as explained in media richness theory.

The aspects of MRT which we include suggest a relationship between the usefulness of a particular communication medium and the nature of the message to be communicated. We adopt the definition of media consistent with MRT: media includes verbal and non-verbal means of communication with face-to-face as the richest medium. Other forms of media include email, phone, letters, voicemail, intranets, other Web-based media, etc. Web-based media are however so malleable that the same technology could be configured as different media altogether (Henriksen et al. 2002; Monge et al. 1998). For example, Monge et al. (1998) have shown that Web-based technology could be configured as a *communal* communication medium and also as a *connective* medium. In a communal configuration, information contributions are available to all members of the collective, including those unknown to the contributor. On the other hand, a connective systems configuration reflects more dyadic exchanges between sender and recipients. Given the reliance upon Web-based media in this context, *medium configuration* is therefore a key consideration in our framework.

In the framework, we use the term perceived nature of content as a more inclusive concept than the message notion in MRT. Thus we allow for other considerations, including equivocality. Content can be messages, but also any other structured and unstructured information that an individual wishes to communicate to others. The perceived nature of content is not an internal characteristic of the content but rather something that is defined in the context, as communicators make sense of the situation. In our framework we draw on genre theory and suggest that the nature of content is to a large extent shaped by the organization's existing communication patterns at a corporate as well as sub-group level (i.e., the repertoire of existing communication genres) (Postmes et al. 2000). A particular instance of a recurring pattern of communication is theorized as an institutionalized communication genre in a given context.

The repertoire of organizational genres suggests that institutionalized genres of communication in the organization enable and constrain media use and also the nature of the messages that are communicated via media. An institutionalized genre such as the formal organizational memo, imposes a structure or form on communication, but also influences the nature of the communication (such as the degree of formality, style and language). The literature thus suggests a link between the medium and genre; a medium's compatibility with existing (especially contextualized and deeply institutionalized) communication genres ultimately shapes its continued use and evolution. Instances of communication that contradict deeply institutionalized genres run the risk of rejection in a particular context. For example, advertising (i.e., spam) sent via a scholarly mailing list would typically be considered as out of

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place by its members. On the other hand, when many people begin to communicate in new ways, and use a new medium, new genres could emerge (Postmes et al. 2000). For example, the widespread use of SMS, and the nature of messages sent via this medium can be seen as an emergence of a new genre.

In combination, these arguments suggest a highly dynamic and ongoing link between the way a medium is configured, the nature of content communicated and recurrent invocation and modification of genres. The dynamics in the relationship between the three concepts can be explained through the different forms of structuring theorized in genre theory, combined with the possibilities of manipulating the medium to fit different levels of ambiguity of content. We propose that the concepts in our analytical framework, derived from genre theory and augmented with media richness theory, can provide a richer explanation of patterns of communication and media use than the two constituent theories on their own. We argue that substantive medium use (and acceptance of the medium and content) is likely when there is a good fit between content, medium, and genre in a particular context. We propose that suboptimal use or even rejection of a medium occurs when such a fit is not achieved.
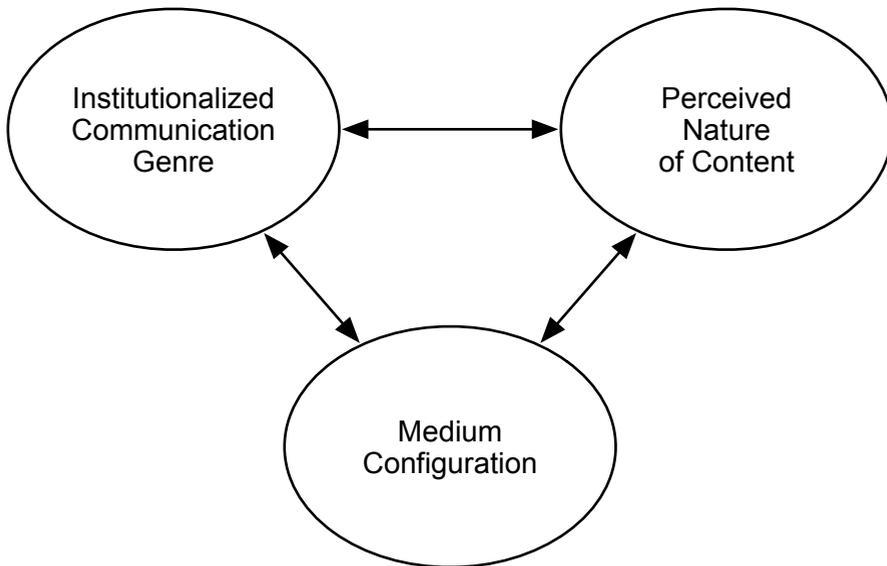

Figure 1: Theoretical framework

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The idea of *fit* in our proposed analytical framework corresponds to similar theoretical conceptualizations of this notion in other research areas, e.g., organizational behavior (Stroh et al. 2002), strategy research (Venkatraman 1989) and the idea of task-technology-fit in information systems (Goodhue and Thompson 1995). Several theoretical interpretations of fit exist, including compatible with, congruent with, and matching (Venkatraman 1989). Fit as theorized in our proposed framework corresponds to the fit-as-matching interpretation. Thus defined, fit is a match between two or more constructs; the effect of this match (or lack thereof) could be examined on subsequent constructs (Venkatraman 1989). In our framework, fit between the three constructs in Figure 1 is postulated to have a subsequent effect on medium use (and acceptance of the medium and content) in a particular context. The following examples from other fields of research are similar to, and serve to illustrate, our interpretation of the notion of fit. In organizational behavior, a good fit between the values of the employee and those of the organization is postulated to lead to subsequent job satisfaction and organizational commitment (Stroh et al. 2002). Similarly, in the field of strategy research, Venkatraman (1989) cites Chandler's (1962) classical thesis that a specific business expansion strategy requires a matching organizational structure. Fit between structure and strategy is thus postulated to lead to administrative efficiency (subsequent effect). Conversely, a poor fit between these constructs would subsequently lead to weaker performance.

4 Illustrative Case Study

We demonstrate how our theoretical framework can be applied to understand the use of a Web-based medium used for communication in two project groups in the case organization. The case is a large, global pharmaceutical firm called PharmaCo (a pseudonym). We examined two pharmaceutical development projects within the case organization. The two development projects used the same Web-based application for their communication, but configured the medium differently.

4.1 Pharmaceutical Development Projects

Development projects in the pharmaceutical industry are usually aimed at developing new medicaments or new medical devices. Projects proceed through various phases from early development to launch as the product (medicament or device) is developed. Firms often engage in strategic alliances with external partners in pharmaceutical development projects due to the innovation potential in combining different areas of expertise.

In order to obtain approval from health authorities in various countries, stringent product trials, testing and meticulous documentation of the whole development project are required. Due to the documentation required from the authorities, deliverables and processes are extensively standardized (for another example, see the Hoffman LaRoche pharmaceutical case in Ciborra 1996b).

Apart from the documentation requirements, pharmaceutical development in general demands a high degree of confidentiality. In order to prevent possible leaks of competitive information to rivals, project information in the pharmaceutical industry is closely guarded. This can be understood against the backdrop of long product lead times and years of investment that may be required to produce a new treatment. Returns on such investments are only realized once the treatment has received approval from health authorities and becomes commercially successful in the marketplace.

4.2 Development Projects in PharmaCo

Development projects in PharmaCo run between two and fifteen years and may involve hundreds of people. The development projects are organized across functional departments. The daily work within the projects is organized in working groups. Working group leaders form a core management group in cooperation with a project director. Core groups stay relatively stable during the project's lifespan to provide ongoing coordination and management.

PharmaCo is dispersed across eight locations within the base country and has numerous international branches and strategic alliance partners in other countries. As such, PharmaCo makes widespread use of computer-based media within the firm and between its partners. This includes email, local area networks (LANs), video and teleconferencing and Web-based media such as intranets and extranets.

The competitive nature of the pharmaceutical industry is evident in the communication behavior of development projects groups in PharmaCo. Confidentiality concerns influence access to project content as is evident from the following comment:

> …not all employees have to know everything, especially in branches where you find a big turnover of staff…employees move back and forth between competitors. [Medical writer]

Where external partners are involved in a strategic alliance, their access is limited to only content relevant to the alliance and not other internal information.

Confidentiality concerns also exist due to internal competition between the different development projects that PharmaCo is pursuing. Each project is evaluated

on an ongoing basis to ensure scarce resources are channeled towards those projects where success is most likely. This results in internal competition between projects that influence project communication:

> …in a huge organization as ours, you find pretty good reasons to control your information exchange to a certain extent (...) we have different committees that evaluate our presentations, many things like that, …we do not want to leak information before time. [Working group leader, Engineering]

PharmaWeb (also a pseudonym) is a Web-based application used by PharmaCo to support dispersed project groups' communication and collaboration. The PharmaWeb application was developed by the PharmaCo's internal IT department and is essentially a generic web-based template which can be configured for use by each project group. Each project group has the devolved responsibility for configuring their own PharmaWeb application. Project assistants acting as system administrators configure the template for each development project. However, as a minimum, use of the medium at core group level is expected by the organization.

PharmaWeb offers facilities for sharing documents, exchanging files, publishing information, event notifications, group management, specifying sub-groups, etc. It operates with four content types; events, articles, documents and discussions. PharmaWeb has a default template structure for projects. This default structure provides folders named according to content and groups in standard development projects. The system administrator just needs to add users and regular content such as meeting minutes. System administrators can change the default settings in the template (the content structure can be modified, existing folders can be renamed, etc.). In addition, users can be given additional rights to add new content or browse (read) content which may be restricted. All members get the right to browse open (i.e., unrestricted) material in the project. Read access can be specified at the level of each document and it is thus for the individual author to decide on access restrictions when uploading material to the project group folders.

4.3 Data Collection and Analysis

The present study was part of a larger investigation into the implementation and use of PharmaWeb in development projects at PharmaCo. The investigation ran as a longitudinal case study from 1999 to 2002. The study builds on an interpretative design of the constructivist type (Guba and Lincoln 1994; Orlikowski and Baroudi 1991). The phenomenon is understood as a social construction based on different actors' interpretations that depend on their situation; organizational issues, work, interrelations, mental schemes, etc. The study was divided into four phases guided

by rounds of empirical investigation. These phases were primarily categorized according to when the interviews took place and who was interviewed – see Table 1.

Phase	1 – Autumn 1999	2 – Autumn 2000	3 – 2000/2001	4 – 2001/2002
Informants	Project directors Project assistants	Project members	Project assistants Core group members IT-developer	Active users from Core group and Working groups
Number of interviews	8	7	9	6

Table 1. The four phases in the overall PharmaWeb study

Some of the phases overlapped in time, but were mainly carried out sequentially. This enabled insights from one phase to guide data collection in the next. As such, we could improve the quality of data collection, analysis and interpretation throughout the study (Klein and Myers, 1999). In the overall study, informants from three different development projects participated. For space reasons, and to highlight the effect of contrasting media configuration decisions, we focus on only two of the development projects in this paper. Apart from interviews, multiple data sources were considered including a demonstration of the PharmaWeb application, workshop participation and documentary evidence (such as guidelines for use, a memo on access rights, a project development manual, usage statistics and annual reports) (Yin 2003).

A total of 30 interviews were conducted with various actors such as project directors, project assistants, the main IT-developer of the PharmaWeb application, members of the core management group and employees from the working groups. A combination of three strategies (intensive selection, variation selection and comparison selection) (Miles and Huberman 1994) guided the selection of the informants. Interviews lasted between 30 minutes and 2 hours each. All interviews were tape recorded and transcribed in order to revisit and analyze the interviews. The initial interviews were semi-structured around practical themes such as how the participants communicated in the project, when they used PharmaWeb and when they used other media. We also asked participants how they were introduced to PharmaWeb or how they introduced it to others. We asked about the challenges in using PharmaWeb as well as future possibilities. All interviews were interpreted using the framework of Kvale (1990), moving between different types of interpretation such as immediate, critical and theoretical. We used themes to categorize and sample different information across the interviews and the other material we collected. We followed an itera-

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tive process in identifying themes emerging from the empirical evidence using open coding (Neuman 2000) and categorized all the evidence against the themes (selective coding, ibid.). We revised themes along the way as new insights emerged (open coding) or when different aspects of the same theme emerged (axial coding, ibid.). In these instances, sub themes or new themes were created and all the data were reclassified. We used themes arising from the empirical data such as the relation between access and confidentiality. We also used theoretical concepts like organizational communication genres to examine changes in content that was communicated and the media used. Attribution of evidence to the different themes was done in the written transcriptions by adding notes and highlighting sections of transcripts in different colors. We also extracted relevant statements from the interviews into new documents/sections to collate evidence according to a particular theme.

The proposed framework in this paper emerged in an iterative fashion, following the examination of the evidence using media richness and genre theory. We collected extensive empirical material on the implementation and use of PharmaWeb in PharmaCo. This iterative use of theory, working between the details of the case study facts and revisiting these in terms of a theoretical framework, is a recognized approach towards further refining theory (Klein and Myers 1999). We thus position the framework not as new theory per se, but rather as a blended perspective incorporating salient constructs from genre theory and media richness theory. In combination, these constructs enable a rich understanding of the case study evidence as outlined below. The theoretical framework also holds value in other settings as we discuss later in terms of generalization.

4.4 Project 1

This development project concerns the ongoing development of an existing medical treatment. The project is in the early phase of an expected 15 years of further development and approximately 300 employees are involved. The project involves only PharmaCo and the PharmaWeb application is used internally and is intranet based.

The project management decided to centralize the responsibility for content provision. A project assistant (assistant to the project manager) is responsible for the content provision and apart from creating different information she gathers content from project members and adds this to the PharmaWeb application. She also acts as an information broker between sub-groups in the project thereby adding additional content to the application.

Although the PharmaWeb application allows for access restriction to selected sub-groups only, it was decided that all project members should have access to all

content. This configuration stems from the view that PharmaWeb in this project should be "the ultimate communication tool":

> The whole idea is to have a 24 hour service, in order to make them [the members of the project] independent of my presence or the project manager. All imaginable documents must be available... [Project assistant]

Apart from project members, other PharmaCo employees who have an interest in the project can also obtain access to the project PharmaWeb.

Evidence collected in this project shows that the nature of content that is communicated reflects issues that are of general interest to project members. When content is not of common interest, PharmaWeb is considered inappropriate as communication medium and other media such as email or LANs (for co-located members) are thought of as providing a better fit.

Below follows four examples of media use in this project, analyzed in terms of fit using the framework presented earlier. Table 2 at the end of this section summarizes the different examples across the two projects.

Example 1A: Good fit between the genre project plan, communal configuration and low equivocality of content

Initially PharmaWeb was mainly used to communicate the project plan and other regularly produced material (e.g., monthly reports). This can be seen as the migration of an existing genre of communication without any change in the purpose, content or audience to PharmaWeb. Previously, paper or email attachments would have been the media for such communication. PharmaWeb thus became a central archive for these documents, providing additional advantages compared to the former media. The content was uploaded by the project assistant after receiving this from the assistants in the working groups.

This is an example of a good fit between the communal medium configuration, the low equivocality of the general and non-sensitive information for project coordination and the well known genre of a Project plan. This use of PharmaWeb helps to keep all project members informed about various official documents about the project.

Examples 1B and 1C: Poor fit between working group material, communal configuration and sensitive or confidential information

In the following examples, the fit between content to be communicated, the medium and communication genres related to working groups was analyzed as poor.

In Example 1B it was subsequently hoped that PharmaWeb could support specific members of the project team when preparing confidential Work-in progress reports. This would usually imply several iterations of documents between members. Given the communal configuration of the medium this necessitated the project assistant to act as a go-between, which interfered with the collaborative nature of this communication. Also, project members did not want to post confidential progress reports on PharmaWeb when outsiders could see these; instead alternative media such as e-mail with attachments or local area networks were used.

In example 1C, Market Analyses (price analyses and other potentially sensitive discussions about the pricing of medicaments in different countries) were posted on PharmaWeb. However, these documents only hinted at the information by referring readers to project members to be contacted, rather than containing the actual information itself. The following statement captures concerns from a project member regarding the inappropriateness of the communal configuration of PharmaWeb in this project:

> We do not put in price analysis on PharmaWeb, maybe we could, but then we would have to make sure only specific people could get it… we rather post a document saying if you have specific questions to this subject, then contact us … in order to prevent misuse … [Working group leader, Marketing]

As a result, this marketing group communicated rather superficial content on PharmaWeb and had to operate their own web-tool in order to secure access to documents with content too confidential or equivocal to share within the broad audience of PharmaWeb.

Example 1D: Poor fit between the genre and content of meeting minutes and the communal configuration

In this example, we find an instance of breaking with the existing Meeting minutes genre norms by redefining the sensitivity of the content to be communicated. Normally Meeting minutes were only communicated to the meeting participants and the core project management group. However, other project managers argued that core management group minutes should be communicated openly in the project to provide better understanding and coordination across the project. Core group min-

utes were normally seen as highly confidential and communication of core group minutes outside the core group was against the norm. The project director had to convince the core group of the merits of more openness.

The genre of core group minutes was thus explicitly changed through planned modification of an existing genre due to new visions of communication nurtured by the implementation of PharmaWeb. Meeting minutes thus changed from being core group accessible content to become content intended for a much wider audience with the added purpose of broad information sharing and coordination across the project. Some of the core group members argued against providing this content. There is thus a difference to whether some content is seen as equivocal (confidential) or not. A project manager noted that he would "rather reveal confidential issues than making people paralyzed". However, in one instance content was changed due to some critical information to fit this more open genre of meeting minutes. This is thus an example of a poor fit between genre and content, and an attempt to change a pre-existing communication genre accordingly.

Summary Project 1

In summary, the communal configuration of the medium in this project and the decision to centralize content creation has resulted in less substantive use of the medium. The media configuration and central content creation decisions do not fit with the nature of content and confidentially concerns that underpin much of the work in the project. As such, the medium is largely used for factual, non-sensitive communication. In instances where the medium is used for communicating sensitive content, the communal configuration has resulted in users resorting to limited, 'hinting-at-details' content. Furthermore, the centralization of content administration does not support ongoing communication and feedback cycles. The nature of content is thus reflective of one way communication and is limited for the general audience. Alternative media such as e-mail with attachments or local area networks are used for ongoing project communication and collaboration in this project.

4.5 Project 2

In the second pharmaceutical development project, a new medical device is developed by merging two existing technologies. The project duration is only two years because the two merged technologies have already received health approval. The project is executed in a strategic alliance between PharmaCo, an external partner and the partner's subcontractor. Overall 75 people are involved in the project, a third in each company. Areas of cooperation between the companies include device

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specification and marketing. The PharmaWeb application within this project is an extranet version covering the strategic alliance.

Exchange of documents via the PharmaWeb application is viewed as more secure and more convenient compared to email. Technology constraints in one of the partner companies limit the size of email attachments and PharmaWeb offers built-in security, whereas email messages need to be encrypted each time. Moreover the shared local area networks do not cover the alliance, providing a special need for another collaboration tool.

In this project the responsibility for content provision in PharmaWeb is decentralized to all project members. Training and support are provided to members should they need help or technical assistance to add content to the PharmaWeb application.

Access to content on the PharmaWeb application in this project has been restricted to project members in the strategic alliance; no-one else has access to the application. Pre-specified groups for restricted access reflect the different sub-groups in the project such as the core groups in the two organizations, working groups and company groups. Each content provider has the ability to restrict access to one of these pre-specified groups when new information is added.

The nature of content on this PharmaWeb application is much richer and diverse than in Project 1. It includes project documentation from each company, as well as local practices between the companies. The latter arises from the various working groups that have been formed and operate laterally across the three companies within the project.

It can be argued that this configuration of PharmaWeb supports both a communal and a connective configuration. Content providers add content pertaining to general issues, but also issues of relevance only to specific working groups. Content reflects both hierarchical and lateral communication within and across the companies.

Example 2A: Good fit between work-in-progress, connective configuration and sensitive issues targeted at sub-groups

We found the following collaboration scenario in the project regarding work-in-progress and sensitive content:

> …you publish a document and then you send an email saying, now it is in PharmaWeb under this menu category, take it home, look at it, comment on it, and upload the new version…then we take it down again. [Working group leader, Marketing]

The interchanging of work-in-progress genres was possible as PharmaWeb was configured as a connective medium supporting interaction in smaller sub-groups

(distributed content provision and restricted areas). This enabled a fit between the decentralized nature of such interactions, where sensitive work-in-progress was communicated in well defined subgroups. However a minor change was needed to create the necessary variation in the existing genres of work-in-progress to establish fit. Web-based communications tools in PharmaCo are normally used for genres with a publishing purpose, meaning people expect that content communicated in PharmaWeb should be finalized. Using our theoretical framework, this could be analyzed as an attempt to break with this genre norm when a folder named 'drafts' was created. The existing configuration was thus changed by the project assistant who drew on a naming convention to signal to the communicators that the medium also supports work-in-progress content.

Examples 2B and 2C poor fit between the genre and content on meeting minutes and the mix of a connective/communal configuration

In this project (as in Project 1) it was agreed to publish meeting minutes from all working groups across the project in order to provide for coordination and collaboration across the different groups. The intention was to create an opportunity for people to be informed as early as possible and to respond to decisions taken in a working group. However, in Project 2 another practice was established (compared to Project 1). The precautions taken in this project relates to a) confidentiality issues related to external partnering and b) ethical reasons of informing sites or departments directly, before communicating more broadly about decisions taken. Due to the highly confidential and politically sensitive information in these meeting minutes, the minutes would first be confirmed and cleared within the actual working groups or the core group. Afterwards the approved content would be made available to other members of the project via PharmaWeb. The result is a version of the meeting minutes open for everybody (2B) and an additional memo (2C) with the confidential issues (2C) for the particular sub-group communicated using an alternative medium – e-mail in which only the intended recipients of the highly sensitive content are reached. The following comment illustrates this behavior:

> Sometimes we discuss issues at a core group meeting about internal issues, then we do not write it in the minutes. If it is something we need as a kind of minute, the project assistant will send it as a separate e-mail. This has just happened a couple of times. [Working group leader, Packaging]

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The result was thus different versions of the meeting minutes to create fit; a confidential version for specific recipients only, and the censored version for the wider audience.

Summary Project 2

Due to the possibilities for distributed content provision and restricted groups, this configuration of PharmaWeb is suitable for communicating more confidential content compared to Project 1. Despite this, communicators still made use of alternative media (email) on occasions when they wanted to ensure highly confidential content could only be read by specific individuals.

	Genre	Perceived Equivocality of content[2]	Nature of content	Medium	Analysis
			Project 1		
1A	Project plan	Low	Non-sensitive, General information, for project coordination, etc)	PharmaWeb - Communal configuration	Good fit between genre, configuration of medium and general nature of content
1B	Work-in progress report	High	Confidential information regarding local or sub-group specific issues.	E-mail or LAN	Use of alternative media which offer better fit given nature of content
1C	Market analysis	High	Price analyses and sensitive discussions of the pricing of medicaments in different countries. Content could potentially be misinterpreted or even misused by outsiders	PharmaWeb - Communal configuration	Poor fit – Partial use of PharmaWeb medium (actual details omitted or hinted at; instead details of persons to be contact posted on medium)
1D	Meeting minutes	Low/High[3]	Detailed, and some confidential information for all to see	Communal	Initially poor fit, but also an attempt to alter communicative norms in the longer term.

Table 2. Summary of media use examples in Project 1

	Genre	Perceived Equivocality of content	Nature of content	Medium	Analysis
			Project 2		
2A	Work-in-progress	High	Sensitive issues targeted at specific sub-groups only	PharmaWeb - Connective configuration	Good fit achieved between genre, configuration of medium and confidential nature of content through a folder for unfinished material in PharmaWeb.
2B	Approved Meeting minutes	Medium	Sensitive issues for collaborating subgroups (involves more than one subgroup)	PharmaWeb - Connective configuration	Good fit between genre, configuration of medium and approved content
2C	Memo on Confidential minutes issues	High	Highly sensitive issues shared within core or other project subgroups members only	E-mail	Use of alternative media which offer better fit given nature of content (can target individual recipients specifically)

Table 3. Sumamry of media use examples in Project 2

5   Discussion

The case study illustrates several insights into collective communication behavior and the challenges when introducing a new medium. When using Web-based technologies to foster communication and collaboration in dispersed project groups, configuration of these technologies can indeed have a significant influence on the manner in which the medium is used and alternative media are chosen. The theoretical framework has been a useful mechanism to explore the relationships between emerging and institutionalized communication genres, media choice and media configuration, and the nature of content in the various examples mentioned.

Monge et al. (1998) have found that when content providers did not know who recipients were, little information of value would be contributed to a communal system, with providers instead opting for more connective media (e.g. phone, email). Some of the examples (e.g. 2A) in this study are consistent with Monge et al.'s

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findings in that richer or equivocal content is likely to be exchanged if the medium is configured for a specific audience, i.e., richness in part relates to the capability of the medium to support close relationships and interaction. As Example 1D suggests, a communal configuration could also support some equivocal content, especially when communicators purposefully use the medium to alter communicative practices (which represent an attempt to change existing norms of a communicative genre). We thus contend that the additional inclusion of genres as construct that shape, and are shaped by a medium's configuration and content is necessary to explain changing communicative behavior over time. Indeed, we have observed examples where one or more of the constructs were altered in an attempt to achieve a better fit.

Based on the analysis of the examples in the case, and using the theoretical framework, we highlight the following key findings:

Finding 1: Substantive medium use and adoption is likely when a high degree of fit exists between an institutionalized communication genre, the medium configuration, and the perceived nature of the content to be communicated.

Finding 2: When the fit between an institutionalized communication genre, medium configuration, and the perceived nature of the content is poor, communicators will likely attempt to manipulate one of the three constructs to establish fit.

Finding 1 stems from the examples 1A and 2A where a substantive use of the medium occurred, the nature of the communicated mapped well onto an established genre, and the configuration of the medium enabled such communicative behavior.

Finding 2 stems from the other examples where either alternative media were used, given the nature of the content and configuration (1B, 2C), or the content was altered somehow when the Web-based medium was used (1C, 2B). We also saw an attempt at establishing a new communicative genre (1D).

5.1 Generalizability of the Findings

Our framework has been developed via iteration between theory and the empirical facts in this rather unique case study and its specific context. We do however believe that the notion of fit and its implications, as articulated in the two key findings above, are generalizable to other settings where the following contextual conditions apply (cf., Seddon and Scheepers, 2006): (a) limited choices exist in terms of media alternatives, (b) a range of different configurations of a particular computer-based communication medium exists, and (c) pre-existing norms and patterns of organizational communication shape and are shaped by a newly introduced communica-

tion medium. In regard to (a), typical scenarios could include the limits imposed on media use arising from industry or professional standards or governmental regulation (e.g., in many public sector and professional settings) (Davidson and Chiasson, 2005). As Seddon and Scheepers (2006) point out, all generalizability claims need to be tested empirically in follow-up research in such clearly defined settings. Based on our findings in this case, we believe that the more general conceptualization and empirical tests of the relationship between genre, medium and content represent fruitful areas for further research in computer mediated communicative behavior.

5.2 Practical Implications

These findings also hold some practical implications for the configuration of Web-based media that support ongoing communication and collaboration in dispersed project groups (within and across organizational boundaries). We found that the manner in which Web-based project media were configured, had a significant influence on the nature of the content and ongoing use of these media between project members. In dispersed contexts where confidentiality is a concern, the effective use of Web-based media is enabled when access to content can be restricted to specific individuals (or sub-groups). Media use is constrained when content providers are unsure a) who exactly will be able to access the content and b) if recipients will have an understanding of the context in which the content was produced (or differing interests). In these instances, content providers will likely resort to limited use of Web-based media or choose alternative media which can be targeted at specific recipients.

Our study shows that it is possible to support different types of interaction within the same medium including general publishing to more confidential uses. Significant effort is required to ensure a fit between practice and medium. This stems from the social structuring and genre evolution that enable and constrain medium use. It also explains why the implementation of such systems often takes considerable time.

Different configuration options could be considered in terms of the fit between the medium, current patterns of communication (abstracted as genres), and the nature of content that is exchanged. In this sense, those who configure media or who mediate use of such media can be seen as genre engineers, building upon existing genres (easier to accomplish), extending or modify genres (which is more difficult), or introducing totally new genres (the most challenging).

5.3 Limitations and Further Research

The study has a number of limitations that needs to be taken into account. First, our findings need to be understood against the backdrop of the confidentiality concerns associated with pharmaceutical development projects (even though confidentiality and fears of being misinterpreted are concerns in many other contexts). Second, we have focused on dispersed project environments when commonly used media choices (face-to-face, telephone) are not viable or convenient communication media. Our findings need to be assessed when these commonly used channels are indeed available as well. Third, we focused mainly on particular configuration decisions (content provision, access, content categories) in this study. Other configuration decisions could further enable and constrain project communication. For example, we suspect that decisions about content in general (e.g., navigation, layout, and frequency of maintenance) may also have a particular influence. Fourth, we concentrated mainly on the behavior of content providers and the nature of content provided. We did not explore the argument from the point of view of recipients of this content. Lastly, in this study we focused on Web-based technology support for organizational communication in dispersed settings. Naturally the use of computer-based media is but one form of organizational communication and is usually complementary to synchronous communication channels (such as face-to-face and the telephone) in contexts where these are viable options.

Our findings also show that when introducing a new computer-based medium, where other media are already in use, the new medium effectively competes with the existing media. Further research is needed to assess how the continued coexistence of rival communication technologies influences communication and collaboration in dispersed project groups.

6 Conclusion

We examined how the configuration of Web-based media influence the nature of content in dispersed project groups, when information is considered confidential.

In this particular context we conclude that substantive medium use and adoption is likely when a high degree of fit exists between an institutionalized communication genre, attributes of the configurable medium, and the content or message to be communicated. When the fit between an established communication genre, focal medium and the perceived nature of content is poor, communicators will likely attempt to manipulate one of the three constructs to establish fit (e.g., choosing alternative media, altering their content, or modifying the genre).

We believe these findings also hold value in similar contexts, and point to the need for further research to examine the more general notion of fit between genre, medium and content in computer mediated communicative behavior.

Note

1. This implies a link between MRT and ten principles behind genre theory.
2. This was analyzed from the viewpoint of members of each project.
3. This reflects a difference of opinion between those who regarded the content for a more general audience, and some project members who saw the content as more confidential.

Acknowledgement

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