GENRE STRUCTURING IN A WEB-BASED GROUPWARE MEDIUM: THE EVOLUTION OF A PROJECT PROGRESS REPORT

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Abstract
Information Technology supported teaching and learning typically borrows many teaching practices and instruments from previous contexts. These typical practices or instruments can be classified into recognizable types or "genres". There are different ways in which these genres cross the boundaries of action, voice or paper based techniques to their electronically provided alternates. This study applies the framework of "genre structuring" to explore the evolution of a project progress-reporting mechanism, re-implemented in a web-based groupware application, and used in several different Information Technology courses over the last three years.

Introduction

The process of moving teaching and learning online, invariably involves borrowing from off-line contexts. How this borrowing process occurs, and the process of evolution of the borrowed forms, is not clearly understood. In this paper the concept of "genre structuring" (Yates, Orlikowski & Okamura, 1999) is applied, to explore the evolution of an online project progress-reporting mechanism, borrowed from an offline context and used in several different course contexts over a three-year period. This evolution of a relatively commonplace, almost taken for granted, artefact is analysed closely to investigate the subtle ways in which changes occur as practices are enacted across different media.

Theoretical Frameworks – Genres, Genre Structuring and Technology-Use Mediation

Yates and Orlikowski (1992) define genres somewhat more broadly than the traditional literary understanding of the term, regarding genres as "socially recognised types of communicative actions – such as memos, meetings, expense forms, and training seminars- that are habitually enacted by members of a community to realize social purposes." A genre is considered to possess key elements such as a *purpose* and a *form*. Certain observable aspects of communication such as *medium* (e.g. paper, telephone, face-to-face); *structural features* (e.g. lists and structured fields); and *linguistic features* (e.g. degree of formality, jargon etc.) are said to characterise the *form* of a genre. Yates & Orlikowski (1992) contend that " a genre established within a particular community serves as an institutionalised template for social interaction – an organising structure – that shapes the ongoing communicative action of members through their use of it for social interaction within the community."

These individual genres are said, when combined, to form a "genre repertoire…which reflects the common knowledge, expectations, and norms… that members of a specific community share about communication" (Yates, Orlikowski, & Okamura, 1999). The project progress reporting mechanism to be analysed below, can be regarded as an example of a genre, with its own purpose and evolving form.

While Yates Orlikowski and Okamura (1999) have conducted their studies within the context of a group of R&D businesses, an institution of higher learning is also a particular type of organisational context, to which the concepts of genre structuring are quite transferable. Typical "genres" within an educational context might be:

- examinations,
- quizzes,
- assignments,
- projects,
- lectures,
- seminars,
- book reviews,
- demonstrations,
- reports,
- learning contracts,
- posters and
- exhibitions.

Such a set might be said to comprise a partial "genre repertoire" for a higher learning context. When migrated to an online learning context, particular "genres" of this repertoire may be expanded or adapted to suit the particular medium. The oral discussions of a *face-to-face seminar* context, for example, may be recreated as a series of "discussion threads" in an *online conferencing* medium.

The above authors suggest that this notion of genre repertoire "is helpful in examining the implications for social interaction of introducing and using a new communication medium within a community and for comparing different communities adoption and use of a new medium over time." By examining emerging genre repertoires within a new medium, it becomes possible to see "which genres (and forms of social interaction) are reinforced and which are changed." (Ibid.)

Precisely how these processes of reinforcement and change occur has been little studied. To address the issue the above authors have focused on the relationship between technology-use mediation and communication genres to derive a perspective that will be used in this paper. The underlying perspective on technology is an inherently interactive one, based upon a structurational perspective (cf. Orlikowski, 1992; DeSanctis & Poole, 1994; Clear, 1999), in which social actors, technology and social structures interact in an ongoing process to reinforce or change social action, the features of the technology or the social structures which apply in the context.

Technology use mediators are further indirect parties in this dynamic, interactive model, who have the capacity to reinforce or change the actions, technology or social structures affecting actors in the model. The concept of "*technology-use mediation*" has been defined as "deliberate, ongoing and sanctioned intervention within a context of use which helps to adapt a new communication technology to that context, modifies that context as appropriate to accommodate use of the technology, and facilitates the ongoing effective use of the technology over time" Yates, Orlikowski & Okamura, (1999).

This activity is typically conducted in a commercial context by such technology supportive roles as systems administrators, help desk operators, IT trainers, end-user support staff or even system developers/maintainers. In the educational context the online teacher's role constitutes a further form of technology–use mediation, and in a web-based groupware context the facilitation role of the educator (Clear, 1999) is critically important.

In this paper these threads will be drawn together to investigate the processes of reinforcement and change, as a project progress-reporting mechanism is borrowed from an offline context and applied in several different online course contexts.

Background

Offline Project Progress reporting

The regular project progress report can be seen as one element of the genre repertoire of professional software developers, in effect a regularly enacted "genre" with meaning to that community. Its social *purpose* is varied: to communicate progress to management, to report exceptions and deviations from plans, to systematically gather statistics for estimating purposes, to identify developing issues at an early stage to enable them to be addressed in a timely fashion, to record project history, and to create a deliberate opportunity for meta-reflection by developers about their projects and their progress.

As a project supervisor for students undertaking capstone software development projects (Clear, 1997), it seemed natural to transport a simple one page project report previously used by the author in managing software professionals, to the context of managing and shaping the practice of budding software professionals. In the process of transforming students to practitioners, this project-reporting artefact could be viewed as a mechanism for transferring practices across communities or a "boundary object" (Wenger, 1998 p. 106), a generic element constituting part of the "shared repertoire" (Ibid. p. 83), of the "community of practice" (Wenger, 1998) represented by professional software developers.

The transformed project report, at this stage, in 1995 or thereabouts, a genre element in the *form* of a WordPerfect™ document, was made available as a template in a shared student directory. Students would copy this and create their own weekly reports using the template, and report progress, either in hard copy face-to-face at our weekly reviews, or by emailing them to me each week, prior to our project meetings. A copy of this progress report is shown below as figure 1.

Auckland Institute of Technology
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PJ300   Project Name ....

Weekly Project PROGRESS REVIEW for week no. ....   date   ...../...../......

Review Questions	Yes/No
Are the original assumptions on which the project plans were based still valid ?	
Is the scope of the project drifting ?	
Is the project on target with respect to schedule ?	
Is the project on target with respect to cost ?	
Is the customer involved with the plan, and aware of the status of the project ?	
Are there any current or potential problems ?	
Effort Expended to date	**Hours**
How many hours have you worked on the project this week ?	
How many hours have you worked on the project to date ?	

Tasks/Phases completed last week

Planned Tasks/Phases not completed last week

Main Problems encountered so far and solutions identified

Problems arising, issues of concern and recommendations

Figure 1. Project Progress Report - WordPerfect™ Template

In a variation on this template, one project group modified it to include a further entry below the table:

> "This week's hours from each team member:
> 1.
> 2."

While an apparently minor variation, this had the effect of transforming the template from an *individual* to a *group* progress report, thus by default gathering effort totals at group level, and saving the group effort by producing only a single weekly report. It should be noted that this variation would not suit a learning context in which students were *individually* assessed on such progress reports.

On-line Project Progress reporting

In an ED-MEDIA conference presentation Jacobsen (Kremer, Jacobsen, Wijngaards & Shaw, 1999) discussed her experiences with an MSc. Programme in Software Engineering developed for practicing professionals, taught largely in distance mode. Two key features of the course were: "an open architecture philosophy and the belief that there should be public access to past and present course materials" (Jacobsen, Kremer, & Shaw; 2000). Students were required to submit weekly learning logs, recording effort expended and their reflections on the progress of the course.

Emulating this approach, the author conceived a new design for the offline progress reporting mechanism from figure 1. It would move from an offline to an online medium, to become a series of "online logbooks", in a prototype collaborative database. This Lotus Notes™ database had been developed as part of a continuing action research programme into web-based groupware, collaborative learning and the nature of virtual groups/teams (Clear, 1999). The database had a similar open architecture philosophy to that espoused by Jacobsen and colleagues, and a key motivating factor for the author was the scope for increasing the degree of shared learning for students.

Considered from a further theoretical perspective the practice would also, in the course of automating aspects of the learning process, meet the goals of "informating-up" and "informating-down" (Leidner & Jarvenpaa, 1995). These terms refer to the informational uses of the learner's contributions now available online, whereby communications can be directed upwards to managers or supervisors, or horizontally (from learners) or downwards (from supervisors) to students, peers and co-learners. In other words the progress reports would then be available for project supervisors to review as a control mechanism and for fellow students to review as a status comparison and peer-learning tool.

Implementation Cycles

On-line Logbooks

The logbooks have been implemented in online form using Lotus Notes "Forms" for data entry and "Views" for online reporting, in different collaborative databases over some years and in several different research and course contexts. These courses and contexts, and changes to the online logbooks are analysed closely in table 1 below.

Semester/ Year	Course	Purpose	Significant Features/Changes
2/1999	Intelligent Business Systems	Track Prototype Development Assignment	• "Vanilla" progress report • Single report view
	Intelligent Business Systems	Track International Collaboration	• Customised progress report by 1st international collaboration phase • Dual report view, by week and by phases completed
1/2000	Intelligent Business Systems	Track Prototype Development Assignment	• Customised progress report –spiral methodology phases • Dual report view, by week and by phases completed
2/2000	Intelligent Business Systems	Track Prototype Development Assignment	• No Change
	Intelligent Business Systems	Track International Collaboration	• Customised progress report by 2nd international collaboration phase

Semester/ Year	Course	Purpose	Significant Features/Changes
			• Dual report view, by week and by phases completed
1/2001	Intelligent Business Systems	Track Prototype Development Assignment	• No Change
	Intelligent Business Systems	Track Internal Collaboration	• Customised progress report by internal collaboration phase • Dual report view, by week and by phases completed
	Software Development Project	Track Development Projects	• "Vanilla" progress report • Dual report view, by week and by exception status
2/2001	Intelligent Business Systems	Track Prototype Development Assignment	• No Change
	Software Development Project	Track Development Projects	• No Change
	Intelligent Business Systems	Track International Collaboration	• Customised progress report by 3rd international collaboration phase • Dual report view, by week and by phases completed
1/2002	Intelligent Business Systems	Track Prototype Development Assignment	• No Change
	Software Development Project	Track Development Projects	• "Vanilla" progress report • Single report view, by week and exception status
	Intelligent Business Systems	Track Internal Collaboration	• Customised progress report by internal collaboration phase • Dual report view, by week and by phases completed

Table 1 – Online Logbook Courses and Evolution in Contexts of Use

The classes involved have typically included some 20 students per group, with between one and three groups of AUT students per semester, and the international collaborations including a further 80 students from Uppsala, Sweden.

To indicate the scale of this activity, in the six semester period addressed above, some 500 students have now used some variant of this project progress reporting mechanism in a course and/or research context.

Implementing On-line Logbook Entry Forms and Report Views
Some subtleties in the conversion from offline to on-line logbook entry forms are worth noting. Features have been re-implemented using options such as radio buttons and check boxes, being the Lotus Notes functionality for standard web browser conventions and controls. Applications of these features can be demonstrated by reviewing the *semester 1/2000 prototype assessment progress report*. The "Yes/No" options from the original template in *Figure 1,* have been re-implemented in online form using radio buttons. Likewise the use of check boxes in the Lotus Notes Domino Server web form represented an addition to the original free form template in *Figure 1*. They provided a further structure to aid student progress reporting on their prototype developments, based upon selecting one or more of the phases (*including determine objectives, determine alternatives, identify risks, resolve risks, develop next level product etc.*) from the Boehm (1998) spiral model for software development.

A similar analysis can be applied to an *online logbook view* developed for *semester 2/2002 software development project weekly progress reporting*. In this Lotus Notes "view" the project progress "forms" have been displayed as a set of Lotus Notes documents in a custom online report or "view", grouped as a set of single line report entries for each project, with team member weekly individual reports highlighting issues on an exception basis for further investigation. Column headings include *hours this week, hours to date, date of entry*, with *yes/no* answers from the radio button selections on the forms highlighted under the two columns of *on schedule and problems*. Thus for project supervisors this offered a relatively quick status filter, indicating level of student activity on their projects and enabling issues and concerns to be highlighted when reviewing project progress online.

Discussion

Processes of Genre Structuring
The above depiction of the evolution of an offline genre to an online representation can now be further scrutinised within the framework proposed by Yates, Orlikowski & Okamura (1999). In their report of a global R&D company context they identified a "team report" as an example of a "genre", whose purpose was to report on technical matters related to the work of the team, and its form including formatting such as lists or specifications. While the artefact described in the figures above, does not map exactly to the "team report" genre described by Yates, it nonetheless represents a genre as "an institutionalised template for social interaction" in software development projects, and again a genre as designed into the related learning contexts summarised in table 1 above.

In their framework of genre structuring Yates, Orlikowski & Okamura (1999), identify two primary processes of genre structuring in a new medium.

> The first of these, ***explicit genre structuring***, is typically shaped by the actions of technology-use mediators who act to adapt a technology for use in a new context. Such actions may include: envisioning the modes of use of a new technology or medium, developing guides and templates, setting up aspects of the technology, training users, gaining management approvals and support, and reacting to support requests as usage patterns emerge.

> By contrast, ***implicit genre structuring*** occurs when users of a new technology unconsciously reproduce genres from other contexts in the new medium, such as traditional memos, team announcements, team reports etc. within a computer mediated communication context. In a variant of this, an emergent form of implicit genre structuring sees minor modifications and shifts in usage occur, which cumulatively may build to a significantly changed set of practices.

Within each of these "genre structuring" processes, Yates, Orlikowski & Okamura (1999) identify a number of different associated actions. In the case of ***explicit genre structuring*** they define these three associated actions as:

- *Planned replication* – predetermined action intended to reproduce prior forms of social interaction within a new medium
- *Planned Modification* - predetermined action intended to create some changes in the status quo
- *Opportunistic Modification* – involves purposeful changes introduced in response to some unexpected occurrence, condition or request

In the case of ***implicit genre structuring*** they define two associated actions as:

- *Migration* – unreflective action that reproduces genres established in one community within another medium or community
- *Variation* – not deliberate but emergent action that arises tacitly from people's situated use of a technology over time…Unlike migration, variation results in a departure from established forms of social interaction by introducing some changes in the genres enacted within the new context.

Genre Structuring in this Context
The concept of genre structuring provides an analytical framework against which to review the evolution of the project progress reporting mechanism discussed above. Tables 2 and 3 in Appendix A illustrate how these two processes of explicit and implicit genre structuring and their associated actions helped shape the evolution of the progress reporting mechanism.

Briefly elaborating on examples of ***explicit structuring***:

- Transferring the offline project progress reporting template from a professional setting to an educational context, can be seen as an example of **explicit structuring** by *planned replication*, intending to reproduce prior forms of social interaction within a new medium, namely professional behaviour to be reproduced by students. The form of interaction is represented by

the WordPerfect template adapted to a learning context, and to be used in weekly reporting sessions to their project supervisor. The *medium* in turn is represented by the exemplar document made available for students to copy from a common directory.

- Transferring the reports to an online format can be seen as an example of **explicit structuring** by *planned modification*, intending to create some changes in the status quo, by addressing perceived deficiencies in the reporting process, such as timeliness of reporting, regularity and completeness of reporting, supporting a greater degree of joint learning, and creating a project history in a single location.
- Reacting to a client concern over lack of communication from students over progress on the project, occasioned a new behaviour. The author used the situation to reinforce the use of the online logbooks as a suitable mechanism for simultaneously communicating with project clients. One student posted an online report to the database, then emailed his client to advise of its presence with an embedded URL link to the web-based groupware form. This can be seen as an example of **explicit structuring** by *opportunistic modification*, involving "purposeful changes introduced in response to some unexpected occurrence, condition or request", to effect a change in social interaction. In this case extending the scope of the report beyond the class, to external stakeholders of the project.

Thus all three actions of explicit structuring can be seen in action in these apparently innocuous but deliberate steps. A brief review of Table 2 in Appendix A, demonstrates that the primary action in evidence was *planned modification*, initiated by the author with the intention of effecting change. These author initiated *genre structuring processes*, represent concrete examples of *technology-use mediation* by the author, as a means of reinforcing social change, by transferring genres from one context to another, and using the capabilities afforded by the technology to subtly modify both their purpose and form.

By contrast *implicit structuring* processes are not a result of planned action, but emerge from contexts of use, and are driven by users rather than mediators of the technology.

Briefly elaborating on examples of ***implicit structuring***:

- Poor project reporting practices typically enacted by software professionals (intermittent or no reporting, incompletely filled out reports, missing progress items, missing hours or carried forward total entries) carried across to a student project reporting context using offline document templates – can be viewed as an example of **implicit structuring** by *migration.*
- Students carrying across their prior poor study habits from offline document template reporting to online forms based reporting – with poor project reporting practices continuing in evidence, can be viewed as an example of **implicit structuring** by *migration.*
- Students adapting the offline progress-reporting template, to enable offline **group** progress reporting and totalling, can be viewed as an example of **implicit structuring** by *variation.*
- Students adapting the online progress-reporting forms, to enable online pair or **group** progress reporting and totalling, can also be viewed as an example of **implicit structuring** by *variation.*

This drastically illustrates the point that migrating a practice to an online context does not automatically modify behaviour. Implicit structuring processes will tend by *migration* to reinforce prior behaviours enacted within a genre repertoire, save in those cases where emergent behaviours by *variation* enable significant changes in practice to develop over time.

Conclusion

By observing the ways in which particular genres are adapted to an online context, we can learn much about how genre structuring processes operate to reinforce and change modes of social interaction. This report has used a theoretical framework of "genre structuring processes" (Yates, Orlikowski & Okamura, 1999) and grounded data, to inform reflection upon the insights gained over successive cycles of an action research study. The evolution of a specific genre over some years, namely a project progress reporting mechanism, has been closely followed. In this evolution the processes of transferring organizing structures and patterns of behaviour to a new web-based groupware medium have been analysed.

The analysis suggests that the primary change processes operating in the transfer to an online context have been explicit genre structuring with an initial *planned replication* action initiated by the author as a learning enhancement initiative, followed by several *planned modification* actions for specific learning purposes, again implemented by the author in an educative and research role. These had the effect of changing the offline norms, whereby progress reports were shared between the supervisor and the team member, or at times the whole team, to create a new set of norms in which peers reviewed progress of each other's projects. The extent to which this became common student practice is difficult to assess, but from classroom feedback it did appear that students occasionally reviewed other teams progress to compare with their own.

In addition to these deliberate and pre-planned actions, examples of both the more emergent and the more passive forms of action were identified. These less planned actions were those associated with both implicit and explicit genre structuring. Interestingly and importantly it was observed that **bad habits** are carried across by students to the online environment, through the implicit genre structuring process of *migration*.

The action of *variation* representing "emergent action that arises tacitly from people's situated use of a technology over time" (Yates, Orlikowski & Okamura, 1999) with potentially significant effects, was evident to a limited extent in both offline and online modes, as individual genres were enacted as dual or group reporting mechanisms. While other mechanisms were available in the groupware application to enable students to communicate information (e.g. by uploading files, entering discussion threads or website links), these were not used in any major way that indicated *variation* in progress reporting. It may be that this indicates a potential weakness in the design of the progress reporting forms. The very degree of innate structure, perhaps, constrained more emergent and innovative uses, and reduced the scope for *variation* modes of implicit structuring. Such an argument would suggest that end-user tailorable templates with greater plasticity might better enable emergent uses of the technology. This in turn may also suggest the great advantage of email as a medium of communication, namely the very fact that email is, like paper or a computer conferencing system, a "medium" (Yates, Orlkowski & Okamura, 1999) within which a great variety of different genres may be flexibly constructed and enacted.

This concept of a "genre", and the notion of "genre structuring" offers promise for researchers and educators wishing to undertake closer analyses of the ways in which the learning process is supported by electronic media, and the ways in which genres are reinforced or changed as they migrate from traditional teaching-learning contexts to online modes. The above study could be extended to more closely analyse the role and impact of the online educator as a technology-use mediator, who facilitates the learning process through such means as developing usage guidelines, designing instructional approaches through selecting suitable pedagogical genres, training in use of the technology, tailoring the technology to the context in various ways etc. Close analysis of the processes of "technology-use mediation" (Orlikowski, Yates, Okamura & Fujimoto, 1995), may also provide a means for researchers to investigate the effect of teachers interventions in online contexts, as they attempt to actively facilitate the learning process, and for online educators to improve their effectiveness as they migrate and build their professional genre repertoires. Such careful analysis may also help dispel some of the "silver-bullet" myths about educational technology, by demonstrating that the same bad habits routinely played out by students in offline genres, are equally prevalent and little affected by their enactment in an online context.

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Appendix 1

Primary Action	Original Genre	Modified Genre	Modified Genre Form
Planned Replication	Professional Progress report	Educational progress report - 1995 ff.	• WordPerfect exemplar document template • Available in copy directory
Planned Modification	Educational progress report - 1995 ff	Prototype development progress report - S2/1999	• Web-based Groupware "vanilla" Form • Single report View
	Prototype development progress report - S2/1999	Collaborative trial progress report -S2/1999	• Web-based Groupware "customised" Form by 1st International collaborative trial phase • Dual report Views, by week and phases completed
	Prototype development progress report - S2/1999	Prototype development progress report – S1/2000	• Web-based Groupware "customised" Form by spiral methodology phase • Dual report Views, by week and phases completed
	International Collaborative trial progress report –S2/1999	International Collaborative trial progress report -S2/2000	• Web-based Groupware "customised" Form by 2nd International collaborative trial phase • Dual report Views, by week and phases completed
	International Collaborative trial progress report -S2/2000	Internal Collaborative trial progress report –S1/2001	• Web-based Groupware "customised" Form by Internal collaborative trial phase • Dual report Views, by week and phases completed
	Prototype development progress report – S1/2001	Software development project report – S1/2001	• Web-based Groupware "vanilla" Form • Dual report Views, by week and phases completed
	International Collaborative trial progress report –S2/2000	International Collaborative trial progress report -S2/2001	• Web-based Groupware "customised" Form by 3rd International collaborative trial phase • Dual report Views, by week and phases completed
	Software development project report – S2/2001	Software development project report – S1/2002	• Web-based Groupware "vanilla" Form • Single report Views, by week and exception status

| | International Collaborative trial progress report -S2/2001 | Internal Collaborative trial progress report –S1/2002 | Web-based Groupware "customised" Form by Internal collaborative trial phase Dual report Views, by week and phases completed |
| Opportunistic Modification | Software development project report – S2/2002 – for students and supervisors | Software development project report – S2/2002 – for students, supervisors and project client | Email notifying client report available online Email link to posted report Web-based Groupware "vanilla" Form Dual report Views, by week and exception status |

Table 2 –Explicit Genre Structuring Processes – Project Progress Reporting

Primary Action	Original Genre	Modified Genre	Modified Genre Form
Migration	Professional Project reporting worst practices – intermittent or no reporting, incompletely filled out reports, missing progress items, missing hours or carried forward total entries	Student offline project reporting worst practices –intermittent or no progress reporting, incompletely filled out reports, missing progress items, missing hours or carried forward total entries	WordPerfect exemplar report template
	Student offline project reporting worst practices – intermittent or no progress reporting, incompletely filled out reports, missing progress items, missing hours or carried forward total entries	Student online project reporting worst practices - intermittent or no progress reporting, incompletely filled out reports, missing progress items or phases, missing hours or carried forward total entries	Web-based Groupware "vanilla" & customised forms across all the above courses and semesters
Variation	Educational individual progress report - 1995 ff	Educational group progress report - 2000	WordPerfect exemplar report template, including space for group total entries
	International Collaborative trial - individual progress report - S2/2000	International Collaborative trial - pair or group progress report - S2/2000	Web-based Groupware "customised" Form

Table 3 –Implicit Genre Structuring Processes – Project Progress Reporting