2006

Remediating the professional classroom: the new rhetoric of teaching and learning

David Dean Fisher
Iowa State University

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Remediating the professional classroom: The new rhetoric of teaching and learning

by

David Dean Fisher

A dissertation submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Rhetoric and Professional Communication

Program of Study Committee:
David R. Russell, Co-major Professor
Dorothy A. Winsor, Co-major Professor
Lee Honeycutt
Carol Chapelle
Brad Shrader

Iowa State University

Ames, Iowa

2006

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Chapter 1: Introduction

Surveying the history of the university in the United States, Brint (2002) notes a marked change in recent decades: "the gradual shrinking of the old arts and sciences core of the university and the expansion of occupational and professional programs" in which "... activities considered ancillary in an earlier age have moved to the center and become the leading engines of growth" (p. 231). At the same time, though, the professions themselves have come under fire. Writing about the period from 1963 to 1981, Schön characterizes a world that sounds remarkably like ours in the first decade of the new millennium.

A series of announced national crises—the deteriorating cities, poverty, the pollution of the environment, the shortage of energy—seemed to have roots in the very practices of science, technology, and public policy that were being called upon to alleviate them. (Schön, 1983, p. 9)

And in terminology that is striking for its currency Schön goes on to state (p. 9):

Government-sponsored "wars" against such crises seemed not to produce the expected results; indeed, they often seemed to exacerbate the crises. The success of the space program seemed not to be replicable when the problems to be solved were the tangled socio-techno-politico-economic predicaments of public life. The concept of "technological fix" came into bad odor. (p. 9)

In the US, two of the most recent manifestations of this problem are the corporate scandals of Enron, WorldCom, Tyco and governmental scandal of the mishandling of intelligence about the (lack of) weapons of mass destruction in Iraq.

During roughly the same time of this expansion of professional education, another change, this one tied to the rapidly increasing power and connectivity of personal computers, has had consequences for the American university. The ability to place instructional materials on the World Wide Web has both expanded the potential audience for traditional universities' offerings and enabled the start-up of a number of distance-learning
organizations, many of which focus exclusively on providing professional education. Nevertheless, despite the new technology, traditional notions of classroom instruction inform many Internet-based courses, which are characterized by:

- Delivery of courses online, using course/content management systems (CMSs) like WebCT™ and Blackboard™, each of which is a shell that provides tools for placing existing course materials online and for emulating classroom interaction electronically and
- Repurposing of traditional learning materials for the Web (e.g., electronic textbooks, eBooks).

The central question of this dissertation springs from careful consideration of the aforementioned trends: Given the shifting emphasis of higher education toward what Brint calls a "practical arts" core (p. 232), how can institutions of higher education better use technology to educate professionals?

**Problems with Professional Education**

Two related criticisms have been leveled against professional education as it is currently enacted in colleges and universities. Both criticisms come, in part, from an examination of the nature of classroom education as it relates to what students will be doing in their lives outside of school. And both spring from considering the "authenticity" of school experiences, though on two levels: one intimately tied to the practices of a particular profession and one tied to the larger context in which those practices develop and are enacted.
Problems with teaching professional practices

The first criticism is generally conceived as a question of students developing an "appreciative system" for a particular profession. According to Gee (2003), an appreciative system is an understanding of and participation in the "set of goals, desires, feelings, and values in respect to the domain being engaged with" (pp. 96-97). One of the problems of traditional, classroom-bound professional education is that students don't have the opportunity to set and solve real-world problems in ways that will help them develop an appreciative system for their profession. Schön (1983), like other influential twentieth-century educational theorists including Dewey, Lewin, Rogers, and Kolb, focuses on what it means to be effective in professional/social practices is concerned with helping educators to teach professionals. Schön laments he sees as a crisis in the professions, caused, in part, by an education that focuses on "technical rationality," that is, "instrumental problem solving made rigorous by the application of scientific theory and technique" (p. 21).

This approach to problem solving—one vestige of the status accorded to the sciences in the traditional university—results in what several (Bransford et al., 1990; Collins et al., 1989; Engeström, 1987; Gladwin, 1985; Miettinen, 1999; Schank et al., 1993/1994) refer to as decontextualization or the "inert knowledge problem" (Bransford et al., 1990; Schank et al., 1993/1994, p. 307). When confronted with "messy" situations like the ones commonly encountered outside of school, students don't know how to apply knowledge they've gained in the classroom.

Technical-rational techniques can be applied to well formed problems like what you might see in a garden-variety textbook, but that they are lacking when it comes to
understanding the types of indeterminate situations professionals deal with on the job (and which most of us deal with in everyday life):

From the perspective of Technical Rationality, professional practice is a process of problem solving. Problems of choice or decision are solved through the selection, from available means, of the one best suited to established ends. But with this emphasis on problem solving, we ignore problem setting, the process by which we define the decision to be made, the ends to be achieved, the means which may be chosen. In real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling and uncertain. (Schön, 1983, p. 40)

Schön goes on to suggest that professional education needs to take a form in which students not only practice technical problem solving, but engage in the process of problem setting in which they practice formulating problems from indeterminate situations before applying technical-rational techniques. This process involves the practitioner "choosing and naming the things he will notice": "[t]hrough the complementary acts of naming and framing, the practitioner selects things for attention and organizes them, guided by an appreciation of the situation that gives it coherence and sets a direction for action" (Schön, 1987, p. 4).

Problems with teaching critical practices

The second criticism also springs from the move toward technical rationality, but is more specifically related to the role of school in developing critical citizens: individuals capable of reflection and critical action both in and outside of the workplace. Giroux (2001) notes that in the classical Greek world "education was seen intrinsically as political, designed to educate the citizen for intelligent and active participation in the civic community. . . [E]ducation was not meant to train" (p. 168). He goes on to observe that this visibility of the interaction among schooling, politics, and citizenship was lost "when educational theory and practice in the twentieth century shifted the philosophical basis of schooling from the
political to the technical" (p. 169). This emphasis on the technical has detracted from our ability to educate people as citizens capable of independent thinking and what Heller (1976) has called "civic courage": "a form of behavior in which one thinks and acts as if one lived in a real democracy. It is a form of bravery aimed at exploding reifications, myths, and prejudices" (Giroux, 2001, p. 116). It is, in short, the type of behavior that questions the status quo on many levels and that springs from thinking beyond the expediency commonly fostered by technical-rational approaches.

**Solutions for teaching professional and critical practices**

Throughout the past century reformers (most notably Dewey) have suggested solutions to the problems identified by the scholars above. These have generally taken the form of changing the way in which the world outside of school is represented in the higher-education classroom. In some cases these representations have been aimed at providing students with better appreciative systems (i.e., through case studies) and in others (i.e., through critical citizenship education) the aim has been to make students more aware of the political nature of life in society and at work. In each case, though, educators have made an effort to provide students with something that goes beyond a textbook representation of "the way things are." In each case, educators make an effort to enhance the classroom context by representing "other voices and other spaces" within the classroom.

Key to several of these efforts has been the development of instructional materials designed to immerse students in cultures similar to those in which they aspire to work and live after school. Brown, Collins, and Duguid (1989) note "the pervasive cultures [students] observe, in which they participate, and which some enter quite effectively are the cultures of
school life itself" (p. 34). They go on to characterize the activity that takes place in school as hybrid and argue that it is:

implicitly framed by one culture, but explicitly attributed to another. Classroom activity very much takes place within the culture of schools, although it is attributed to the culture of readers, writers, mathematicians, historians, economists, geographers, and so forth. Many of the activities students undertake are simply not the activities of practitioners and would not make sense or be endorsed by the cultures to which they are attributed. (p. 34)

To remedy this problem Collins, Brown, and Newman (1989) propose the idea of the "cognitive apprenticeship" in which traditional apprenticeship approaches like modeling, coaching, and fading (i.e., doing less and less for the student as she becomes more adept) are applied to the types of thinking that characterize various professions. Williams (1992) aptly summarizes their reasoning:

Because apprentices learn while using the same tools and materials that experts use while performing the same type of jobs that experts perform, they do not have to adapt their learning to a new situation once they complete their apprenticeship. (p. 370)

Thus a cognitive apprenticeship confronts students with problems more like what professionals face and leads to students and teachers inhabiting roles similar to those of apprentice and master—working together to solve problems—rather than note taker and lecturer or Freire's (Freire, 2003) "depositories" and "depositor" (p. 72).

Building on the notion of cognitive apprenticeship, Bransford et al. (Bransford et al., 1990) forward the idea of problem-oriented acquisition which is "the need to help people conditionalize their knowledge—to acquire knowledge in the form of condition-action pairs mediated by appropriate goal-oriented hierarchies rather than as isolated facts" (p. 120). Key to establishing these condition-action pairs is a representation of context (condition) that will enable students to apply the their knowledge when they experience similar conditions in the
future. Anchored instruction, they argue, provides just such a context and enables students to engage in problem setting and solving. This type of instruction has at its center an anchor or focus that generates interest and enables students to identify and define problems and pay attention to their own perception and comprehension of these problems. They can then be introduced to information that is relevant to their anchored perceptions. The major goal of anchored instruction is to enable students to notice critical features of problem situations and to experience the changes in their perception and understating of the anchor as they view the situation from new points of view. (p. 123)

Very often these anchors will take the form of a video, which introduces a scenario to students. According to Branford et al. video makes a good anchor because it provides much richer opportunities for noticing:

there is much more to notice than is true for books. The increase in opportunities for noticing [see Schön's problem setting above] is especially important for increasing the possibility for finding relevant issues that are embedded in the movie—it provides an opportunity to encourage problem finding and problem representation [see Schön's "framing" and "naming" above] (e.g., Bransford and Stein, 1984) rather than to always provide preset problems to students. (p. 124)

Schank et al. (1993/1994) forward the notion of a goal-based scenario (GBS) and believe that every school course can be structured around such a scenario. Specifically, Schank et al. define a GBS as

a type of learn-by-doing task with very specific constraints on the selection of material to be taught, the goals the student will pursue, the environment in which the student will work, the tasks the student will perform, and the resources made available to the student. For example, tasks such as composing a piece of music, designing a car, or starting a business each can provide the foundation for a GBS. (p. 306)

A GBS is different from anchored instruction in the following way:

In a GBS . . . the student becomes an active participant in the scenario. The student's motivation within a GBS is to move toward completing some task on his or her own behalf. We do not mean to imply that anchored instruction prevents students from assuming a participatory role within the simulation. Rather, we wish to highlight how central the student's role is in a GBS. GBSs and anchored instruction both have in
common the end goal of overcoming the inert-knowledge problem. However, anchored instruction attempts to provide opportunities for teacher-guided discovery, whereas GBSs strive to create environments in which target issues arise naturally in the course of pursuing the defined objective. (p. 307)

The student learns, then, as he or she "discovers a need to know in order to complete the current task" (p. 306). And while they note that computers are not necessary for the implementation of GBSs in classroom, Shank et al. are quick to add that "computers are particularly well suited for implementing GBSs because they may facilitate meeting prerequisite conditions that, although often difficult to achieve in the classroom, are necessary for the proper use of GBSs" (p. 306). Most recently, Gee (2003) and Aldrich (2004; 2005) have taken up the notion of the GBS as enacted in video games and have made explicit the link between computers and the ability to represent the contexts within which various goal-directed activities take place.

**Remediating Professional Education**

I locate my project within the preceding line of pedagogical thinking. For my study, I have built a content management system (CMS) called MyCase. While other CMSs like WebCT™ and Blackboard™ are designed to rapidly deploy course materials to the Web, MyCase enables instructors to create goal-based scenarios that include the multimedia elements Bransford et al. believe to be so important for developing conditionalized knowledge (Gee's appreciative systems). The goal-based scenarios created using MyCase take the form of Web portals\(^1\). These portals are designed to look like the interface a contemporary knowledge worker might confront upon logging into her computer at work. The portals contain:

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\(^1\) Wikipedia (2005) defines a Web portal as "a web site that provides a starting point, a gateway, or portal, to other resources on the Internet or an intranet."
• information sources—video footage of meetings, video/audio interviews with characters, access to organizational documents, access to an organization’s intranet and

• collaboration tools—discussion boards, polls, and surveys—which students can use to communicate with each other about the scenario.

Figure 1-1 shows what one of these portals, Omega Molecular, looks like.

Figure 1-1: Omega Molecular portal, an environment that seeks to achieve immediacy through hypermediacy.

Remediation

In this dissertation, I develop the notion of "remediation" as something that happens when we reconfigure—with the aid of Web technologies—professional education in hopes of improving students' ability to act in life outside of school applying the knowledge they gain.
from the classroom. Using the term "remediation" in this context, I’m following Bolter and
Grusin (1999) who note that remediation has been used by "educators as a euphemism for the
task of bringing lagging students up to the expected level of performance," but who go on to
adopt the word to explain the "double logic" of our culture which seeks to "erase its media in
the very act of multiplying them" (p. 5). Bolter and Grusin suggest that remediation is tied to
"our apparently insatiable desire for immediacy" (p. 5), for removing all evidence of
mediation to provide an experience of the pure presence of the object represented. This
immediacy, they claim, is achieved through hypermedia, of which any of a number of
television broadcasts in which "in the effort to be up to the minute and complete [i.e.,
immEDIATE], television news producers assemble on screen ribbons of text, photographs,
graphics, and even audio without a video signal when necessary" (pp. 8-9). The Web—with
its multi-windowed environment—is another obvious example. (See Figure 1-1 above for an
example of a hypermediated environment in which an organization's calendar, its CEO and
its file server are all represented.) Another example of Bolter and Grusin's conception of
remediation—immediacy achieved through hypermedia—appears on television sets across
the US every Sunday in the form of sports broadcasts, in which viewers are often transported
from inside a quarterback's helmet or driver's car to a point high above the stadium or track
all within a matter of seconds while all the while seeing graphics that show player/driver
statistics, the score of the game/running order of the race, and scores from other sporting
events around the world. For Bolter and Grusin remediation, comprised of immediacy and
hypermedia, relies on "the appeal to authenticity of experience," immediacy through
immersion and hypermedia through "the insistence that the experience of the medium is
itself an experience of the real" (p. 71).
In the portal depicted above, we can see immediacy and hypermediacy working simultaneously. First, like a video game, the environment purports to "be" the experience it represents. That is, the portal is designed to make students feel as if they are in an actual workplace. The portal achieves this effect, in part through its hypermediated design. That is, because many contemporary workers use Web portals of one type or another as they work, the hypermediated nature of the portal is indeed an experience of "the real." The portals we've created using MyCase characterize what one instructor who participated in the study has called an in-box genre. The hypermediated environment suggested to him the reality of a worker logging in each morning to check her email.

Beyond the nature of the representational media, however, this study also emphasizes that representational tools like the MyCase CMS and the "realistic" portals they enable cannot by themselves significantly change classroom education. Remediation—as I am developing it—requires us to consider other aspects of school-going activity, including the relationship between the instructor and the students, the community in which the classroom activity takes place, and the rules that help determine what actions take place in the classroom.

In the following section, I develop the idea of mediated action as a way of thinking about the relationship between the tools people use and the way those tools enable action within social contexts.

**Mediated action**

In this study I go beyond Bolter and Grusin's notion of remediation by bringing in the concept of tool mediation, specifically mediated action as developed by cultural-historical psychologists (Vygotsky, Leont'ev, Luria, Cole). Cultural-historical psychology posits that "the structure and development of human psychological processes emerge through culturally
mediated, historically developing, practical activity" (Cole, 1996, p. 108). Central to this activity are a community's tools or artifacts².

According to Cole (Cole, 1996):

Culture . . . can be understood as the entire pool of artifacts accumulated by the social group in the course of its historical experience. In the aggregate, the accumulated artifacts of a group—culture—is then seen as the species-specific medium of human development. It is "history in the present." The capacity to develop within that medium and to arrange for its reproduction in succeeding generations is the distinctive characteristic of our species. (p. 110)

Schooling is one means humans have created for passing our knowledge of culture on to succeeding generations, that is, for teaching our children to use our tools. As we lean to master these tools, we become members of society. Luria (1928) states:

The transition to civilized habits of conduct is thus reduced to the alteration in the main scheme of behavior; instead of applying directly its natural function to the solution of a definite task, the child puts in between that function and the task a certain auxiliary means, a certain manner, by the medium of which the child manages to perform a task. (p. 495)

One good example of a natural function as compared to an auxiliary means (tool-mediated means) comes from Luria's (1928; 1978) experiments with memory and writing. If we are read a lengthy list of numbers and asked to remember them and repeat them back in order, most of us will not be able to do so with good accuracy. However, if we are provided with a pen and paper (and have learned some type of numbering system) we can simply write down the numbers as they are dictated and can thus repeat them back with perfect accuracy. Thus between the natural function of memory and the task at hand we place several auxiliary means (including pen, paper, and numbering system) that help us complete the task with greater efficiency.

² In this discussion, I use tools and artifacts interchangeably.
Figure 1-2 shows this relationship.

![Diagram](image)

**Figure 1-2:**  
"The basic mediational triangle in which subject and object are seen not only as 'directly' connected but simultaneously as 'indirectly' connected through a medium of artifacts / tools (culture)" (Cole, 1996, p. 119).

It is important to remember, however, that the mediated action does not replace the natural one. We still rely on our "natural memory" to remember the number as dictated before writing it down on the paper. The "mediated memory," however, enables us to "remember" more items for a much longer period of time. Cole (Cole, 1996, p. 119) emphasizes:

. . . the emergence of mediated action does not mean that the mediated path replaces the natural one . . . One does not cease to stand on the ground and look at the tree when one picks up an axe to chop the tree down; rather, the incorporation of tools into the activity creates a new structural relation in which the cultural (mediated) and natural (unmediated) routes operate synergistically; through active attempts to appropriate their surroundings to their own goals, people incorporate auxiliary means (including very significantly, other people) into their actions, giving rise to the distinctive, triadic relationship of subject-medium-object. (p. 119)

**School as tool**

As cultural artifacts, the tools that mediate human activity are already there, and each generation doesn't have to take the time to reinvent them, though the tools may be changed
by altered conditions of use or technological innovation. What people do have to do, though, is learn how to use the tools by entering into relations with other people who already know how to use them. This interaction results in the acquisition of the social motives shared by the community (Gee's appreciative systems) and inscribed in the tool. As Leont'ev (1981) observes:

humans do not simply find external conditions to which they must adapt their activity. Rather these social conditions bear with them the motives and goals of their activity, its means and modes. (pp. 47-48)

One of the purposes of school, then, is to provide humans with the tools—and the motives and goals inscribed therein—that people have developed over centuries for performing the tasks that enable our species to continue. As Cole (Cole, 1996) suggests:

human beings arrange for the rediscovery of the already-created tools in each succeeding generation. Becoming a cultural being and arranging for others to become cultural beings are intimately linked parts of a single process of enculturation. (p. 109)

I certainly am not the first to observe, then, that school acts as a tool for enculturation. If we think about school in this way, that is, as a tool for enculturating students, we can see it as mediating the relationship between students and their participation in other activities, like work. Figure 1-3 shows this relationship.
Figure 1-3: Basic mediational triangle with school as the mediator between the student and the world of work. School prepares and enables students to act on/in the world.

Critics (see above, e.g., Shank; Brown, Collins and Duguid; Collins, Brown, and Newman; Bransford; Gee; Aldrich) of (professional) education have noted that in the way schooling is currently enacted, students are deprived of experiences in which the motives and goals of tool use are those of the communities in which the tools are created and plied. As Brown, Collins, and Duguid (Brown et al., 1989) observe:

Learning how to use a tool involves far more than can be accounted for in any set of explicit rules. The occasions and conditions for use arise directly out of the context of activities of each community that uses the tool, framed by the way members of that community see the world. The community and its viewpoint, quite as much as the tool itself, determine how a tool is used. . . . Because tools and the way they are used reflect the particular accumulated insights of communities, it is not possible to use a tool appropriately without understanding the community or culture in which it is used. (p. 33)

Generally during classroom instruction students do not have the opportunity to operate as if they were members of the artifact-creating or artifact using community that they are studying or preparing to enter. In such environments, students are deprived of two things. First, as I have noted, they miss out on the opportunity to learn the tools of their profession in an environment similar to the one in which they will apply them and second, they find
themselves in an environment in which they might talk a good deal about reflection and critical action, but an environment that provides little opportunity to practice in such reflection and action.

**Remediated school aided by reconfigured tools**

Remediation of professional classrooms results in what Schön (1987) calls "a virtual world, relatively free of the pressures, distractions, and risks of the real one, to which, nevertheless, it refers" (p. 37) or what Newman, Griffin, and Cole (1984) call practicing a "whole task," which includes a representation of the social context from which an task arises and within which it is undertaken:

A "whole task" thus becomes specifically a task considered in the context of the activity or higher-level goals that motivate it. Whenever there is a task, there is always a whole task. But in some settings, like the laboratory, the classroom, or wherever there is a hierarchical division of labor, the higher-level goals may not be under the actors' individual control. In other cases, the actors formulate the instrumental relation between the goal of the task and the higher-level goal they are primarily trying to achieve. (p. 191)

Part of this world is evoked by what amounts to a CMS reconfigured so that students using it do so in ways and for reasons like those for which such systems are used outside of school.

By itself, however, the introduction of such a tool into the classroom cannot remediate the educational experience. The introduction of portals like the ones we have developed do, however, provide affordances for instructors and students to engage in social relationships closer to those that characterize the cultures they seek to enter. The activity-theory approach that I take in this dissertation and for which I have briefly set the foundation in the preceding discussion of mediated action, emphasizes that we need to consider not only the world represented by the tool, but also the rules of the classroom and the division of labor between instructor and students, both of which help determine the roles these people play and thus the
social environment in which they participate. I develop the groundwork for this approach in
the following section.

The Classroom (Course) Activity System

As its name suggests, activity theory emphasizes social context by including it in its basic
unit of analysis, the activity. The following sections describe this unit of analysis and how
we can think about classroom work in terms of the theory.

Individual level

Activity theory has at its center a model of mediated action (like I discussed in the
previous section) in which we consider specific people (subjects) and the tools (or artifacts)
these people use to "get things done" (transforming an object into an outcome).

Activity. Activity theory takes its name from the constellation of people, tools, actions, and
relationships it holds as the minimal meaningful unit of analysis—the activity. As I
mentioned above, activity theory holds that context is as important as human action when it
comes to analyzing real-life (i.e., outside the psychology laboratory) situations. As Kuutti
notes:

[a]n activity always contains various artifacts (e.g., instruments, signs, procedures,
machines, methods, laws, forms of work organization). An essential feature of these
artifacts is that they have a mediating role. Relations between elements of an activity
are not direct, but mediated; for example an instrument mediates between an actor
and the object of doing; the object is seen and manipulated not "as such" but within
the limitations set by the instrument. (p. 26)

Thus activity theory has important implications for the way we understand tool use in
context. Specifically, activity theory suggests that using one tool rather than another or using
one particular tool in different ways impacts each aspect of the activity system. Within this
dissertation, then, I hope to show how the reconfiguration of a CMS so that it is used more
like such tools are used in the workplace not only impacts students' perceptions of the things they are doing in class, but creates an environment in which students confront and work through the "messy" situations professionals confront.

In Figure 1-4, what we might call a common classroom activity system, the students and the teacher are the subjects working together to transform course content (i.e., various "opening texts" including textbooks, lectures, PowerPoint slides, etc.) into course outcomes (i.e., various "closing texts" including completed quizzes and tests, essays, assessments, and grades).

![Image of a diagram](https://via.placeholder.com/150)

**Figure 1-4. Classroom activity system (individual level)**
In this depiction I show that students' and teachers' (subjects') work on course materials (object) is mediated by a content management system (tool or artifact).

**Actions.** The work of transforming these opening texts to closing texts (what I am calling the transformation process) involves various actions, like viewing lectures, taking notes, and working problems. These actions have an immediate goal, like preparing for a test. But as Kuutti points out, "[t]he actions cannot be understood . . . without the frame of reference of the corresponding activity" (p. 30), in this case "going to school" or "schoolgoing." Thus actions are taken under the umbrella of an overarching motive for participating in the
(schoolgoing) activity system—for the students I studied, learning job skills or obtaining a credential that will enable employment.

**Operations.** Finally, operations like typing, cutting and pasting text, downloading files, punching in numbers on a calculator, and filling in bubble sheets require less conscious effort than actions. While they were actions at one time (that is they required conscious effort) over time they have become almost automatic thanks to practice and internalization. Figure 1-5 shows how actions and operations comprise the transformation process of the classroom activity system.

![Diagram of Classroom Activity System](Image)

**Figure 1-5. Classroom activity system (individual level)**
In this depiction I show that students' and teachers' (subjects') work on course materials (object) is mediated by a content management system (tool or artifact). The arrows from the Tool to the Actions/operations and from the Actions/operations to the Transformation process are included to emphasize the mediational nature of the tool. That is, the tool's affordances and constraints shape the actions and operations available to subjects seeking to transform the object.

Though Jonassen (2000) argues that this individual level "is generally regarded as the most important, because in the production processes, the object of the system is transformed into the outcome " (p. 99), a good deal of the descriptive power of activity theory comes from
its consideration of various aspects of context that shape and are shaped by the actions taking place at the communal level.

Indeed, one group of scholars (Adam, Dias, Freedman, Medway, Smart and Paré) makes the need to consider social environment very clear by challenging the idea that simulations (which they define as text-based case studies requiring students to produce "real-world" written products and accompanied by some "real-world" behaviors like wearing suits to class) can enable students to develop appreciative systems (an understanding of and participation in the activity's social motive) that are aligned with the domain they are studying.

**Communal Level**

Figure 1-6 shows the structure of an entire activity system. Note the additional elements—rules, community, and division of labor—considered when studying the actions of people using tools. In the succeeding chapters, I will show how the deployment of the MyCase portals in the classroom impacted both the students' and the teachers' perception of the classroom community, including rules and division of labor.
**Division of labor.** Division of labor refers to the way the members of the community divvy up the tasks involved in transforming the object of the activity into the outcome. This division is both horizontal "between cooperating members of the community" but also a "vertical division of power and status" (Jonassen, 2000, p. 102). We can think of this division of labor in terms of roles that participants in an activity play. For example, in the classroom teachers have traditionally wielded the most power, which includes assigning students work and telling them how to do it (vertical). Teachers have also engaged in different types of work than students (i.e., lecturing and grading) (horizontal). Thus, these actions have come to define the role of teacher as it is perceived by members of the community.
**Rules.** An activity's division of labor is enabled and perpetuated by its rules. Rules are the implicit and explicit norms and conventions of a community. Rules include laws, policies and conventions as well as social norms. In the traditional classroom rules range from those for academic honesty (i.e., "doing your own work" and "citing sources appropriately") to those for classroom behavior (i.e., "doing the work assigned by the teacher" and "attending class every day").

**Community.** The community is the group of people that "negotiates and mediates the rules and customs that describe how the group functions, what it believes, and the ways that it supports different activities" (Jonassen, 2000, p. 103). For the university classroom the immediate community is the teacher and the students; however, the community also includes administrators, parents, etc.

In the remainder of this paper, then, I use activity theory to inform my investigation of how changing classroom context through the use of CMS-based technologies (like the Web-based portals we have created) affects roles teachers and students play in the classroom as well as students’ perception of their learning. Each chapter in this portfolio centers on its own research question (related to the central question of how we can better use technology to educate professionals) as it explores the impact of remediation on students and instructors in professionally oriented classrooms.

Because this is a portfolio-style dissertation, each of Chapters 2, 3, 4, and 5 has its own specific research question, which is related to the central question of the dissertation as a whole: How might we better use technology to prepare students for their lives outside of school? Also because this dissertation is a portfolio, each chapter begins with a short introduction in which I 1) suggest to which journal(s) I will submit all or part of the chapter
and 2) what type of revision from the current form will be necessary before making that submission.

Table 1-1 provides a chapter-by-chapter overview of the research questions.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 2</td>
<td>Why can we consider the portals &quot;games&quot; and how does the way these games work enable simulation of extra-classroom situations?</td>
</tr>
<tr>
<td>Chapter 3</td>
<td>In what ways and for what reasons do teachers and students in a senior-level management course see the work they undertake within the portals as similar to or different than the work they have undertaken within:</td>
</tr>
<tr>
<td></td>
<td>• Traditionally configured CMSs (e.g., WebCT™),</td>
</tr>
<tr>
<td></td>
<td>• Traditionally narrated case studies, and</td>
</tr>
<tr>
<td></td>
<td>• Internships and coops.</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Based on an instrument designed to measure how closely students perceived their work in a professional writing course as resembling the characteristics of workplace writing ascribed by Adam, Dias, Freedman, Medway, Smart and Parè, how does a class specifically designed to simulate these characteristics through computer simulation compare with a similar course that used computer technology and cases, but not simulation?</td>
</tr>
<tr>
<td>Chapter 5</td>
<td>How do students respond to affordances provided by the simulations for reflection and critique and what do these responses suggest about the relationship between &quot;playful&quot; representations of dominant social practices and the actual practices represented?</td>
</tr>
<tr>
<td>Chapter 6</td>
<td>What implications do these findings have for development of CMS-based activities designed to engage students in their learning and prepare them for work outside of school?</td>
</tr>
<tr>
<td>Chapter 7 (Epilogue)</td>
<td>What are the technical specifications of the CMS developed for this project?</td>
</tr>
</tbody>
</table>

References


Chapter 2: Making it "real": Web portal as game/simulation

Preface

Writers like Pardoe and Gee have conceptualized learning and transfer in terms of student attribution of professional significance to classroom actions (Pardoe) and the ability of the learning environment to provide students with a medium in which they can "form the sorts of goals, desires, feelings, and values that 'insiders'" in a particular domain recognize as characteristic of that domain (Gee, 2003, p.97). Gee calls this "insider's view" of a domain its "appreciative system." Pardoe's and Gee's ideas represent contemporary views on learning and transfer, specifically those that argue that what is learned or "transferred is not knowledge from task to task but patterns of participatory processes across situations" (Tuomi-Gröhn & Engeström, 2003, p. 25).

In this chapter, I draw on Aldrich's (2004; 2005) ideas about the three essential types of simulation content—linear, cyclical, and open-ended—to show how we developed portals designed to immerse students in environments we hoped would help them develop appreciative systems for a particular professional practice and attribute significance beyond the classroom to the actions they undertook in the classroom. In each section I describe how we developed the portals with the goal of providing classroom experiences different than those afforded by 1) traditional (Harvard) case studies and 2) traditional configurations of educational CMSs.

Since my defense, I have submitted a version of Chapter 2 to Computers and Composition. To ready the chapter for submission, I removed the information about the management course (Agile portal) and concentrated solely on the technical communication courses (Omega portal). I did so because it was in the technical communication courses that
the document cycling process documented below saw its fullest realization, and this process is an important part of my characterization of "cyclical content." Finally, I removed description of three tools—the poll tool, the reference library tool, and the discussion board—whose use in the portals somewhat resembles the use they serve in a traditionally configured CMS.

**Introduction**

As I defined it in the previous chapter, remediation is the attempt to provide for students and instructors a sense of situational immediacy by using Web technologies in the professional classroom. Considered in a school environment, remediation is a curricular activity that can help "recontextualize" problems offered to students. I suggested that in remediating traditional cases—themselves a tool for introducing extra-university situations into the classroom—we hoped to provide students with additional motivation for undertaking classroom tasks. This motivation, we believed, would spring from their attribution greater professional significance to the work they undertook within the portals than to their work at traditional "schoolgoing" activities, especially schoolgoing as it is conceived by Engeström (1987), Brown, Collins, and Duguid (1989), Schank, Fano, Bell, and Jona (1993/1994).

In this chapter, I document two products of our remediation efforts, the Omega Molecular portal³ and the Agile Consulting portal and show how they were deployed in such a way as to help students develop what Gee (2003) calls appreciative systems, that is, an understanding of and participation in the "set of goals, desires, feelings, and values in respect

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³ In the discussion that follows, we will refer to the individual cases created with MyCase as either cases or, when referring to their electronic incarnation, as portals. So, for instance, the Omega case is housed in the Omega portal; the Agile case is housed in the Agile portal. These portals make a number of tools available to case participants (e.g., video libraries, document-sharing, chat, etc.).
to the domain being engaged with" and thus potentially increase motivation and attribution of professional significance (which, in Chapter 3, I associate with "transfer") (pp.96-97).

**Appreciative Systems and Attribution**

In his book *What Video Games have to Teach us About Learning and Literacy*, Gee (2003) asks:

> When the child acts and reflects, probes the world and gets a result, on what basis does the child determine the "significance" and the "acceptability" of the result? The very form of this question makes it clear that children must evaluate the answer coming back from the world, must determine whether they "like" it or not, whether it is "good" or not from their perspective. Otherwise, why use the answer in their reflections and subsequent interactions with the world, and indeed, in their own minds as they build up their mental networks of associations? (p. 96)

He goes on to state:

> Expert practitioners in a semiotic domain—whether teaching, science, law, business, architecture, art, or what have you—have to form an appreciative system relevant to that domain in terms of which they can evaluate action (probes) in the domain. That is, they must form the sorts of goals, desires, feelings, and values that "insiders" in that domain recognize as the sorts members of that domain (the affinity group associated with that domain) typically have. (p. 97)

Along the same lines, Pardoe (2000) suggests that how students assign significance to the content they encounter in class has much to do with whether they in Gee's words "like" it or find it "acceptable" given their purpose for engaging in the schoolgoing activity. He states:

> attribution is a very fundamental process of assigning significance to an activity or experience. If the tutor or students attribute an activity or experience to the wider profession, they will see it as significant insight and learning. If they attribute it to the 'here and now' of the course, they will see it as not worthy of inclusion in their professional text. This attribution is therefore central to students' developing understanding and learning, and to their writing. (p. 131)

Gee's and Pardoe's ideas represent contemporary views on learning and transfer, specifically those that argue that what is learned or "transferred is not knowledge from task to task but patterns of participatory processes across situations" (Tuomi-Gröhn & Engeström,
2003, p. 25). In this emphasis they are similar to rhetorical theorists like Thomas Miller and Carolyn Miller. T. Miller (1991), centering his discussion specifically on writing instruction, suggests:

To become an experienced professional, the individual must learn the "common sense" of the professional community—the common assumptions and practical good sense that an individual gains while learning how to work from the community's shared assumptions to address the problems of the field. . . . The limitations of formulaic approaches to written products and processes are strikingly apparent outside of the classroom because problems and audiences have histories . . . (p. 58)

In this statement he echoes C. Miller's (1984) seminal article in which she emphasizes the situatedness of communication by conceiving of genre as "more than a formal entity" for classifying textual features (p. 153). Miller states:

Situations are social constructs that are the result not of "perception," but of "definition." Because human action is based on and guided by meaning, not by material causes, at the center of action is a process of interpretation. Before we can act, we must interpret the indeterminate material environment [note how she echoes Schöen's notion of problem setting or framing here]; we define or "determine," a situation. (p. 156)

According to Miller, this determination is helped along by an attribution of "types" we assign to situations in which we find ourselves: "What recurs is not a material situation (a real, objective, factual event) but our construal of a type" (p. 157). She elaborates on this concept of types using Schutz and Luckmann:

It is possible to arrive at common determinations of material states of affairs that may have many possible interpretations because, as Alfred Schutz has argued, our "stock of knowledge" is based upon types: "We can . . . imagine a type to be like a line of demarcation which runs between the determinations explicated on the basis of the 'hitherto existing' relevance structures . . . and the . . . unlimited possibilities for the determination of experience" (Schutz & Luckmann, 1973, p. 231). In other words, our stock of knowledge is useful only insofar as it can be brought to bear upon new experience: the new is made familiar through the recognition of relevant similarities; those similarities become constituted as a type. A new type is formed from typifications already on hand when they are not quite adequate to determine a new
situation. If a new typification proves continually useful for mastering states of affairs, it enters the stock of knowledge and its application becomes routine. (p. 157)

Miller emphasizes, however, that as we gain more experience in particular domains, our stock of knowledge is usually enough to get us through most of the situations we "define" during our day-to-day life in the world.

The Simulations

One of our chief goals in developing portals with the MyCase software has been to create environments in which students can develop some idea as to what it feels like to participate in discourse-demanding contexts outside the classroom: to provide them with the means of, in C. Miller's words, creating new types or, returning to Pardoe, providing them with an opportunity to attribute professional significance to the activities they undertake in the classroom. We believe these portals are fundamentally different from what is commonly called e-learning today. Omega Molecular and Agile Consulting are not self-study titles, nor are they simulations in which students work to optimize behaviors in order to "win" at some activity (e.g., make more money than other teams). Instead, we designed these portals to enable students and instructors to inhabit roles different than those they inhabit in traditionally mediated classroom situations, roles that, we hoped, would facilitate the development of appreciative systems by enabling teachers and students to take part in social activities that resemble those that characterize various semiotic domain(s). The chapters that follow are a first step toward determining whether and to what extent we achieved these goals, using students' and instructors' perceptions of their work within the simulations.

At the same time, we also hoped to create an environment that promoted activity different than what might result from a monolithic representation of business practices within the
university classroom (for a discussion of the problems with the "tyranny of the 'real,'" see Herndl (1993)). We wanted to create an environment in which students could "develop the capacity to speak up, to negotiate, and to be able to engage critically with the conditions of their working lives" (The New London Group, p. 67). In short, we have worked to create an environment in which instructors and students can engage in open discussion about the attributions made to various activities undertaken during immersion in the cases. It is in these frank discussions about the "reality" or "authenticity" of the situations and the activities students undertake that I locate the chief difference between practices undertaken within a remediated classroom and those undertaken on the job. We hope that these portals provide a better tool than textbooks, courses deployed online, or even traditionally narrated cases to, as Pardoe states, "make explicit for students the implications of the professional scenario" (p. 144) in which texts are generated, circulated, exchanged, and consumed.

What follows, then, is a brief description of two cases/portals we developed, deployed, and studied. I begin by briefly describing the courses in which the portal was used. I then move to the central project of this chapter, which is to show how the portals created with the MyCase software provide simulation or game-like affordances designed to evoke an appreciative system. These affordances are different than affordances provided traditionally configured educational CMSs or by traditional case studies.

Omega: The company

We studied the use of the Omega portal in a one-semester course entitled Technical Communication. The course focuses on theories, principles, and processes of effective oral,  

4 On the job, questioning the "authenticity" or "value" of particular work assignments is often seen as subversive. One only needs to turn to the comic pages to see representation of such situations in "Dilbert." De Certeau (de Certeau, 1984, p. 25) has a fascinating discussion of la perruque or "the wig," which amounts to a worker doing something for him or herself while on the job, rather than assigned work for the employer.
written, and visual communication in the technical disciplines. I instructed the sections studied in this dissertation.

Omega Molecular is a small, privately-held biotechnology company that produces a fungal-resistant variety of Golden Rice and various strains of pharmaceutical corn. The organization has several patents and a genetic engineering process called the Omega Targeted Ecosystem Program (O-TEP) that enable them to quickly engineer desirable qualities into native plant varieties. Students play the role of information-design consultants as they interact with case materials. During their consulting engagement they confront a number of issues including:

- Discrepancies between what company officers say in public forums and the scientific data (or lack thereof) that informs their messages,
- Issues of intellectual property and their relationship to humanitarian and/or for-profit activity,
- The need to assemble a coherent story about the company and its current situation based on information provided in the form of artifacts and to subsequently adapt that story for various audiences and purposes (e.g., requests for financing for humanitarian projects vs. requests for investment dollars), and
- The continual changing of information available within the portal due to events triggered within the portal as well as events that take place in the "outside world\(^5\).

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\(^5\) An example of the latter is when (Spring, 2004) the global agribusiness company Syngenta decided to make Golden Rice available for free for humanitarian efforts. This event had a huge impact on the Omega case, as one of Omega's products is vitamin-A-enriched rice.
Figure 2-1
Omega Portal. Each choice in the left-hand menu leads to a tool that commonly appears in a Content Management System (CMS). Messages of the day appear in the space on the right. These messages are either generated automatically by the system or added by instructor. In either case, they require immediate attention from case participants. In this case the message of the day comes from CEO Kurt Danzer and requests that students consider the impact of a current event on Omega.

Table 2-1 shows the assignment sequence that was used with the Omega portal during the semesters of the study.
Table 2-1: Omega Immersion—Written/Oral Assignments

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Characteristics</th>
<th>Format/Genre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Define and/or describe a tool/process involved with genetic engineering</td>
<td>(Individual) Incorporation of at least one graphic</td>
<td>Definition for web glossary designed for Omega newcomers</td>
</tr>
<tr>
<td>2 Create a team charter/project plan</td>
<td>(Group) Task identification; time estimation</td>
<td>Memo for team lead (instructor)</td>
</tr>
<tr>
<td>3 Summarize/synthesize scientific findings</td>
<td>(Group) Using various tables and lab reports provided in the learning environment</td>
<td>State-of-the-company report</td>
</tr>
<tr>
<td>Summarize/synthesize financial situation</td>
<td>(Group) Using financial statements and “testimony” provided in the learning environment</td>
<td>State-of-the-company report</td>
</tr>
<tr>
<td>4 Create a product/process data sheet</td>
<td>(Individual)</td>
<td>Datasheet for audience interested in learning about/buying process/product; Or investor bulletin for venture capitalist interested in investing in the company</td>
</tr>
<tr>
<td>5 Develop and deliver an oral report about political and agricultural conditions in a Southeastern Asian country</td>
<td>(Group) Accompanied by PowerPoint presentation</td>
<td>Videotaped presentation to be available on the corporate intranet</td>
</tr>
<tr>
<td>6 Create a proposal or business plan</td>
<td>(Individual)</td>
<td>Proposal directed at funder (RFP available in learning environment) / Business plan directed at potential investor (document criteria available in learning environment)</td>
</tr>
<tr>
<td>7 Develop a public Web presence for Omega</td>
<td>(Group) Display and defend in front of class (characterize major argument(s) and how they are rendered in structure and content of site)</td>
<td>Web site for the public</td>
</tr>
<tr>
<td>8 Wrap-up report</td>
<td>(Group/Individual) Actual vs. Budget assessment; self assessment</td>
<td>Project post mortem in which students do actual vs. budget analysis on the time they projected they would spend working the project vs. the time they actually took</td>
</tr>
</tbody>
</table>

**Agile: The company**

We studied the use of the Agile portal in a one-semester capstone course in management, entitled Strategic Management. The course focuses on strategy formulation, implementation, and evaluation and control in contemporary organizations. The course emphasizes strategic planning and decision-making using the case method or other projects.
Agile Consulting is a transportation consulting company, specializing in automotive, heavy, and mass transit. The goal of students is to help build the organization's expertise about the global motorcycle market as well as advise Agile's clients about decisions surrounding entry and continued presence in the motorcycle market. One of these "clients" is the Iowa- and Minnesota-based Polaris Industries, a company that in 1998 introduced a cruiser-type motorcycle that posed direct competition to Harley-Davidson. Figure 2-2 shows the Agile portal.

![Agile Portal](image)

**Figure 2-2**  
**Agile Portal.** The interface, though not the content itself, is very similar to the Omega portal.

As it is currently embodied, the case includes three or four "intervention points"—i.e., times within the chronology of the case, 1998-present, at which the students playing the role
of Agile consultants get involved and contribute information or make decisions. Polaris is introduced to students in 1998 initially as Company B, one of four Agile clients who are seeking advice about whether or not they should enter the domestic motorcycle market and, if so, with what type of product.

These intervention points span from early 1998 to the present day. A brief description of these intervention points appears in Table 2-2.

<table>
<thead>
<tr>
<th>Case Date (Stage)</th>
<th>Key activity</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring, 1998</td>
<td>Decide what an entrant into the US motorcycle market might look like</td>
<td>Generic entrant-profile memo</td>
</tr>
<tr>
<td>Spring, 1998</td>
<td>Recommend whether or not one of four possible entrants should enter the US market</td>
<td>Recommendation memo</td>
</tr>
<tr>
<td>Spring, 2000</td>
<td>Contribute to Agile reference library by characterizing Polaris's decision to enter the cruiser market</td>
<td>Case brief</td>
</tr>
<tr>
<td>Present Day</td>
<td>Given that Polaris successfully entered the domestic market, evaluate the decision and recommend a course of future action</td>
<td>Post-mortem and recommendation memo</td>
</tr>
</tbody>
</table>

I now move on to show how we attempted to design the portals to provide simulation or game-like affordances in hopes of enabling students to develop appreciative systems for professional activities. To accomplish this task, we worked to remediate the classroom activity system so that it might provide access to the tools and operate according to the rules and division of labor that characterize the professional activities we sought to simulate. As I proceed, I also attempt to show how these portals provide and experience different than 1) traditionally configured CMSs like WebCT™ and 2) traditionally narrated case studies.

**Three types of content**

In his book *Simulations and the Future of Learning: An Innovative (and Perhaps Revolutionary) Approach to e-Learning* (2004), Aldrich posits a model of three types of
content—linear, cyclical, and open-ended—that when used together, he claims, contribute to building an environment that engages learners by immersing them in life-like situations. Linear content is the one we're most familiar with. Books, movies, and lectures are all examples of linear content. Aldrich suggests that the sets of most computer games are linear, that is, "the fields or buildings or roads or bridges never change, except for maybe a door opening or lights flashing" (p. 24). Cyclical content is vehicle by which game players learn something that can be mapped to a "real" activity. As such it is the cognitive/motor centerpiece of a simulation. It is what the player does each time she returns to the game. For example, in a flight-simulation game, the cyclical content provides the illusion that one is flying a plane. In a strategy game like Caesar III where the player assumes the role of a "disembodied, high-level general-type" the cyclical content forces the player to "balance numerous, often-competing tasks such as resource gathering, production, research, consolidation, and expansion" (p. 62). Finally, open-ended content enables players to try different approaches and achieve different outcomes each time they return to the game. Aldrich suggests that we can measure open-endedness by looking at the potential solutions to the problems posed in the game: the more open-ended the game, the greater variety of potential solutions (p. 28).

As Aldrich points out, there are a number of videogame genres: fighting games, driving and racing games, puzzle games, platform games, adventure games, role playing games, sports games, first- and third-person shooters, and strategy games, just to name a few. Each

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6 Aldrich acknowledges an issue that we'll talk more about in Chapter 4, that is, the tendency of educators to simply repurpose their linear content for display on a website: The instinct of any simulation designer is to repurpose the existing course material from academic and organizational classrooms into these three categories. However, most of the content that we have taught traditionally . . . has no cyclical or open-ended counterpart. (p. 29)
of these genres, in turn, employs the three content types in different ways and to varying degrees. Interestingly, as Aldrich and his development team considered each of the preceding game genres (with their own particular instantiations of and mixes of linear, cyclical, and open-ended content) as vehicles for their own simulation, they came to the conclusion that "because the content has to reside at all three levels—cyclical, linear, and [open-ended]—we will all have to build completely new genres to populate the world of educational simulations" (p. 64).

Such was certainly the case for our development team as we wrestled with ways to immerse students in situations that would enable them to practice social activities that characterize life and, specifically, communication situations outside of the classroom. As we thought about what we wanted our students to do when they interacted with the portals we were developing, we came to the conclusion that, to an extent, we were building an educational strategy game, in which individuals and groups would confront multiple demands and multiple tasks simultaneously and produce communication (act) required by these discourse-demanding situations. While one group of the students we studied would be leaving school in hopes of obtaining management positions, they would, we believed, not find themselves in a subjectivity afforded by a game like Caesar III (a disembodied general with well-organized and neatly represented and abstracted information about the world around them), but would rather find themselves engaged in the cyclical process of dealing with a number of different workplace texts, even as they made their own contribution to this document universe. Our students were to be the ones "on the ground," making sense of an organization from within. As a result, our linear content (the set for our drama) had to
include a number of (what I defined in Chapter 1 as) authentic opening documents or texts like what a consultant might face—all at once—upon gaining access to an organization.

The next three sections describe the instantiation of and mix of linear, cyclical, and open-ended content that make up the two portals whose use is documented in this dissertation.

**Linear content (Opening texts)**

We are all used to linear content. In fact, most of what currently counts as educational material is comprised of linear content, including e-learning deployed in CMSs like WebCT. Books, videos, lectures, and documents are all examples of this type of content.

Figure 2-3 shows how we can think of this linear content in terms of the classroom activity system. In the case of a traditional classroom or of traditional classroom practices mediated through an educational CMS like WebCT™, this linear content takes the form of lectures, notes, PowerPoint slides, etc. During the school term, students and teachers work to transform this material into the "closing texts" of the course (completed tests and quizzes, grades, essays, etc.)
Linear content also plays a key role in the Omega and Agile portals. However, as opposed to textbooks repurposed for the Web or traditional lectures captured on video for delivery over the Web, the linear content of the MyCase portals—the "set," if you will—is composed chiefly of artifacts transplanted from contexts outside the classroom, from the contexts we hope to evoke during the simulation experience.

To that end, we developed what we later began calling the inbox game genre. The name for this genre was coined by the instructor who used the Agile portal with his management classes. He came up with the term inbox because students using these portals confront an interface much like the one they would face when working on their computer within a contemporary knowledge-intensive organization. They go to work (i.e., the portal), login, and gain access to the latest organizational happenings, shared file spaces, and organizational calendar. As one student observed when asked "do you feel that the on-line case environment, helped or hindered your learning in this class?":

I think it helped a lot. Because, I mean, it’s one thing to come into class and attempt to say, okay now you are in a business, you know. But I mean, and you don’t go to the building. You don’t go to the building for the business, you don’t go and convene all in one room. I mean, we’re all over the place, I mean, the web site was kind of like the location, sort of, where everybody combined, and that kind of brought us together as a company, I think. So, all the company data was there, we would share files there, sort of brought it all together, whereas without it I don’t think I would have felt like I was in the company, and I don’t think I would have treated it as a company. And acted like that, if it wasn’t there, so I think it helped. (TC, p. 101)

This set, or linear content, became the students' workplace. Within the portals we took every opportunity to "contextualize" information spaces so they evoke a workplace, rather than a classroom. So, a tool like the one in Figure 2-4 that might be used to inform a conventionally conceived class about upcoming assignments, becomes an organizational calendar that
indicates upcoming meetings and provides clues as to what students/consultants must do to prepare.

<table>
<thead>
<tr>
<th>Mon</th>
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</tr>
</tbody>
</table>

**Figure 2-4**

Calendar of Events. Assignments arise from "workplace" exigencies (e.g., Director of Marketing preparing a glossary for new hires, CEO going to venture capital seminar, Director of Marketing going to trade show).

Within the Omega portal these clues also take the form of video footage of one or more organizational employees explaining what they see as the need for a particular document or other type of communication. Each of these sets of videos is also supplemented with a more formal work order issued by one of the characters from the organization. Figure 2-5 shows a video/work order assignment set.

**Friday, 11 February 2005**

Directors' meeting - State of the company memo/report
Link to work description
Figure 2-5

Omega Assignment “Sheet.” Work order and details. In this example students view three videos in which the Director of Finance and the Director of Research and Development provide conflicting information about the state of the company. The text-based work order comes from the CEO and asks students provide an "objective" analysis of the company's situation and to make recommendations to the board of directors about its future.
According to Aldrich, "Modern DVDs represent the purist extension of linear content today. The quality of sound and video is extraordinarily high. They have some interactivity. A viewer can rewind, pause, or move freely between scenes or chapters" (Aldrich, 2004, p. 24). Each of our portals provides a number of linear segments, that is, content that participants can view much like a DVD. For example, Figure 2-6 shows one page of the Omega Video library. In this particular segment an actor, playing the role of a contract agronomist, details the safety precautions he takes when growing biotechnology crops. Other videos in the portal include exclusive interviews with experts in genetic engineering, bioethics, and agricultural engineering in developing nations.

Figure 2-6
Omega Video Library.
As with other educational CMSs, MyCase provides the opportunity to add and remove opening texts as the term progresses, in essence, changing the set. For example, within WebCT™ an instructor who wishes to make a quiz available at a certain time during the semester can set what is called a "trigger" so that the quiz becomes available on a particular date at a particular time. The instructor can also decide when this quiz will disappear from the site (i.e., no longer be available for completion by students).

According to Aldrich, triggers are "predefined, predictable moments when something irrevocable happens" (2004, p. 24). The best illustration of triggers in Omega and Agile portals are the times during the simulation at which additional data (opening texts) are released into or withdrawn from existing information structures. These releases and withdrawals are designed to simulate the appearance and disappearance of documents form an organization's document universe. In a traditional WebCT™ deployment triggers usually coincide with a well-established classroom event, for instance, the ending of one unit and the beginning of another. Within MyCase deployments, triggers generally define a change in the environment that springs from an event that might actually arise from the domain being simulated; for instance, the marketing director files a brief about his findings from attending a venture capital seminar, even as the consultants (students) are developing materials to attract equity investors. I describe two concrete examples of MyCase trigger use below.

In both the Omega and Agile portals there exists an information structure called the "Document Server." This structure is designed to resemble the shared network drive that many workgroups use for file exchange. Figure 2-7 shows the Omega and Agile document servers.
Figure 2-7

Document Server. This component represents the organization's file server. Additional documents and additional folders appear in this tool as the simulation progresses.

As time passes, say from 1998 to 2000 in the Agile portal, new folders and documents make their appearance in the document server. These documents contain information from the period of time that has passed between intervention points. Like the changing of a WebCT™ environment with the beginning of a new unit, new opening texts appear within the Agile portal. However, unlike the beginning of a new unit in most course deployments of WebCT™ the materials released into the Agile portal make their appearance as additional documents from the domain being simulated, in this case a transportation-industry consulting firm.

In the Omega portal, additional information appears in the document server as students request information from organization employees (see below for a discussion of how they can make such requests and who responds). In both cases, preset or on-the-fly-instructor-
initiated triggers result in a set change within the working environment. This new information changes the nature of the problems on which students are working.

Thus, triggers—both the nature of their timing and what they "release"—define a key difference between a MyCase deployment and a more traditional CMS deployment. For MyCase deployments, triggers and the content they release are important elements in helping to evoke for students an environment in which they can develop an appreciative system. We hoped that the MyCase triggers would become rhetorical in ways that traditional CMS triggers, because of the classroom expectations associated with them, had not. That is, MyCase triggers we believed would be means to persuading students that they are taking part in a professional activity system.

MyCase triggers, then, in addition to changing the set for the simulation contribute to what Aldrich describes as the centerpiece of any simulation: cyclical content.

**Cyclical content (Working texts)**

According to Aldrich (2005) cyclical content "addresses tiny activities that can be infinitely combined to impact an environment and create an outcome" (p. 73). He continues:

> These bundles of discrete action, timing, and magnitude, are a natural concept to us when understanding how to operate a machine like a car, communicate by using a typewriter, or even perform with a piano. The opportunity [provided by simulations], however, is to move beyond these kinesthetic examples to create cyclical content for all professional skills. (p. 73).

To take advantage of this opportunity, he states:

Cyclical content has to be mapped to, and represent faithfully, a specific "real" activity. Teaching the right cyclical content assures that the content can be transferred to "real life" immediately and seamlessly. Teaching the wrong cyclical content, mapping to irrelevant interactions, will render simulations, at best, academic. (Aldrich, 2004, pp. 26-27)
Returning to the classroom activity system (Figure 2-8), we can see that cyclical content has to do with the actual process of transforming "opening texts" to "closing texts." It is on these processes that any course purporting to provide transferable competencies must focus if it is to be effective. My research shows that how these processes are enacted inside and outside the classroom has much to do with whether students attribute professional significance to the tasks they undertake within a course.

Cyclical content in the Omega and Agile portals, then, is the day-to-day workings of the portal in which the students and instructors go about transforming a variety of opening texts. Students receive messages from various organizational characters, they review and modify opening documents that appear and then either remain or disappear from the site, and they send and receive emails under the guise of "being at work" at Omega or Agile. Students and instructors respond to exigencies that occur during the course of their engagement (for example, a real company Syngenta offering what had appeared to be one of Omega's core technologies for free to developing nations) as if they are actual members of the organization.
The difference between the cyclical content in a WebCT™ deployment vs. a MyCase deployment again has to do with the remediated environment. Because communication tools are configured to be used as they might be outside the classroom and the goals of the transformation process are represented as those of a non-school environment. Again, we hoped this switch in perceived motive would impact students' willingness to attribute professional significance to their work in the course.

Likewise because students were interacting with each other and with fictitious organizational characters represented through multiple means and through time, we hoped students would view their interaction with the portal as substantially different from their interaction with the static text that comprised the traditional cases they were accustomed to using.

To the support portals' cyclical content, we designed the following processes and tools in hopes of helping students feel like they were experiencing the quotidian routine in a high-tech workplace. Chief among these is the document-sharing tool, which plays an integral role in the discourse circulation process, one of the central aspects of the portals' cyclical content.

**Discourse circulation and file sharing.** We endeavored enact the discourse circulation process within the portals so that it would mean differently for students than the circulation process common to work with traditionally configured CMSs and even, to an extent, writing classrooms in which the instructor reviews and comments on multiple drafts. In addition to the quotidian interactions described above, we hoped to make the student contribution the site an essential part of achieving the goals arising from the simulated activity.
A key part of cyclical content, then, is the process of adding, changing, and using text added to the site by students and instructors over the course of the term. This content, though, is not traditional pedagogical content, like lectures, etc., but instead is directed toward the goals that arise from the activity represented in the portal. The position of student writing as part of the cyclical content of the case would help us address Trimbur’s concern that

By privileging composing as the main site of instruction, the teaching of writing has taken up what Karl Marx calls a "one-sided" view of production and thereby has largely erased the cycle that links the production, distribution, exchange, and consumption of writing. This cycle of interlocked moments is what Marx calls circulation. (p. 190)

Trimbur believes that this circulation process needs to play a much more prominent role in writing instruction, instruction that he views as being dominated by "various articulations of in loco parentis" (p. 192) that is "... the student writer as an active meaning-maker—in loco parentis—to a powerful teacher figure" rather than a participant not only in production, but also distribution, exchange, and consumption of writing (p. 193). Participants in the Omega and Agile cases do just that: produce, distribute, exchange and consume communication in ways that we hoped would diffuse the in loco parentis relationship. In other words, we hoped to create a world in which the key question was phrased "what does the situation demand" as opposed to "what does the instructor want."

Thus, students returned to the portal time and again as they completed multiple drafts inspired by various discourse-demanding situations evoked in the case (see Table 2-1 above for details on how we evoked these situations). Students submitted their drafts to the requesting character's (e.g., Marketing Director, Jake Steubens) folder in the portal's
document-sharing tool. Figure 2-9 shows the Omega document-sharing tool. The Agile portal employs a similar tool\textsuperscript{7}.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{omega_document_sharing.png}
\caption{Omega Document Sharing. Students post drafts and assignments to these folders and are able to access them from anywhere.}
\end{figure}

Throughout the Omega simulations, students worked through at least two drafts. I commented on the first draft, in some cases playing the role of the character who requested the document. In this role I added comments and made edits that, say, a Director or Marketing or a Director of Finance might make on a draft. Figure 2-10 shows one way of managing this type of commentary using the MS Word Track Changes tool.

\textsuperscript{7} The management instructor who used the Agile portal did not follow the elaborate commentary practice documented here. He was playing the role of a lead consultant and thus opted to comment on student papers "as himself in role."
Comments by Director of Marketing. Students received comments on their work via the Track Changes tool in Microsoft Word. This feature enabled the instructor to change the "identity" of the commenter, so that it matched that of the organizational individual to whom the document was submitted. In the case above, Jake Steubens, Director of Marketing has commented on the paper.

These drafts were not graded, but instead, were placed in a new folder in the document-sharing tool. Thus students could access not only their documents and comments, but also those of other students. As anyone who has used portfolio grading can attest, for many students the idea of not receiving a grade, but instead a number of comments in preparation for revision of their documents was something they had never experienced in the school environment.

Next, students would revise their work based on initial feedback and post it once again to the document-sharing tool, this time for grading. I then graded the documents and emailed them directly to students. Finally, students would make any final revisions and place a clean copy of their work in the tool. Figure 2-11 provides an overview of this process.

**Memo**

<table>
<thead>
<tr>
<th>To:</th>
<th>Jake Steubens</th>
</tr>
</thead>
<tbody>
<tr>
<td>From:</td>
<td>M. K. Freedburg</td>
</tr>
<tr>
<td>Date:</td>
<td>10/8/2004</td>
</tr>
<tr>
<td>Re:</td>
<td>Lime</td>
</tr>
</tbody>
</table>

**Figure 2-10**

**Comments by Director of Marketing.** Students received comments on their work via the Track Changes tool in Microsoft Word. This feature enabled the instructor to change the "identity" of the commenter, so that it matched that of the organizational individual to whom the document was submitted. In the case above, Jake Steubens, Director of Marketing has commented on the paper.

Lime-Lime is a fertilizer used to control the pH of agricultural soils. If soil is too acidic, lime is added to soil to bring the pH up towards 7.0, which is a neutral pH value. The main active ingredient in lime fertilizer is calcium carbonate. Lime with a high calcium carbonate equivalent (CCE) tends to neutralize soils faster than that of low CCE. Acidic soil is cause of several negative effects on crop growth and nutritional value. In low pH soils, nitrogen fixing is limited due to reduced microbial and insect activity, which is necessary for healthy plant growth. *What does nitrogen fixing do? This is the cause and effect for Lime.*

Soil around the world will have varying soil acidity. Lime is used to control and emulate some unfavorable soil conditions that Omega’s Vita rice may be able to. *Can you be more specific here? Why does Omega need to emulate these soils? Does it emulate these soils? How is it part of Omega’s business/technology strategy?*
Figure 2-11
Omega Document Cycling. Students submit all drafts to the document-sharing tool. Instructor reviews documents (as an organizational reviewer, for example, the Director of Marketing) and submits reviewed documents to the document-sharing tool. The only drafts that are not submitted to this tool are the graded drafts, which the instructor emails directly to students. However, students are then responsible for placing a "clean" version of the graded draft in the tool.

One of the goals for having students circulate their written work in this fashion was to enhance the verisimilitude of the simulation by having them revise and resubmit based on the comments of an organizational reviewer (instructor playing role other than teacher). This process, I thought, would more fully simulate the quotidian circulation process that is part and parcel of text production, distribution, exchange, and consumption in a high-tech organization.
Another goal for this circulation process was to make available to students the "best drafts" of each other's work. The instructor using the Agile portal and I (instructor using the Omega portal) encouraged students to draw on each other's work as they progressed through the semester to increasingly complex assignments.

One result of this writing circulation was the development of an online glossary from definitions developed by each student within the Omega case. Figure 2-12 shows how the definition for lime appearing in Figure 2-10 was repurposed by one group (along with definitions generated by all the other students) to create an online glossary that comprised part of the public web site the group built for Omega.

**Figure 2-12.** Glossary assembled from student definition memos and deployed on external website developed for Omega Molecular.
Email. Another key tool for deploying cyclical content, which is so essential for helping students develop appreciative systems is the email tool (Figure 2-12). This tool allows students to develop an email and send it to one or more characters in the organization. Students can use this tool to obtain clarification about any of the artifacts they find on the site, or they can request new information to help with their analyses. The instructor, who receives these emails, can reply in the role of the character the student has emailed, or, if the situation merits, in the role of instructor.

Omega Organizational Email. Within the Omega portal, students had the ability to email members of the organization with questions or concerns. The instructor, playing the role of the person to whom the email was directed, responded. A number of students used this tool to fill information gaps they found in the portal.
The following email, sent to the Director of Finance, shows how a student actually found a problem with some of the data in the portal and requested clarification.

Virginia,

I'm trying to put together some finance data for the state of the company report, and I've come across a bit of a problem:

- Omega's Ames processing plant can produce 1M bags/year, and they are needing a new processing plant, so I'm assuming they do produce 1M bags/year.
- The finance data says seed production costs ~$1.5M/year. At most, the total cost of production would be $4.5M/year (Subtotal Direct Cost of Sales).
- Researching seed companies, it looks like to buy a bag of corn seed (80,000 kernels) costs at minimum $30, and up to $100+ if you get fancy seed (think: GMO).

This leads me to believe that either a) Omega produces seed for under $5/bag, making at least 500% profit on seed production, or b) the finance numbers don't add up.

Do you have any hints for me regarding this? I was trying to show the money Omega would save by outsourcing seed production, but it looks like other companies would charge way more than Omega produces seed for.

Thanks,
Riley Coy

The email tool contains the means by which the instructor can respond in role to such queries. The following is the response that I sent to the student, in role of Virginia Jackson, Director of Finance:

Riley-

It is quite possible that the 1M number is an error. It may be that is projected demand and the number got fat fingered in the site. Very good catch. Try using 100K bags per year as your number, but point out the error in your SOC report.

Not all the employees and equipment at the Ames facility is dedicated to seed production, so I don't think there's "unproductive labor" there (i.e., people screwing around), but you may want to point out that 100K seems a bit low for 15 people in a year.

Let me know if you have other questions.

Ginny

Reference library. Each portal also has a Web Reference Library (Figure 2-13). This library is a repository for links that can prove helpful for students and instructors as they work with
the case. Anyone with access to the site can add a category or an entry to this library. Each entry requires a brief description of the site, a justification of why it seems useful, key words, and the URL. Again, one of the reasons for making this tool available in the portal is so that students contribute to the workings of simulation by providing discourse other students can use.

**Web Reference Library**

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<th>Name</th>
<th>Description</th>
<th>Add View</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews with Experts</td>
<td>Interviews with various experts conducted by Omega consultants.</td>
<td></td>
</tr>
<tr>
<td>Genetic Pirating</td>
<td>Sites that contain information or discussions about pirating genetic material.</td>
<td></td>
</tr>
<tr>
<td>Technology of Genetic Engineering</td>
<td>Sites that cover the technology of genetic engineering. Includes DNA manipulation or high-tech equipment used for such manipulation.</td>
<td></td>
</tr>
<tr>
<td>Product Information Sheet Examples</td>
<td>These sites have examples of product information sheets or data sheets. Often these documents appear as PDF files in order to preserve their graphically rich format.</td>
<td></td>
</tr>
<tr>
<td>Soil conditions and plant growth</td>
<td>These sites contain information about soil conditions and how they affect plant growth (i.e., yield). These conditions include pH, salinity, moisture level, etc.</td>
<td></td>
</tr>
<tr>
<td>Rice and Golden Rice sites</td>
<td>Sites that contain information about rice and genetically modified rice (Golden Rice).</td>
<td></td>
</tr>
<tr>
<td>Funding document examples</td>
<td>Includes examples and explanatory materials for writing proposals and business plans.</td>
<td></td>
</tr>
<tr>
<td>Dealing with Financial Data</td>
<td>Sites that help you understand various financial statements.</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2-13**

*Omega Reference Library. Students and instructor can add helpful items to this library.*

**Poll and Discussion.** The poll tool (Figure 2-14) and the discussion board (Figure 2-15) are ways students and instructors can express themselves in an "assessment-free" environment. These tools are much like their counterparts in traditional CMSs. Again, though, we hoped their use would be colored by the goals of the activity being simulated.
Figure 2-14

Agile Consultant Poll. Voted on these polls voluntarily.

Which competency do you think best qualifies a company for entry into the domestic market?

30 votes cast so far.

- engineering, small-engine expertise 3.33%
- engineering, body design 23.33%
- marketing, brand/image loyalty 53.33%
- distribution, previously established channels 20.00%

Answer
distribution, previously established channels

Comments
I pick distribution. Honda is too far ahead in terms of engines, and Harley has image and loyalty. It seems this industry is ready for new channels and perhaps new forms of retailing.
Figure 2-15
Agile Discussion Board. Students posted to general topics voluntarily.

Open-ended content ("Closing" texts)

Aldrich suggests that "[a]n open-ended experience is no longer just about the creator, but also about the end-user" (p. 28). He continues:

This is where computer games finally get out of the James Bond destruction mentality (your job is to destroy something incredible) and into the Thomas Edison mode of actually building something incredible . . . . Users can express themselves. (p. 28)

Returning to the model of the classroom activity system (Figure 2-16), we see that Aldrich's open-ended content corresponds with the course's "closing texts," what students and
instructors produce during the school term. In traditionally mediated courses, these outputs tend to be limited by the common conception of schoolgoing, which results in assignments designed specifically to sort and rank students or to provide opportunities for students to display the knowledge they have acquired during the course (as one professor I studied called it, "doing the brain dump") (Freedman et al., 1994).

![Classroom activity system diagram]

**Figure 2-16. Classroom activity system (individual level)**

Open-ended content as the outcome(s) (closing texts created by students)

There is certainly no single "right answer" in the Omega and Agile cases. Students can and do come up with analyses, strategies, and recommendations that vary considerably. We can see one example of this open-endedness in a management class in which teams were asked to compare four potential entrants into the US motorcycle market, recommend which one should introduce a product, and suggest what that product would be (e.g., cruiser, dirt bike, scooter, etc.). Before the class discussion of this scenario ended, the instructor had listed all four potential entrants on the board (i.e., at least one team out ten in the class had developed an entry strategy for each of the organizations under consideration). Similarly, when asked to produce a "state-of-the-company" report recommending future directions for Omega Molecular, responses among teams of technical communication students varied
widely, but included such seemingly opposed recommendations as drop the VitA Rice (vitamin-A-fortified rice) line and increase marketing expenditure on the VitA Rice line.

Finally, if we consider teachers as key "players" in this game, we can see how the same body of linear content can yield vastly different results depending on exigencies evoked during the course of the semester. Using the opening texts provided in each of the cases, students can plan and generate a Web site or they can write a proposal to a humanitarian organization. This manifestation of open-endedness seems like an important part of keeping instructors engaged with the game through multiple iterations.

**Conclusion**

In this chapter, I used Aldrich's (2004; 2005) ideas about simulation content as well as the model of the classroom activity system I elaborated in Chapter 1 to show how we developed portals we hoped would not only help students develop appreciative systems for a particular professional practice and attribute significance beyond the classroom to the actions they undertook in the classroom, but would also enable classroom experiences different from those afforded by 1) traditional configurations of educational CMSs and 2) traditional (Harvard) case studies. The next three chapters continue to develop the activity-theory framework for understanding the relationship among school, simulation, and work. In addition, these chapters use various qualitative methods to show how students responded to their interactions with the portals.

**References**


Chapter 3: Remediating a CMS: From acceptance to active learning

Preface

In this chapter, I examine the idea of a course/content management system (CMS) as a tool for representing the workplace cultures. I criticize the unquestioned (especially, it seems, in business schools) notion that an educational CMS should be used mainly for deploying traditional course materials in a more expedient fashion. I suggest that by reconfiguring such a system so that it is used as a workplace CMS (e.g., Lotus Notes, Plone, etc.) might be, we significantly change students' perceptions of the work they do when they use the system—i.e., they perceive themselves as sharing the motives and goals of people who use such tools at work. Specifically, I show through focus-group interviews with students in a capstone management course that the way in which the CMS is configured and deployed can qualitatively change the types of actions in which students engage and thereby impact their perception of the learning process as well as their motivation. In other words, I characterize these changes in terms of cognitive processes, specifically active learning and higher-order thinking, and affective processes, specifically attributions of professional significance.

I intend to submit parts of Chapter 3 to Mind, Culture, and Activity. The article will criticize the generally unquestioned notion that an educational content management system (CMS) deploys traditional course materials in a more expedient fashion. Aided by the theoretical model I have developed for the course activity system, I suggest that by reconfiguring such a CMS to be used by students as it might in a workplace context, we significantly change students' perceptions of the work they do when they use the system.
This article will use as its central piece of data the analysis of student attributions (affective processes) that appears in this chapter. As with the article I hope to submit from Chapter 2, I will have to draw in some of the theoretical material about the course activity system I developed in Chapter 1 in order to set the stage for my observations and so the audience understands why the attribution data is significant for evaluating the usefulness of a CMS deployed in this way.

I also plan on submitting a section of this chapter to *Academy of Management Learning and Education*. My article is a response to one published in this journal by Martins and Kellermanns (2004) suggesting we measure students' motivation to use a CMS by surveying the "perceived usefulness of the system" and its "perceived ease of use." In this article I suggest that we need to measure the "usefulness" of Web-based CMSs in ways other than the facility with which students feel they can use them to accomplish traditional classroom tasks like "attending" lectures or taking quizzes. The central data pieces for this article will be the analysis of students' perception of the actions (cognitive processes) they took using the portal that appears in this chapter, specifically the comparisons they make with their experiences using other CMSs like WebCT™, as well as the attributions (affective processes) they made concerning experiences they had with traditionally configured and remediated CMSs.

**Introduction**

The incarnation of many Internet-based courses is informed by traditional notions of classroom instruction, in which course/content management systems (CMSs) like WebCT™ and Blackboard™ are used to 1) place course materials (e.g., lecture notes, PowerPoint slides) on the Web and 2) encourage discussion of relevant issues outside of class, either synchronously through chat or asynchronously through threaded discussion.
Martins and Kellermanns (2004), noting that incorporation of the Web into management education is a significant trend in business schools, review recent findings with regard to the employment of CMSs in the management curriculum. They suggest that while the potential for using CMSs has generated excitement among business school administrators and some faculty, the results of their employment in (conjunction with) the classroom have been mixed (Bilimoria, 1997; Miesing, 1998; Parikh & Verma, 2002; Scifres et al., 1998). Concentrating on situations in which CMSs are used in mixed-mode instruction (i.e., a class with both a face-to-face component and an online component), they argue that students need to feel motivated to use a CMS for its intended purpose (i.e., "migrating some traditional instructional processes to a central Web-based system" (p. 10)), rather than simply be required to use it (otherwise students will circumvent the system and conduct discussions, chat, meetings, etc., when they meet in person) (p. 9). Martins and Kellermanns go on to show how a variation on the Technology Acceptance Model (TAM), which concentrates on encouraging acceptance of a new information system based on users' "perceived usefulness of the system and the perceived ease of its use" (p. 10), can help instructors, administrators, and technology specialists motivate students to use the system.

While I agree with Martins and Kellermanns' assertion that student motivation to use a system derives in part from "perceived usefulness" and "perceived ease of its use," I believe an evaluation of motivation that has as its object "student preference for the system over the traditional instructional processes it replaces" is symptomatic of a particular type of thinking about computer technology and education, one that has been variously called a "Type I use of technology" (Maddux, 2002, p. 10), the "technological imperative" (Oliver & Herrington, 2000, p 178), and the "transmission model" (Garrison & Anderson, 2003, p. 1).
Maddux attributes part of what he sees as the failure of Web-based instruction to a lack of effective interactivity, which he calls "the most promising, yet scarce characteristic that can be built into Web pages" (p. 10). He goes on to recount his notion of Type I and Type II uses of technology. According to Maddux, Type I uses of technology "make it quicker, easier, or more convenient to teach in traditional ways. Type II uses make it possible to teach in new and better ways that are not otherwise available" (p. 10). Similarly, Oliver and Herrington warn of the "technological imperative" that "sees the need and place for information technologies in education being based on such organizational factors as opportunity, competition, and efficiency" (p. 178). They go on to observe that when these technical imperatives drive change in education:

> the applications of learning technologies are more likely to be made through additive strategies which see existing strategies and methods being complemented by technology-oriented initiatives. . . . A majority of current Web-based learning environments have evolved from face-to-face teaching programs in [this] additive form . . . (p. 178)

In contrast, the "pedagogical imperative," Oliver and Herrington claim, leads to "more integrated approaches which have the potential to redefine and transform the more fundamental aspects of teaching and learning" (p. 178). Finally, Garrison and Anderson question the sense of "replicating or simulating traditional face-to-face approaches" (p. 2), noting that:

> it should be no surprise that most research into using technology for educational purposes has shown no significant differences in learning outcomes between traditional and technically advanced media. Why would we expect to find significant differences if we do essentially the same thing we always have done (both teaching and learning activities) except that the medium of communication has been changed or a deficient approach has been enhanced with some visually appealing or entertaining technology? (p. 6)
Martins and Kellermanns' focus on perceived usefulness (e.g., "Using WebCT™ enables me to accomplish tasks for this course more quickly" (p. 24)) and perceived ease of use (e.g., "It is easy to get WebCT™ to do what I want it to do" (p. 24)) makes it fairly obvious that these researchers are exploring the efficacy of the Type-I / technical-imperative-driven / transmission-model uses of the Internet mentioned above.

In this chapter I argue that, especially in professionally oriented classrooms, the way in which the CMS is configured and deployed can qualitatively change the types of actions in which students engage and thereby impact their perception of the applicability of their classroom work to life outside of the classroom. In the MyCase model (i.e., Agile and Omega portals), the CMS becomes more than a means for offloading traditional classroom practices like lecture and discussion to a centralized software system.

I designed this study as an attempt to get at how students understand different experiences associated with professional education in relation to their experience with the Agile portal. What I present in this chapter, then, is a comparative analysis of how students talk about their experience with the Agile portal in relation to their experiences with 1) CMSs as they were used in other classes, 2) traditionally-narrated case studies, and 3) their experiences in the workplace. I characterize these comparisons along two dimensions:

1) cognitive processes, specifically "retention-oriented" (lower-order) and "transfer-oriented" (higher-order) processes (Anderson et al., 2001), and
2) affective processes, specifically attributions of professional significance (Munton et al., 1999; Pardoe, 2000).
CMS as Crystallized Practice

In the preceding chapters, I have shown that the nature of the work (actions and operations) teachers and students undertake in the classroom activity system depends, in part, on the tools that mediate the relationships among the people (subjects) and the texts (objects) involved in the course.

The study detailed below hinges on how students characterize the actions and operations they take within a course in which the Agile portal was used as compared to those they have taken in others parts of their professional education. To facilitate understanding of these comparisons, I must first review how actions and operations are defined within the activity-theory model I am using.

In the classroom activity system (Figure 3-1), the students and the teacher are the subjects working together to transform course content (i.e., various "opening texts" including textbooks, lectures, PowerPoint slides, etc.) into course outcomes (i.e., various "closing texts" including completed quizzes and tests, essays, assessments, and grades).

Figure 3-1. Classroom activity system (individual level)
In this depiction I show that students' and teachers' (subjects') work on course materials (object) is mediated by a traditionally configured CMS (content management system).
**Actions.** The work of transforming these opening texts to closing texts (called the transformation process) involves various actions, like viewing lectures, taking notes, and working problems.

**Operations.** Operations like typing, cutting and pasting text, downloading files, punching in numbers on a calculator, and filling in bubble sheets require less conscious effort than actions. While they were actions at one time, that is, they required conscious effort, over time they have become almost automatic, thanks to practice and internalization. Figure 3-2 shows how actions and operations comprise the transformation process of the classroom activity system.

![Diagram of the classroom activity system](image)

**Figure 3-2. Classroom activity system (individual level)**

In this depiction I show that students' and teachers' (subjects') work on course materials (object) is mediated by a traditionally configured CMS (content management system). The arrows from the Tool to the Actions/Operations and from the Actions/Operations to the Transformation process are included to emphasize the mediational nature of the tool. That is, the tool's affordances and constraints shape the actions and operations available to subjects seeking to transform the object.

Developing the relationship between actions and tools further, Kuutti (following Engeström and Vygotsky) argues that the tools used in the activity system not only shape the actions the subjects undertake as they transform the object, but "have been created and
transformed during the development of the activity itself and carry with them a particular culture—a historical residue of that development" (p. 26). She continues:

The tool is at the same time both enabling and limiting: it empowers the subject in the transformation process with the historically collected experience and skill "crystallized" to it, but it also restricts the interaction to be from the perspective of that particular tool or instrument only; other potential features of an object remain "invisible" to the subject. (Kuutti, 1996, p. 27)

Because tools like WebCT™ and Blackboard™ have grown out of the desire to make traditional classroom activities—like discussions, lectures, chalkboard drawing, quizzing and testing, and assignment submission—workable on the Web, many course developers (and teachers), and even, lamentably, those in the professionally oriented university disciplines, have overlooked the potential for "repurposing" the course tool to simulate professional practice. For example, the "opening texts" (i.e., genres) students see represented when they interact with an educational CMS are not those they might encounter when logging into a workplace CMS. PowerPoint presentations housed in educational CMSs are generally not old pitches to clients, from which ideas and even slides can be cannibalized during the development of new presentations as they often are in various professional situations, but instead are lectures designed to help students remember course concepts.

To an extent, the potential for repurposing an educational CMS use seems "invisible" in large part due to the classroom practices crystallized in the tools themselves. Indeed, the numerous "course tools" made available to instructors using WebCT™ take their names from the classroom metaphor on which they are based: "Assignments, My Grades, Quizzes/Surveys, Self Test, Student Homepages, etc."

Even so, CMSs like Plone (Zope), Wiki, and IBM Lotus Notes® are used in knowledge organizations across the globe. Each of these tools affords content storage and retrieval as
well as collaboration tools similar to those provided by educationally oriented CMSs. However, while the operations supported by educational CMSs and general CMSs are in many ways similar (i.e., exchanging documents, online collaboration, etc.), the activities supported by common deployments of these tools are often very different (for example, taking quizzes vs. producing a technical white paper). Certainly part of the difference lies in the crystallization of classroom practices in educational CMSs.

For example, enabling students to draw freely from each other's work as it is posted to a shared file space and from the work published in the CMS (without citation), while extremely unusual in classroom settings (traditionally governed by rules for academic quotation/citation), is much more common in the workplace, where people often draw from a common pool of documents. As described below, students saw this feature of the class in which the Agile portal was used as something unique in their school experience and many felt that such evaluation and integration would be something they would need to know how to do in their careers. Thus, several suggested that document (assignment) sharing was a feature that made them feel as if the simulation were a realistic representation of workplace practices. That is, they made an attribution of professional significance to their experience within the classroom.

On the social/contextual level, then, these attributions can be shaped by the changes in classroom rules and division of labor that the mediating tool affords. Figure 3-3 shows these relationships.
Figure 3-3. Affective process (attribution) dimension for actions

When we include the social/contextual level in our model, we can see that the mediating tool (CMS) impacts how actions are undertaken not only through its relationship to the course object (opening texts), but also by affecting the rules and the division of labor that play a role in transforming the object into the outcome. In this study, the remediated CMS (MyCase/Agile) affected the rules and division of labor within the classroom activity system. These changes seem to result in students attributing professional significance to the things they did using the Agile portal.

I see the repurposing of an academic CMS, or the implementation of a workplace-like CMS in the classroom, as one way of providing students with experiences that may be more closely aligned with their motive for being in school and therefore more likely to appear to students as "significant insight or learning" (Pardoe, 2000, p. 131). That is, students in professional curricula may attribute extra-classroom significance to the activities they undertake in the classroom when those actions are mediated by a tool in which workplace,
rather than school practices seem to be crystallized\(^8\). As the preceding discussion of activity
theory suggests, these attributions can result from the shaping of classroom actions by the
way the mediating tool (CMS) is configured (i.e., with its representation of workplace genres
as opening texts and its affordances for participation in workplace-like activity).

However, after examining the data I found that even when students did not explicitly
attribute extra-classroom significance to the actions they undertook, they did characterize
those actions as different than those they perceived themselves to be taking in traditional
CMS-mediated courses and within courses that used traditionally narrated (e.g., Harvard)
cases. Thus, in the next section, I detail how I used the revised version of Bloom's cognitive-
process taxonomy to characterize students' perceptions of their work with Agile.

**Methods**

For this study I focused on the Agile Consulting case, built using the MyCase CMS.
Participants in the study were students in a one-semester capstone course in management,
entitled Strategic Management. Management 478 focuses on strategy formulation,
implementation, and evaluation and control in contemporary organizations. The course
emphasizes strategic planning and decision-making using case studies. The section studied
was one of eight offered (Fall 2004 count) during a sixteen-week semester. Students had
access to the online case throughout the semester, but assignments and face-to-face
discussions of the case were structured around four "intervention points" evenly spaced
throughout the term (January 27, February 19, March 23, and April 27).

\(^8\) For a discussion of the boundary-crossing facility enabled by the computer interface, and especially the Web
browser, see the following chapter.
Within the case, students confronted a different data set at each intervention point because the case environment is designed to reflect states of affairs at four different times in an organization's (Polaris Industries') decision to enter the motorcycle market. As the case progressed, students made evaluations or recommendations at each point. A brief description of these intervention points appears in Table 3-1.

Table 3-1: Agile intervention points

<table>
<thead>
<tr>
<th>Classroom Date</th>
<th>Case Date</th>
<th>Key activity</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 27</td>
<td>Spring, 1998</td>
<td>Decide what an entrant into the US motorcycle market might look like</td>
<td>Generic entrant-profile memo</td>
</tr>
<tr>
<td>February 19</td>
<td>Spring, 1998</td>
<td>Recommend whether or not one of four possible entrants should enter the US market</td>
<td>Recommendation memo</td>
</tr>
<tr>
<td>March 23</td>
<td>Spring, 2000</td>
<td>Contribute to Agile reference library by evaluating Polaris's decision to enter the cruiser market</td>
<td>Case brief</td>
</tr>
<tr>
<td>April 27</td>
<td>Present Day</td>
<td>Given that Polaris successfully entered the domestic market, evaluate the decision and recommend a course of future action</td>
<td>Post-mortem and recommendation memo</td>
</tr>
</tbody>
</table>

During their work with the online case, students participated in more-or-less traditional classroom activities like attending lectures, reading and discussing textbook chapters, reading and discussing paper cases, and taking tests.

There were 42 students in the class. Volunteers for the study were accepted without regard to demographic characteristics. All of the students were seniors. Sixteen (38%)\(^9\) students participated in focus group interviews, the first of which was conducted after the first intervention point (January 27) and the second of which was conducted just before the fourth intervention point (April 27). Five students participated in both pre- and post-focus group sessions.

\(^9\) Unfortunately some of the responses from these groups were lost because of technical problems with the recording device or inaudibility due to unexpected background noise during one of the interview sessions.
Focus-group questions (see Appendix A) were designed to elicit comparisons among students' experiences: 1) with various tools (concentration on CMSs), 2) with various texts (concentration on traditionally narrated cases), and 3) in various activity systems (concentration on school and work). Members of our research team conducted these interviews. The interviewers were never responsible for giving the students a grade in the course and the student responses were not available to the instructor of the course until he/she had submitted grades.

In addition, I conducted an interview with the course instructor before the semester and after the semester. These interviews were designed to understand his expectations for the simulation as it was to be incorporated in his class and understand how he perceived himself and his role in the simulation.

I also conducted a discourse-based interview with the instructor as he evaluated student papers. In these interviews I asked him to talk aloud as he marked the papers. I tape recorded his responses. At the conclusion of the grading session, I also asked him to talk generally about his impression of the students' work.

Except in the case of instructor interviews, which were one-on-one meetings, focus groups contained from two to five students and the format generally took the form of interviewer question followed by each student responding in turn. There was generally little conversation among students during these sessions, though students commonly made reference to each other's responses.

The unit of analysis considered (and coded) below is the student response or utterance, which I define as when a student begins speaking either after being asked a question or after
another student finishes his/her response and ends when the student finishes speaking and another student begins to speak.

Data analysis

To analyze the data, I coded the actions mentioned in each utterance. I developed a coding scheme from the recent revision of Bloom's hierarchy and categories of cognitive processes. I chose this hierarchy because it seemed like an established way to characterize the differences in action that students reported in a variety of contexts using a variety of tools. In addition, many student responses contained words like "analyze," "apply," and "create" that seemed ready-made for classification using this taxonomy. In short, the taxonomy allowed me to progress beyond Martens and Kellermanns' "perceived ease of use" and "perceived usefulness" of systems to characterize actions along a continuum from retention-oriented to transfer-oriented. Using the scholarship that has surrounded the recent reworking of the taxonomy, I define retention and transfer orientation in the following section and described how I coded the data.

Activity and active learning: Linking action and context

In their report Active Learning: Creating Excitement in the Classroom (1991), Bonwell and Eison note that "active learning' seems to lack an identifiable origin or a common definition" (p. 1). Nevertheless, most definitions include a component that hearkens to the taxonomy of educational objectives proposed by Bloom (1956). In that work Bloom and his colleagues on the Committee of College and University Examiners propose a hierarchy of educational behaviors ranging from simple to complex based, in part, on student performance on comprehensive examinations. As Krathwohl (2002) notes:
The framework was conceived as a means of facilitating the exchange of test items among faculty at various universities in order to create banks of items, each measuring the same objective. (p. 212)

Krathwohl notes that one of the most frequent uses of the Taxonomy has been to "classify curricular objectives and test items in order to show the breadth, or lack of breadth, of the objectives across the categories" posited within the taxonomy. The original taxonomy was revised by a group of researchers and published in 2000. The emphasis of the revised edition, according to Anderson (2002) is "on the uses of the framework" and a good deal of the text is "devoted to examples of the framework's application, making use of classroom vignettes written by classroom teachers" (p. 210).

In this revision of the Taxonomy Anderson, et al. (2001) distinguish between retention and transfer in the following way:

retention requires that students remember what they have learned, whereas transfer requires students not only remember but also to make sense of and be able to use what they have learned. . . . retention focuses on the past, whereas transfer emphasizes the future. After students read a textbook lesson on Ohm's law, for example, a retention test might ask them to write the formula for Ohm's law. In contrast, a transfer test might ask students to rearrange an electrical circuit to maximize the rate of electron flow or to use Ohm's law to explain a complex electrical circuit. (p. 63, emphasis in original)

In this chapter, then, I extend the use of this framework to include a coding system that helps categorize student observations about their learning process. Thus, rather than using the taxonomy to a priori predict outcomes from classroom exercises10, I use the descriptions of cognitive processes to categorize students' reports of the actions they took as transfer-oriented processes (often called higher-order) or retention-oriented processes (often called lower-order). In so doing, I adapt Anderson et al's characterization of cognitive processes

10 See, for example, Nelson's (Nelson, 1990) "'This was an easy assignment': Examining how students interpret academic writing contexts" for some striking examples of disconnects between instructors' expectations for assignments and students' actual work on them.
used for retention and transfer. They suggest that the process most closely related to retention is "Remember" with the other five ("Understand", "Apply", "Analyze", "Evaluate", "Create") "increasingly related to transfer" (p. 66). Mayer (2002) echoes this formulation when characterizes the taxonomy as moving from actions that promote retention to those that promote transfer, or "the ability to use what was learned to solve new problems, answer new questions, or facilitate learning new subject matter" (p. 226).

Though the authors of the revised taxonomy associate Understand (formerly Comprehension) with transfer-oriented cognitive processes, I follow the scholars like Bonwell and Eison as well as Sarason and Banbury in considering only Apply, Analyze, Evaluate, and Create as transfer-oriented.

Figure 2-4, then, shows how I employ this cognitive-process continuum to help characterize the differences students perceive between their work with traditionally configured CMSs and the Agile portal.

---

Figure 3-4. Cognitive-process dimension for actions
Actions students reported in their work with the Agile portal, traditionally configured
CMSs, traditionally narrated cases, and work were compared by locating them on the cognitive process continuum.

Table 3-2 contains a brief overview of the cognitive-process dimension of the taxonomy taken from the revised Taxonomy (Anderson et al., 2001) and Mayer's (2002) explanatory article.

### Table 3-2: Cognitive process taxonomy

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Processes (key words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remember</td>
<td>retrieve relevant knowledge from long-term memory</td>
<td>Recognizing (identifying), Recalling (retrieving)</td>
</tr>
<tr>
<td>Understand</td>
<td>construct meaning from instructional messages including oral, written, and graphic communications, and material presented during lectures, in books, or on computer monitors</td>
<td>Interpreting (clarifying, paraphrasing, representing, or translating)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exemplifying (illustrating or instantiating)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Classifying (categorizing or subsuming)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Summarizing (abstracting or generalizing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inferring (concluding, extrapolating, interpolating, or predicting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comparing (contrasting, mapping, or matching)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explaining (constructing models)</td>
</tr>
<tr>
<td>Apply</td>
<td>carry out or use a procedure in a given situation</td>
<td>Executing (carrying out)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Implementing (using)</td>
</tr>
<tr>
<td>Analyze</td>
<td>break material into its constituent parts and determine how the parts are related to each other and to an overall structure or purpose</td>
<td>Differentiating (discriminating, selecting, distinguishing, or focusing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Organizing (finding coherence, integrating, outlining, parsing, or structuring)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attributing (deconstructing)</td>
</tr>
<tr>
<td>Evaluate</td>
<td>make judgments based on criteria and standards.</td>
<td>Checking (coordinating, detecting, monitoring, or testing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Critiquing (judging)</td>
</tr>
<tr>
<td>Create (synthesize)</td>
<td>put elements together to form a coherent or functional whole; that is, reorganize elements into a new pattern or structure.</td>
<td>Generating (hypothesizing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planning (designing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Producing (constructing)</td>
</tr>
</tbody>
</table>

Since the first publication of this taxonomy, educators have associated "active learning" and "higher-order thinking" with actions characterized as more complex than remembering (i.e., with the processes below the triple line in Table 3-2) and often as more complex than
understanding (i.e., with the processes below the double line in Table 3-2). For example, Bonwell and Eison's characterization of active learning has as its centerpiece "students are involved in higher-order thinking (analysis, synthesis [create], evaluation)" (p. 2). Within management education, Sarason and Banbury (2004) again make the explicit connection between active learning and Bloom's hierarchy, arguing that "[s]tudents are more likely to draw on analysis, synthesis [create], and evaluation when they are actively engaged in their learning process" (p. 511).

**Coding Procedure**

I used the following four focus-group questions (see Appendix A for a complete list of questions asked) because I believed these would provide the most insight into my question about the relationship between a mediating artifact and students' motives, goals, actions, and operations in classroom contexts. I refer to these questions by the numbers they are assigned below in the remainder of this chapter.

**Question 1.** What do you feel like you learned from the Agile case?

**Question 2.** How does the Agile case compare with the other cases you’ve worked with here at ISU?

**Question 3.** Do you feel like the Agile experience is more or less like what you might experience on the job than the other cases you’ve worked on in class? How?

**Question 4.** Have you taken other classes that have an online component using WebCT or other course tool? How did the Agile experience compare with that class/those classes?
In order to characterize the impact implementation of the organizational simulation had on student perceptions of their actions vis-à-vis CMS configurations from other courses as well as their perceptions about whether the Agile deployment engaged them in actions they viewed as significantly different from they undertook in other classes, I took the following steps:

1. For each student response (utterance), I attempted to distill a "reported action" (e.g., "make a decision with real-world consequences" (Agile Interview, p. 11)). Since these questions generally resulted in students making comparisons, the responses are often characterized by a report of two actions: one that characterizes their experience in Management 478 (and within the Agile context, in particular) and one that characterizes their experience in another context (either other course(s) or outside the university).

   When students talked about things they did with the tools (i.e., download files or share files) without specifying an objective (i.e. "make a decision" or "take a quiz"), I coded "operation" rather than action. These procedures, by themselves, did not seem to be goal-directed cognitive processes, but, instead, played a part in processes that were left unnamed in the student response.¹¹

¹¹ Following Anderson et al., I was careful about confusing "actions" (in our parlance, operations) with "objectives" (in our parlance actions) (p.17): To emphasize the difference between means and ends—between instructional activities and objectives—the phrases "be able to" or "learn to" are either included or implied in our statements of objectives. Thus for example, "Students will learn to apply the criteria for writing coherent paragraphs" is a statement of an objective. The act of writing paragraphs is an activity that may or may not lead to the objective. (p. 17)
2. I then attempted to associate the reported action with a particular category in the taxonomy. For my purposes I attempted to code reported actions as belonging to one of the six categories listed in Table 3-2 (above). So, for example, while "deciding" is not one of the key words in the taxonomy, "make a decision" fits well with the definition of evaluate: "make judgments based on criteria and standards." And, in turn, evaluate falls within the several cognitive processes (Apply, Analyze, Evaluate, Create) that I am considering as transfer-oriented processes.

In my analysis below, then, I rely on the least granular report of this coding in which the categories are "transfer-oriented" (Apply, Analyze, Evaluate, Create) and "retention-oriented" (Remember, Understand). These labels eliminate the value-laden terms "higher" and "lower" which I believe to be problematic inasmuch as while "higher-order" processes are more complex than those of "lower" orders, these higher-order processes are considered to subsume the processes "below" them and thus would not exist without them.

3. Following the idea of professional attribution suggested by Pardoe and a attribution coding method forwarded by Munton et al. (1999), I examined the response (utterance) to determine if the student explicitly attributed the origin or projected outcome of this action to a professional context (i.e., workplace or life outside of school). In the case of "make a decision with real world consequences," I would mark the response as being associated with a professional context. In the case of

12 Note in situations where people reported an action like "took online quiz," I assigned the value "operation" because the student was generally referring to using a the tool to take the quiz, not the questions on the quiz itself.
marking professional context attributions, I looked for the following words and phrases in order to code a response as marked: "real," "on the job," "at work," "in a business," "real world," etc. Otherwise the attribution was coded as "unmarked" or "school."

Figure 3-4 shows a coded utterance. A concrete description of my coding decisions for this response follows the figure.

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
<th>Column 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme</td>
<td>Student Response (utterance):</td>
<td>Actions</td>
<td>Cognitive Process</td>
<td>School/Professional Attribution</td>
<td>Comment</td>
</tr>
<tr>
<td>(Question 1) Learning from Agile</td>
<td>Now we're moving into questions specifically about Agile. What do you feel like you learned from the Agile case? E. For the first time I didn't feel like it was bullshit... you make a decision, your decision has real world consequences, because before when you would talk about a case what would you do? Well, I would do &quot;this&quot;, it's bullshit. At first I thought that maybe this was another case where you just make up something, that you should make motorcycles for monkeys, but to actually see the company made a decision and their decision was successful, to see that they had to do the research like we did and they used that research to make a successful decision and are looking back on it now, that really helped me see what it's really like to make a business decision as opposed to analyze other decisions.</td>
<td>Agile: Research, make decision vs. Other: Analyzing decisions others had made</td>
<td>Agile: Professional (marked) &quot;really like . . .&quot; vs. Other: School (not marked)</td>
<td>Several students commented on how the ability to see &quot;what actually happened&quot; helped them to learn or made the Agile experience stand out from other case experiences. This space for reflection created by the case can be tied into the knowledge dimension of the revised taxonomy, under metacognitive knowledge—something we'll discuss in Chapter 5. Also note the importance of the decision in this context. Many students commented on the importance of feeling their decision was &quot;real&quot; with real consequences.</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3-4: Student response coded for cognitive-process level and professional/school attribution

Column 2 in Figure 3-4 shows the question as the interviewer asked it. Below the question is the entire student response (utterance). Bold text represents the parts of the response I have identified as either 1) a report of action or 2) a marked (professional)
attrition. Column 3 contains a distilled description of the actions identified in Column 2. As I mentioned earlier, because of the nature of the questions, students usually identified actions they took in two contexts: Agile and a comparison context. Thus, there are usually two actions in this column, one for each context. Column 4 contains the cognitive-process level assignment I have made for the actions identified in Columns 2 and 3. Finally, Column 5 contains a distilled description of any attribution from Column 2. Again because students were comparing contexts/experiences, two attributions appear here.

So, for the response above, I characterized the reported actions (Column 3) as in the case of Agile as "making a decision" and in the case of other cases she had considered (what the student chose to compare with Agile) as "analyzing decisions others had made." Next I coded the actions based on the taxonomy of cognitive processes (Column 4), using the definitions of the categories and names of the processes listed in Table 3-2 (above) to assist with the classification. I coded the Agile action as "Create" because the student said she was actually making a decision which amounts to "hypothesizing" or "designing" (see Table 3-2, above). I coded the student's action with the other cases as "Analyze" because she characterizes this activity as "judging" (see Table 3-2, above) decisions made by others. As in this example, most cases of this cognitive-process coding were made easier by the comparative nature of the responses.

In situations where students characterized things they did with the tools (i.e., download files or share files) without specifying an objective (i.e. "make a decision" or "take a quiz"), I coded "operations" rather than actions. In other words, these procedures, by themselves, did

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13 As mentioned earlier, I am aware that this coding procedure is, inexact, and therefore, despite making an effort to code to the six processes categories, I group these results into the two general categories: retention-oriented actions and transfer-oriented actions.
not seem to be goal-directed cognitive processes, but, instead, played a part in processes that were left unnamed in the student response. Note also that a student response can contain more than one action or may contain no code-able action/operation at all.

Finally, I assigned a context attribution to the identified actions (Column 5). In the case of the Agile context, the student says the experience showed her "what it's really like to make a business decision," so I considered this a "marked" response, that is, one which points to a context outside the classroom.

Following the procedure outlined above, I hoped to make sense of the ways students perceived the role of the tool as a mediating artifact affording either extra-classroom-type action or action aimed at promoting transfer to extra-classroom activity systems. I coded a total of 47 student responses (utterances). Tables 3-3 and 3-4 contain the results of my coding.

**Results**

**Table 3-3: Categorization of actions according to cognitive-process dimension. This table corresponds with Column 4 in Figure 3-4 above.**

<table>
<thead>
<tr>
<th>Context</th>
<th>Retention-oriented actions</th>
<th>Transfer-oriented actions</th>
<th>Operations</th>
<th>Agile or comparison context not mentioned in response</th>
<th>Total Utterances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agile</td>
<td>1</td>
<td>12</td>
<td>3</td>
<td>0</td>
<td>16</td>
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</table>

*Question 1: What do you feel like you learned from the Agile case?*

<table>
<thead>
<tr>
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<th>Other</th>
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<tbody>
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<td>0</td>
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</table>

*Question 2: How does the Agile case compare with the other cases you’ve worked with here at ISU?*

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<tr>
<th>Agile</th>
<th>Other</th>
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<td>8</td>
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</tbody>
</table>

*Question 3: Do you feel like the Agile experience is more or less like what you might experience on the job than the other cases you’ve worked on in class? How?*

<table>
<thead>
<tr>
<th>Agile</th>
<th>Other</th>
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<tbody>
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</table>
Table 3-3 (cont.): Categorization of actions according to cognitive-process dimension. This table corresponds with Column 4 in Figure 3-4 above.

| Question 4: Have you taken other classes that have an online component using WebCT or other course tool? How did the Agile experience compare with that class/those classes? |
|-----------------|---|---|---|---|---|
| Agile           | 0 | 3 | 4 | 6 | 13 |
| Other           | 2 | 1 | 8 | 2 | 13 |

| Total           |
|-----------------|---|---|---|---|---|
| Agile           | 1 | 33 | 7 | 6 | 47 |
| Other           | 15 | 12 | 11 | 9 | 47 |

Table 3-4: Professional attributions for Agile vs. other learning activities. This table corresponds with Column 5 in Figure 3-4 above.

<table>
<thead>
<tr>
<th>Context</th>
<th>Professional attribution (marked)</th>
<th>Total Utterances</th>
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</thead>
<tbody>
<tr>
<td>Question 1: What do you feel like you learned from the Agile case?</td>
<td></td>
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<tr>
<td>Agile</td>
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<td>16</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>16</td>
</tr>
</tbody>
</table>

| Question 2: How does the Agile case compare with the other cases you’ve worked with here at ISU? |
|--------|----------------------------------|------------------|
| Agile  | 3                                | 8                |
| Other  | 0                                | 8                |

| Question 3: Do you feel like the Agile experience is more or less like what you might experience on the job than the other cases you’ve worked on in class? How? |
|--------|----------------------------------|------------------|
| Agile  | 7 (Three of these utterances referred to jobs students actually worked, so naturally, they contain a professional attribution.) | 10 |
| Other  | 5                                | 10               |

| Question 4: Have you taken other classes that have an online component using WebCT or other course tool? How did the Agile experience compare with that class/those classes? |
|-----------------|---|---|
| Agile           | 2 | 13 |
| Other           | 0 | 13 |
Examining the totals from the preceding tables, we can see that:

- Students described the actions they took within the Agile environment as what I have defined as transfer-oriented roughly three times as often as they described the actions undertaken in comparison contexts (33 utterances to 12 utterances). (Table 3-3).

- There was only one report of retention-oriented action within the Agile environment as opposed to 15 reports of retention-oriented action within comparison contexts. (Table 3-3).

- There were roughly four times (19 utterances to five utterances) the number of professional attributions made for work undertaken in the Agile environment versus work undertaken within comparison contexts. And three of the five professional attributions for non-Agile contexts were made when students spoke about actual jobs they had worked. This observation is important because a work attribution is virtually guaranteed when someone is talking about an actual job. (Table 3-4).

What follows is an interpretation of these results in which I use the content of the focus-group responses to suggest that the following four elements contributed to student reports of
transfer-oriented action as well as the professional attributions they made for the Agile environment. These elements are:

1) Participating in a decision-making process that students felt was open-ended, yet had consequences they could easily imagine as "real." (Question 1)

2) Working with authentic opening texts. (Question 1)

3) Producing closing texts that students saw as having a purpose beyond improving a classroom grade (i.e., not just "papers on topics"). (Questions 2 and 3)

4) Interacting during construction and revision of closing texts that was unconstrained by traditional classroom rules and followed what students perceived to be workplace rules more closely. (Question 4)

Taken together, these findings show evidence of "a world with its own culture, including its own language, norms and rituals" that Schön believes is necessary to create a "credible and legitimate" reflective practicum (p. 170)

Discussion

Question 1

Simulating the passage of time through the progressive revelation of authentic opening texts (i.e., workplace/business genres) contributed to users saying they were participating in "real-world" decision making and "other-than-student" and "other-than-teacher" roles.

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Retention-oriented actions</th>
<th>Transfer-oriented actions</th>
<th>Operations</th>
<th>Agile or comparison item not mentioned in response</th>
<th>Total Utterances</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>
Consideration | Professional Attribution (marked) | Total Utterances
--- | --- | ---
Agile | 7 | 16
Other | 0 | 16

Builders of a reflective practicum have to think of ways to make the environment point to the "real" one it represents (whether it be an academic world—as it might be in the case of a graduate course in a discipline—or the business world—as it was in the case of Management 478). One way the Agile environment accomplished this task was through the deployment of a number of authentic artifacts (see Chapter 2) throughout the site (e.g., employee emails, market reports, trade-journal articles, corporate financial documents in their entirety).

And, in characterizing their experience with the Agile portal, students commonly recounted the process of evaluating a number of these documents to make and support a decision. In 12 of 16 responses, actions associated with this process were transfer-oriented (application and evaluation). In addition, students' description of this process yielded a number of professional attributions (seven in 16 total utterances), which were generally tied to evaluating multiple documents and making what students called a "real-world" decision.

The following is a representative response:

Kevin: I just think it was probably more real world type of experience to realize that decisions do have ramifications and implications for the future more than, like she [Lacey] was saying, when we look back at cases [traditionally narrated textbook cases], our decisions don’t matter at that point, but when we’re kind of consulting and really taking this firm forward and making a decision. . . . It’s a need for strong research and good information to make those key decisions. I took that away from it [Agile]. (Agile Interview, p. 14)

I have this example coded as "Evaluate" (transfer-oriented) because the student sees support for the recommendation (or within the scenario, making the best data available to the
consumers of your recommendation so they can either accept or reject a recommendation) as the key to moving the firm forward.

Kevin also refers to one aspect of the case that students talked about making a tremendous difference in their perception of engaging in a professional decision-making process: the simulated movement through time afforded by the online representation of artifacts. Because he was able to work with an initial data set at T1 and then immerse himself again at T2 to discover additional information about what had transpired between T1 and T2, Kevin can speak about the "ramifications and implications for the future." Lacey underscores Kevin's perceptions when she says:

Lacey: I really like seeing what happened. It just really clicked for me, it was like, it was a real decision. (Agile Interview, p. 6)

He and Lacey both noted that traditionally narrated cases generally cause students to look backward and then to make a decision. Sometimes, then, a professor provides details about "what really happened," but for these students that unveiling never took the form of discovering what happened by again turning to authentic texts (like engineering documents and production plans) as it did in the case of Agile consulting. I will talk in much greater detail about how this simulated movement through time provides a space for student reflection about their decisions in Chapter 5.

Lacey's response, also coded as Evaluate, begins with a description of tests (which, in this case, because of the way she describes them in conjunction with listening, I coded as Remember), but expands to cover other classroom activities and concludes by reiterating the importance of the opening texts and the decision:

Lacey: There are a lot of classes where we go sit and listen and take tests. There are a couple of other classes that have done more activity-based things but I think this is
the first one where we have looked at industry data, analyzed industry data and been asked to make decisions, not necessarily pointing to the teacher’s correct answer that they had in mind. (Agile Interview, p. 7)

Germane to our discussion is Lacey’s perception of her teachers as individuals who pose questions to which they already have answers. Not surprisingly, Lacy has been prone to perceive her teachers as assuming a role at least partially determined by the rules and division of labor that have characterized the schoolgoing activity system since the Middle Ages. Playing by traditional rules, teachers try to elicit the "correct" answers from students. Not the case for Lacey with Agile. This experience seems to have made available to her a different role ("other-than-student"), one in which she seems motivated to develop and share her own answer helped along by the affordances of the portal.

Along the same lines, the instructor of Management 478 might have begun the class in a role like the one Lacey had initially counted on. Nevertheless, the following reflection indicates that his work with the portal may have enabled him to inhabit a role other than "answer person":

See I sort of entered the case thinking Polaris is kind of going down the wrong road and the historical data and the class discussion have kind of now swayed me in how I think about Polaris. Maybe what they did wasn’t that bad of an idea; I’m still not sure they’re distributing things correctly and I still wonder about taking Harley on directly, but, there are a lot of things to recommend what they’re doing here and that came out of the discussion that that was discovered in our doing this. It’s different than I would have thought going into it. Which I think is another good benefit of doing…[the case this way]. (Business Interview, p. 55)

This passage shows the subtlety with which the instructor's role changed as he modulated between "answer person" and lead consultant. We can see this modulation in role as well in this comment recorded during a discourse-based interview in which the instructor reviewed student texts:
I can kind of sense now how a real executive might feel, you know, somebody who gets bombarded with stuff, and so if you’re going to communicate with me, can you really lay it out so I can see right away, so you and I can link up right away and I know where you’re coming from. That’s why I like, especially these two that were organized so clearly with nice sub-headings and logical flow, here’s my point, followed by a paragraph on that point, here’s a second point followed by a paragraph and then a summary. (Business Interview, p. 6)

In this case, we see how a genre becomes more than a set of rules for the instructor. Because he at least partially inhabits a role he likens to that of a "real executive" in which his mind is open to the suggestions of the students, the information structuring strategies that characterize a readable document become salient as important tools for accomplishing the task of recommendation and persuasion.

It is important to note here that the modulation of the instructor and students between traditional roles and "other-than" roles is not an indication of the failure of the simulation to achieve its goals as some scholars might suggest (see, for example, Freedman et al. (1994) who seem to suggest that students and instructors must always be "in role" for a simulation to be successful). Indeed, as Schön implies, this modulation is an important indicator that the reflective practicum is "a collective world in its own right, with its own mix of materials, tools, languages, and appreciations" (Schön, 1987, p. 37). I see the modulation documented in the previous passages as essential to enabling the "reflective" part of the reflective practicum. I develop this idea in greater detail in Chapter 5.

Questions 2 and 3

Messy context forces students to work at setting problems. Producing authentic closing texts (i.e., workplace genres) contributes to students' professional attributions.
Question 2: How does the Agile case compare with the other cases you've worked with here at ISU?

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<thead>
<tr>
<th>Consideration</th>
<th>Retention-oriented actions</th>
<th>Transfer-oriented actions</th>
<th>Operations</th>
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<th>Total Utterances</th>
</tr>
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Question 3: Do you feel like the Agile experience is more or less like what you might experience on the job than the other cases you’ve worked on in class? How?

<table>
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<td>10</td>
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<tr>
<td>Other</td>
<td>5 (Three of these utterances referred to jobs students actually worked, so naturally, they contain a professional attribution.)</td>
<td>10</td>
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</table>

Messy context causes students to work at setting problems.

Schön observes that "in real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling, and uncertain" (p. 40). For Schön problem setting is tantamount to selecting "what we will treat as the 'things' of the situation," that is, setting "the boundaries of our attention to it, and we impose upon it a coherence . . . . We name the
things to which we will attend and *frame* the context in which we will attend to them" (1983, p. 40).

Students differentiated between the Agile context and comparison contexts by foregrounding the uncertainty involved with Agile. Their characterization of this uncertainty and how they dealt with it resulted in a report of transfer-oriented action for each utterance coded (eight of eight for Question 2 and 10 of 10 for Question 3). All the respondents saw the Agile experience in one way or another as more "open-ended" than a traditionally narrated (Harvard) case.

For example, Janell, in comparing a traditionally narrated case with Agile, observes:

Janell: Vagueness, is the only way to describe it – When you draw parallels between the case studies and Agile and the case studies tended to pinpoint a certain issue, a certain subject. The Agile thing reminded me of just how vague the world is and how little information we tend.. we learn in business schools about equations and getting exact answers and minimizing and maximizing certain things, and in the real world it isn’t really like that; you’re given a lot of information on a lot of different subjects and the vagueness of it, how difficult that must be… we can look back at these case studies and say "Well, that CEO or the executive team, boy they really made a poor decision" but, the Agile case tells you exactly what they were looking at and how vague it is and how difficult it is- Was it successful, or maybe luck had a lot to do with it too. I think that’s the biggest thing I learned from Agile. (Agile Interview, p. 20-21)

Janell sees orienting herself in this "vague" world as an important part of her learning experience. The absence of extensive narrative forces her, as Schön says, to "name" the things to which she will attend. She also learns that decision makers represented in other cases she has considered have wrestled with the same issues.

Janice, responding to the same question, actually credits this messiness as contributing to her professional attribution for the Agile case:

Janice: I think it is definitely less cut and dried that a case in the textbook, either you’re taking ideas from all kinds of different documents and you’re looking all over
the place for them instead of just reading 15 pages and that’s it. . . . It definitely makes it more "real worldly."
(Agile Interview, p. 5)

Janice talks about "looking all over the place" for documents rather than "just reading 15 pages." If we think about her and Janell's responses, we can see that this environment requires that the student look around to piece together the story of the situation at hand.

When dealing with a traditional case study, this work is typically done by an (invisible) narrator (the case author). This case author, while usually including more information in the case than is relevant for a particular problem, still, provides a filtering function when it comes to representing the situation. The Agile portal provides less of this function while asking students to engage in much of the story construction the author of the traditional case would provide. Thus students, rather than the case author, are to a greater degree responsible for framing the problems arising from the case context than they are when someone narrates a case for them. The students saw this process of framing as requiring them to undertake transfer-orient actions, ones they could readily see themselves undertaking again at work.

**Genre of closing documents contributes to professional attributions.**

Requiring that students produce workplace genres is another way the Agile designers attempted to evoke a world that referred to the one that the management students hoped to join.

Of the eight students who responded to Question 2, only one—Miguel—said he had had a similar experience with a case at university. His description of this experience provides insight into the kind of activity evoked by the Agile portal.

Miguel: for an engineering class, I took.. we had a project that was very similar to the Agile case where you had information, you had information, - 20 documents or something like that and we would decide which ones were important and extract information from maybe 10 or 12 of them and use that to formulate your final
solution to the problem, but I think that one was definitely similar to the Agile where you were reading through different documents and using those; taking information from various ones and using them to put in your papers. (Agile Interview, p. 12)

Miguel emphasizes the opening texts, which he identifies in another response as being "data" (Agile Interview, p. 5), that is, data represented in workplace genres. As I mentioned above, the theme of different (than the traditional classroom texts) or authentic opening texts runs throughout the student responses. However, Miguel, also shows the importance to his experience of closing texts:

Miguel: I guess most of the cases I’ve done are kind of like the one class here where you read 10 pages and answer some questions, it’s pretty directed, it’s pretty obvious what you need to do . . . (Agile Interview, p. 5)

Miguel's differentiation between school genres and non-school genres again highlights the way a CMS can be configured so that students actually "do school" differently than they have done it in the past. Indeed, many students associated traditional school genres with busy work or what they seemed to perceive as "overhead" associated with school.

For example Janell talked about what she called "prop up" assignments distributed throughout the business curriculum:

Janell: . . . there’s always some added throw on stuff, I guess, to meet the ideals that maybe the College of Business has that’s kind of add on stuff to help prop up some grades. I really didn’t feel like there was any of that in here [Management 478]. Obviously, the Agile thing was something that, I guess, was a test-run thing to kind of figure out how it works, but I didn’t really feel, I mean I felt like that was a value-added thing to the course, not something that was just thrown on to prop everybody’s grades up, so I really didn’t feel like any of that. I thought all of it had a purpose and a place, and to me that’s good. (Agile Interview, p. 23)

Interestingly, Janell's observation about including the Agile assignment in place of prop up assignments is almost the opposite of what Martens and Kellermanns seem to be advocating when they suggest that CMSs should be used to offload the administrative parts of the
course\textsuperscript{14}, including actions like quizzes and required discussions (which the students in my study tended to characterize in terms similar to Janell's as "prop-up" or "busy work"). Janell, however, sees the actions she undertakes using the CMS as adding value by bringing something new to the course, while in Martens and Kellermanns' investigation the CMS is touted as making the old or traditional faster or more efficient.

Richard claimed to have gathered plenty of experience with what seems to be a common academic genre in business, the "writeup":

Going through the Agile stuff and getting a chance to do that, I thought that was helpful. It kind of taught me to be a little bit more concise and direct in my writing, instead of trying to fill up a 3-5 page space. You had to really get down to what was important and present that as opposed to filling a certain amount of space with other types of writing. [Agile] helped with getting you to do the type of writing you will be doing once you get out into the workforce. (Agile Interview, p. 20)

For Richard, the genre he was required to create for the Agile simulation caused him to engage in actions he associated more with workplace rules. For him the rule of "getting down to what is important and presenting it" is clearly one he associates with a workplace while "filling a certain amount of space" is a rule he associates with school writing. Thus, his participation in the Agile context may have evoked for him a different set of rules.

**Question 4**

Interaction during construction and revision of closing texts that was unconstrained by traditional classroom rules contributed to professional attributions. (Question 4)

Question 4: Have you taken other classes that have an online component using WebCT or other course tool? How did the Agile experience compare with that class/those classes?

\textsuperscript{14} Of course, this is a perfectly valid use for a CMS and can lead to freed up class time for a variety of activities. However, I suggest that a CMS can do more, if people are willing to consider its potential for evoking extra-classroom contexts.
Cognitive processes

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<th>Consideration</th>
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Professional attributions

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<tr>
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*Operations can support either retention-oriented or transfer-oriented actions.*

Four students characterized their work with Agile in terms of operations, like downloading or uploading (i.e., actions that have become routine and therefore require little cognitive processing), while eight characterized their work with other CMSs in terms of operations. There were, however, important differences in the way students described the operations undertaken within the two contexts. In both cases where students made professional attributions to the Agile environment, they did so while talking about the operations involved with file (assignment) sharing. For example, Richard states:

> All my classes right now are Web CT. You log-in, you write the papers and you log out. I guess with Agile, I felt it was more like real life where you would go in and see every body else's documents on a situation and kind of share things like that. (Agile Interview, p. 11)

Because the Agile portal was configured to represent a consulting organization, all student assignments were viewed as a contribution to the ongoing development of that organization and therefore as resources to be drawn on by each consultant. Whereas in traditional classroom configurations, individuals (or in many cases teams) are responsible for assignments, these assignments are submitted to the instructor and never viewed by members
of other teams. Such was not the case with Agile, and many students felt that the affordance provided by the CMS for sharing assignments when coupled with the elimination of the classroom rule about "competitive" or "private" assignment submission contributed to their professional attribution for the experience.

Students generally felt like this kind of online affordance for sharing of information was more in line with actions they expected to take at work than other means of communicating online. Part of this attribution may result from the genre of the closing text (as noted in the previous section) and part of it may spring from students feeling that certain actions or genres enabled by traditionally configured CMSs are school-oriented and therefore "prop-up" assignments. Manny is candid in expressing his views about the discussion postings held up by many researchers as an important interactive part of online learning:

Manny: I actually liked Agile better simply because... (The) Web CT in my previous classes where they did try to get us to post things, and stuff like that.. it wasn’t really there, it was basically you just go there and check your class. Or upload an assignment on Web CT. I liked Agile because the best part was document sharing, being able to review those who already had the assignment done and see what they had to say and go from there. And I liked that (type) of class. (Agile Interview, p. 12)

For Manny, required discussion posts seemed to add little to his learning experience, perhaps because he didn't see how they moved him forward in the classes in which the posts were required. Agile's assignment (document) sharing, though, did make sense to him in the context of completing his work. As I discussed in Chapter 2, the file-sharing feature within the portals enables students to submit their completed assignments or what they believe to be their "best texts." At the same time, they are free to download and view completed assignments uploaded by other students/groups. After viewing these other "best texts" they can revise their own submission(s) until the deadline for the assignment has passed.
About half the students interviewed commented on this assignment-sharing affordance in a similar way. And, based on the MyCase user tracking statistics, students downloaded 1039 documents that were written by other students (i.e., viewed assignments completed by other students/groups) over the course of the semester. That means that each student examined an average of 24.7 documents (besides their own) for the semester and an average of 6.2 documents (besides their own) for each assignment. As I noted earlier and as Manny indicates in his response, this document sharing often led to transfer-oriented actions like evaluation, especially when students were deciding about the usefulness of their peers' approach to problems. In Chapter 4, I show further how this affordance contributes to students understanding the social motive for the activity simulated within the portal.

Students also pointed out other differences in the actions afforded by Agile vis-à-vis traditional CMS configurations. Richard characterizes the differences in the following way:

Richard: I’ve had a lot of classes with something to do with the website, but most of them are the instructors’ website to post notes or post news or whatever. So it’s a little different from the Agile case where it’s like interactive tool type of deal. So, it’s kind of hard to compare, but as far as the overall design and ease of use of the Agile website, I thought it was great. I don’t really see how you could have made it too much better. The menus are real easy to navigate through; I didn’t encounter any problems as I was going through the website, so it was very well designed. It made it very easy to navigate.

Richard seems to indicate that site "ease of use" is a least-common denominator when it comes to student's perception of a course website. His comparison of the instructor's site to post news with Agile as an interactive tool seems to indicate his acknowledgement of a significant difference between the two uses for the Web, even as far as operations go. Whereas the instructor-student communication in this case seems one way, the work that takes place in the Agile environment is "interactive."
Other characterizations of the deployment of other CMSs also suggest the perception of limited interactivity accompanying many deployments of WebCT™. The following comments come from the same interview:

Lacey: It [Agile] was totally different. When I used WebCT™ in other classes, it's just been for pretty much multiple-choice, online quizzes. I am trying to think if any other classes use WebCT™ for something a little bit more different.

Kevin: Get your grades, class notes, do an online quiz.

Lacey: It's just a class web page.

These responses suggest that—as Martens and Kellermanns have shown—traditionally configured CMSs make traditional schoolgoing more efficient. Nevertheless, students still find themselves in the "world" of the classroom, engaging in the types of actions that have characterized schoolgoing for years.

A CMS configured as it might be within an organization, however, contributes to a noticeable change in students' perception of the classroom activity system and involves them in actions they see as more aligned with the sort of work they will engage in outside of school.

**Conclusion**

By analyzing how students talk about their experiences with the Agile portal in relation to their experiences 1) with CMSs as they were used in other classes, 2) with traditionally-narrated case studies, and 3) in the workplace, I have tried to show that there are ways to configure a CMS so that the tool becomes more that just a Type I use of Internet technology or an embodiment of the technical imperative. The alternative configuration presented in this study seems to help students to confront the kinds of indeterminate situations that Schön believes frequently confront professional practitioners and requires that they engage in the
types of actions necessary for making decisions in these sorts of contexts, actions I have labeled as transfer-oriented.

In many cases, students associated these transfer-oriented actions with "real-world" work. That is they believed that work outside the university would generally be characterized by actions that require them to apply, analyze, evaluate, and create. However, being asked to undertake these activities within a school genre (e.g., a synthesis-oriented test question) did not elicit the same professional attribution (e.g., students saw test question that asked them to synthesize as and thus seemingly the same level of engagement that it did when undertaken in conjunction with the Agile portal, with its authentic opening texts and requirements for collaboration to produce authentic closing texts.

In working to show that a CMS can be configured to enable transfer-orient actions and attributions of extra-university context, I discovered what I believe to be important components for people wishing to accomplish similar tasks in their classes (and thereby develop a reflective practicum), either with or without a Web-based CMS.

These are the things that helped evoke an environment in which instructors could act as coaches and students could practice the role of consultants:

1) Participating in a decision-making process that students felt was open-ended, yet had consequences they could easily imagine as "real." (Question 1)

2) Working with authentic opening texts. (Question 1)

3) Producing closing texts that students saw as having a purpose beyond propping up a classroom grade (i.e., not just "papers on topics"). (Questions 2 and 3)
4) Interacting during construction and revision of closing texts that was unconstrained by traditional classroom rules and followed what students perceived to be workplace rules more closely. (Question 4)

In the following chapter, I examine the relationship between the classroom and the workplace in greater detail and suggest how the four elements listed above help create an environment in which the students can understand and at times embrace the social motive for undertaking various workplace (communication) genres.

References


Appendix A: Focus Group Questions

Business Focus Group Script (mid semester)

Notes: Two video cameras and tripods reserved for Thursday, Feb 26.

Briefly introduce yourselves, include:

- First name
- Major
- Internship/corporate work experience
- What you’d like to do after you graduate.

Do you feel like the Agile experience is more (or less) like what you might experience on the job than the other cases you’ve worked on in class? How?

(Possible follow up) What type of job do you think you’d have if you were doing work similar to that you undertook with Agile?

How does the Agile case compare with the other cases you’ve worked with here at ISU?

(Possible follow up) Did the instructor teach differently with the Agile case than he did with the other cases?

Was your learning process different for the Agile case than it was for 1) the exam 2) the other cases you’ve considered thus far? (Describe how.)

Did you refer back to information from Phase 1 as you worked on Stage 2? Did you look at different information?

Did you find yourself using course concepts, such as Porter’s five forces model, to try to make sense out of what was happening in the Agile case? At Stage 1? At Stage 2? Point out in memo, if possible (and workable given focus-group constraints).
Business Focus Group Script (late semester)

Briefly introduce yourself:
First name

Mgt. 478

Coming into Management 478, what were your expectations for the class (i.e., what did you expect to get out of it)?

What parts of Management 478 do you think prepared you most for your work after graduation?

What parts of Management 478 seemed to be specifically about passing or getting a decent grade in the class?

Book Cases and Case Presentation

What do you feel you learned from covering the cases in the textbook?

Are you learning more or different things from preparing for the end-of-semester case presentations?

Agile

What do you feel like you learned from the Agile case?

Do you feel like you could have learned that (as well or better) from another one of the teaching methods used in the class (book case, lecture, case presentation, class discussion)?

Did you find your approach to the Agile projects changing as the semester progressed?

Did you find yourself using different tools (kinds of information) provided in the Agile environment as the case progressed? If so, which ones at which stage?

Did the instructor's feedback on your work on the case change how you approached the Agile projects as the semester continued?

Did the instructor's feedback on your tests change how you approached the Agile projects as the semester continued?

Have you taken other classes that have an online component using WebCT or other course tool? How did the Agile experience compare with that class/those classes?
Would you recommend using Agile in future sections of Mgt 478? What would you change?
Chapter 4: Suits to Class?: A case does not a simulation make

Preface

This chapter tackles the issues raised by Adam, Dias, Freedman, Medway, Smart and Paré, who suggest that implementations of simulations within classroom cannot provide students with the type of activity necessary for experiencing the social motive behind genre:

To [participate in the actions of the workplace community], they will need to sense from the inside the nature of the social action entailed by these new genres: the instrumental and praxis-oriented social motives, the complex phenomena of multiple readerships (some remote in time and place), the different life-cycle of their texts, and the different literacy practices surrounding the texts (reading practices and collaborative composing strategies). None of this know-how will have been made available through simulations, no matter how realistically or elaborately staged. (Freedman et al., 1994, p. 221)

I suggest Adam, Dias, Freedman, Medway, and Paré base their work on a definition of simulation that is too narrow (e.g., traditional case study write-ups and what they refer to as "wearing suits to class"), that is, in activity-theory terms, they label as "simulation" classroom activity that seeks to emulate only certain aspects of a target activity, namely its object (i.e., the closing text—"specific recommendations for action to a board of directors" (Freedman et al., 1994, p. 202) and one of its mediators, in this case a "rule": wearing suits (to class). I then argue that only by representing the tools, rules, and division of labor of the target activity system can a simulation be successful in providing the opportunity for students to engage in actions like the ones they might undertake outside of school, while also understanding and sometimes sharing the motives of those who engage in such actions.
Through the use of focus-group interviews with students and a semester-end survey of students, I show that students in technical communication classes in which one of our simulations was used were more prone than their peers in sections that used traditionally narrated cases to feel like they were\textsuperscript{15} 1) writing for a professional audience, 2) receiving feedback similar to that which they might get at work, and 3) understanding—and at times sharing—a social motive for the assigned work other than the one they normally attributed to their school-going activity. As the discussion proceeds, I also suggest—with the help of student input—which aspects of the portal and its deployment in the class contributed to these results.

I will submit a version of this chapter to \textit{Written Communication}, the venue in which the work of Adam, Dias, Freedman, Medway, and Paré has most often appeared. To make the article ready for submission, I may have to include a brief review of the course activity system model I developed in Chapter 1.

\textbf{Introduction}

Interviewer: So what do you think you are learning in this class?

Rachel: I think we've learned what we have done. In other classes we learned topics and things, but this by doing them, it's sort of like a lab, but you're not filling out, you're not working for a report, you're actually doing things and doing anything you do, you really have a firm grasp on it. I mean, just by doing it that way instead of learning facts and regurgitating by doing them, pretty much everything that we've done, is kind of what I've learned.

Technical communication student discussing her experience participating in an online simulation

In this chapter, I forward the idea that computer simulations of organizational situations can be one way of successfully bridging the gap between school and workplace

\textsuperscript{15} In many cases these students had already had coop/internship experiences.
writing. In so doing I interrogate the work of scholars such as Freedman, Adam, and Smart (1994) who conclude "None of this know-how [i.e., knowing how to acquire new genres] will have been made available through simulations, no matter how realistically or elaborately staged" (p. 221) and Dias (2000) who argues that

If a view of writing as social practice is to prevail, then writing classrooms must be open to writing tasks that emerge as outcomes of situations within the classroom (not simulations, which I believe would produce simulated writing), and with that a degree of spontaneity and urgency that cannot be anticipated in preset assignments. (p. 26)

Before going further, I need to characterize what in these scholars' eyes qualifies as a simulation. Freedman, Adam, and Smart use the word twice in the title of their 1994 article "Wearing Suits to Class: Simulating Genres and Simulations as Genre." For this article Freedman, Adam, and Smart studied an upper level-course in financial analysis in which students used a textbook consisted entirely of case histories, and students were "required to write up their own analyses of the cases under discussion every week" (p. 199). Students also worked in groups to develop three "formal written case studies" which involved "both analyses and recommendations for action" (p. 199). Finally, for one of these written studies students were "asked to do an oral presentation for the whole class, based on their written report" (p. 199). For this presentation students were asked "to role-play actual players within the case, make recommendations to the relevant board of directors" (p. 199). In their roles as case participants, students generally wore suits to make their presentations. A classroom course conceived in this or some similar way, then, seems to be what this group of scholars considers a simulation.

As I proceed, I'll suggest that the aforementioned scholars and their adherents base their work on a definition of simulation that is too narrow (e.g., traditional case study
write-ups and "wearing suits to class"), that is, in activity-theory terms, they label as simulation classroom activity that seeks to emulate only certain aspects of a target activity, namely its object (i.e., the closing text—"specific recommendations for action to a board of directors" (Freedman et al., 1994, p. 202) and one of its mediators\(^\text{16}\) (in this case a "rule": wearing suits (to class)).

This chapter, then, uses activity theory to suggest that if acquiring a genre is as Dias et al. suggest really acquiring an activity (p. 28), then for a simulation to be successful it must represent the entire activity, rather than simply certain aspects of it. In other words the simulation must pay heed in some way to the subject, object, and mediators that characterize that activity. In doing so within a classroom context, then, it becomes what Star (1989) has called a boundary object, that is, a tool used to join activities together (Bowker & Star, 1999), in this case the classroom activity system and a workplace activity system.

I will argue that one portal we have created, Omega Molecular, enables students and instructors to operate in what Konkola (2001) calls a boundary zone\(^\text{17}\), that is:

\begin{quote}

a hybrid, polycontextual, multi-voiced and multi-scripted context, the boundary zone is considered a place where it is possible to extend the object of each activity system and to create a shared object between them. In that way, the activity itself is reorganized, resulting in new opportunities for learning. (Tuomi-Gröhn et al., 2003, p. 5)
\end{quote}

In Chapter 5, I show how the hybrid activity enabled by a Web-based simulation reorganizes both classroom and workplace activities to enable both instrumental practice

\(^{16}\) Tools, rules, and division of labor are considered mediators within an activity system. They mediate the relationships between subject and object (tools), between subject and community (rules), and between object and community (division of labor) respectively.

\(^{17}\) This definition of a boundary zone sounds strikingly similar to the space that Schön (1987) sees as necessary for developing a reflective practicum: "It stands in an intermediate space between the practice world, the ‘lay’ world of ordinary life, and the esoteric world of the academy. It is also a collective world in its own right, with its own mix of materials, tools, languages, and appreciations" (p. 37).
as well as critical reflection and action, a combination that has proved elusive to instructors in professional curricula. In this chapter, though, I concentrate on showing that students in technical communication classes in which the Omega simulation was used were more prone than their peers in sections that used traditionally narrated cases to feel like they were 1) writing for a professional audience, 2) receiving feedback similar to that which they might get at work, and 3) understanding—and at times sharing—a social motive for the assigned work other than the one they normally attributed to their schoolgoing activity.

In so doing, I hope to make the case that a simulation that (convincingly) makes available a role other than student can be a boundary crossing experience for students, that is, an experience that enables them to encounter the practices of a context other than that of a traditional classroom in a way that can help "bridge the gap between university and workplace discourse" (Freedman & Adam, 2000a, p. 130).

**Acquisition through immersion**

Freedman, elaborating on C. Miller's (1984) formulation of genre as social action, suggests that if "a view of writing as social practice is to prevail" (p. 26) writing instruction cannot take the same form that instruction in many other disciplines has taken, that is, tutoring in certain discrete facts or procedures (in the case of writing, generic features) followed by a test to determine whether or not students have retained and can apply those facts in problem situations resembling ones discussed in class. In arguing against this type of instruction and for writing classrooms that are "open to writing tasks

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18 See, for example Bushnell (1999) who admits that while he feels his seminar in technical communication enables students to "examine various narratives created by technical and scientific writing, including their own, and to critique the conventional notion that those kinds of writing are objective and impersonal" (p. 182), he has not been successful in introducing the elements of his "subversive agenda" into his practicum courses.
that emerge as outcomes of situations within the classroom" (p. 26), Freedman uses the work Krashen and Ellis.

According to Freedman (1994), Krashen and Ellis (in separate articles) suggest that "the number of rules that can be applied in language production by the learner is very limited" (p. 198). Using Krashen's terminology, she insists that "learning" (i.e., "the conscious learning of rules such that they can be formulated explicitly by the learner") and "acquisition" (i.e., "unconscious inference of rules on the basis of exposure to the target language") are two "separate processes resulting in different kinds of knowledge, each stored separately, with no interface between the two possible" (p. 198). Thus, according to Freedman, as writing teachers we need to focus on enabling "[m]eaning-focused instruction, reading and writing for meaning [which] leads to implicit knowledge" (p. 204), rather than on instruction aimed at teaching students explicit rules or features of various discourses.

Freedman concludes that because there can be little efficacy in teaching the features of genre, "teachers have a central role to play in setting up facilitative environments" (p. 200) in which tacit learning can take place. Essential to such environments is the inclusion of reading experience of a number of expository genres. Perhaps even more important, though, is the role of "intention," "having something to say" (p. 201). "In addition to exposure [reading exposure to genres], then, what is necessary is an occasion and a need to mean: some kind of rhetorical exigency which will elicit performance" (p. 201). I agree with Freedman's argument to this point. Where we differ is on our belief about the ability of simulations to represent non-school situations to a degree in which
students feel they "have something to say" that both springs from their immersion in the situation and then has some impact on the situation as time goes on.

Freedman and her colleagues are always careful to emphasize the "school-bound" nature of the classroom, arguing that "student writing within professional simulations needs to be seen not as a process of bringing professional practices and texts into the classroom, but as types of texts in their own right, quite distinct from the 'real' workplace" (Pardoe, 2000).

Case in point is Freedman's observation:

It has become a cliché to speak of school activities as decontextualized. While that cliché has some validity with respect to the data dealt with in the classroom, it is meaningless in discussing contexts of composing. School writing has a real context – not the imaginary situation specified in some assignments (from 'you are an irate customer writing to the President of Air Canada' to elaborated 'cases'), but the classroom itself, and all that it entails. (p. 201)

Nevertheless, one aspect of the classroom context that proves most difficult for these researchers is what Dias (2000) calls the "school-going" activity of students (p. 20). Providing an activity-theory analysis of a writing course, Dias notes that each student (and teacher) "bring(s) different roles and histories to the activity and therefore regard the activity very differently from how it is regarded by people who occupy different institutional roles" (p. 21). In other words, the object or motive for the students in a writing class may range from a "desire for learning (including learning how to write), getting a qualifying degree (for employment or graduate study), and in some cases, acquiring or maintaining social status" (p. 20). These motives have concrete implications for how students engage school assignments.

In writing about students in a composition course offered at his university Dias admits:
it is more than likely that a student reading that one of the criteria for evaluation is "unmistakable evidence of effort to employ recommended strategies," may decide that given this criterion, her goal becomes one not so much of using those recommended strategies but of so staging her writing that evidence of their use is clearly apparent. (p. 25)

The question naturally arises, then, as to what exactly such a classroom experience amounts to. The student in question certainly reads and understands the guidelines enacted by the teacher, understands what needs to be done to achieve a goal that's aligned with her overarching reason (motive) for engaging in the school-going activity, and acts in a way that moves her toward her object. Still, if we ask ourselves if the student views these activities as "real" or "authentic" our teacherly answer might range from "Well, not in the way we had hoped" to "No, not at all. She was just playing the game." We might even go further and ask why one game—the "college writing game" as characterized above should be privileged over another—the "workplace writing game," especially in courses that are supposed to prepare students for communication outside the university. Still, Freedman and Adam (2000b) go so far as to suggest that students see whatever task they are assigned at university as authentic:

In contrast [to inauthentic internship tasks], any task in the university context is seen as authentic insofar as the instructor assigns it. From the perspective of the classroom simulations are as authentic as academic essays, or lab reports, or book reviews. (pp. 46-47)

This view springs from these scholars' definition of an authentic task, "one that has consequences in its context" (Freedman & Adam, 1996). I view Freedman and Adam's application of this definition to the academic context as problematic because it doesn't seem to recognize the special role attributed to schooling by students: that of preparation

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19 Later in this chapter I'll talk briefly about the "peanut-butter-and-jelly factor", which amounts to writing teachers creating assignments that while they might help students practice writing genres, like instructions, leave them generally unmotivated or unwilling to see the assignment as aligned with their motive for being in school.
for future activity (tasks that may have consequences for/in future contexts). It also
underestimates the sensitivity of students to the rules of the school context (their
understanding of it as a game\textsuperscript{20}). Nelson (1990) observes that writing tasks that students
viewed as "unmotivating" and a "waste of class time" caused them to expend negligible
effort, taking the kind of shortcuts mentioned by Dias above (p. 394). In Nelson's case
study, the tasks that elicited these descriptions from students looked very little like the
tasks they anticipated confronting outside of school: "the engineering students had to
paraphrase what they had read, and the sociology students had to follow the step-by-step
guidelines for presenting a field report" (p. 394). Nelson concludes that "[i]n addition to
examining how students interpret writing assignments under different conditions, we
need to explore the relationship between task interpretation and learning through writing"
(p. 391).

One theorist who has taken up Nelson's suggestion is Pardoe (2000) who offers a
direct critique of Freedman et al., who he contends offer an uncritical reaction to
vocational educators' claims that their classroom activities are "real" by "counter-
claiming that they are 'not real'" (p. 143). Pardoe states:

\begin{quote}
By asserting what is 'real' and 'unreal' themselves, their analyses miss the
negotiation of this within the classroom. They miss the ways in which making
links to professional practice beyond the classroom is part of the process of
attributing significance to the activities and experience, and learning from them.
They miss the way in which separating off educational experience and activity
from the 'real world' is already a pervasive practice. They miss the way in which
students have a highly skeptical view of claims that activities in education are
'real'. And therefore they miss the need for tutors to anticipate and respond to
assumptions and to talk of what is 'real' as an integral part of developing shared
understandings within their classroom. (p. 143)
\end{quote}

\textsuperscript{20} For some very candid student testimony about this school-going game from a group of seniors in
Management, see Chapter 3.
Like Pardoe, I am unwilling to accept that the classroom boundaries are impermeable and that the social motive of classroom writing is confined (as Freedman and her colleagues suggest, see below) to sorting and ranking students and to the "display" of disciplinary knowledge through participation in school genres, like essay exams, case write-ups, or even the classroom-produced amalgams we have grown accustomed to calling workplace genres\(^\text{21}\). As Pardoe points out, many students draw their motivation for participating in post-secondary education from their desire to find and (be better-prepared participants in) rewarding (financially or in terms of personal fulfillment) work after their university experience. This research study acknowledges this drive as a third social motive for the activities (including writing) that take place in professionally-oriented classrooms.

It follows, then, that we need to place students in situations where they can practice making sense of workplace-like social activities by examining the artifacts those activities produce and then, in turn, producing those types of artifacts themselves, not without instruction and scaffolding, but with a special kind of instruction designed to help students read and write the environment they discover. Part of this instruction, as Pardoe notes above, involves helping students learn how to attribute the significance to the events that take place in the learning environment.

Now, I consider why more than ever before we have the ability to transplant a variety of workplace activities into university classrooms. Later I'll explain why this transplantation is essential for allowing students to practice workplace genres.

\(^{21}\) One problem in professional communication classrooms is genre confusion created by asking students to produce workplace forms while tacitly maintaining the warrants of citation that characterize academic writing. This confusion is compounded when we ask students to produce workplace forms while making little effort to immerse students in the exigencies from to which these forms are a response.
Mediators and Interfaces

Again, I turn to Freedman, Adam, Smart, Dias and Paré, who have done considerable research on the differences between school and workplace contexts and the communication that occurs in each. In order to make the case for classroom simulation of professional contexts, we must address the serious doubts they raise about the efficacy of such projects, even as we draw on their fieldwork to inform the construction of our simulation. I'll do this by

1. proposing that a Web interface helps to eliminate some of the barriers that Freedman, Adam, and Smart (1994) argue prevent classroom-bound students from "sensing from the inside the nature of the social action entailed by" workplace genres (p. 221), and

2. arguing that this interface, when configured in a particular manner, supports a game that can be played using the rules and division of labor common in contemporary workplaces and thus provides students with the opportunity to practice acquiring genres by experiencing workplace-like social practices, especially the collaborative process of document cycling.

Work and School

Much of the work undertaken by Dias et al. (1999) and the scholars in Dias and Paré (2000) is aimed at describing the differences between communication activities at school and in the workplace. Indeed, Crew (2001) has cataloged over twenty differences that these scholars have posited between the two contexts. Freedman, Adam, and Smart (1994) provide a summary view of the implications for education they draw from their observation of these contexts. I'll call these Conclusion 1 and Conclusion 2 respectively.
When students leave the university to enter the workplace, they may have acquired, in part as a result of their writing in disciplinary courses, the intellectual stance, the ideology, and the values necessary for their professional lives. However, what they will still need to learn is "how to participate in the actions of [this new] community" (Miller 1984, p.165). That is, they will need to acquire new genres. (p. 221)

To do so, they will need to sense from the inside the nature of the social action entailed by these new genres: the instrumental and praxis-oriented social motives, the complex phenomena of multiple readerships (some remote in time and place), the different life-cycle of their texts, and the different literacy practices surrounding the texts (reading practices and collaborative composing strategies). None of this know-how will have been made available through simulations, no matter how realistically or elaborately staged. (p. 221)

For these scholars, school and workplace are truly "worlds apart." Their pedagogic work (see, for example, Dias (2000) and Freedman (1994)) is aimed at developing writing instruction to help students acquire "intellectual stance, ideology, and values necessary for professional lives." As for Conclusion 2, even when Freedman and Adam (2000a) allow that a practicum course in systems analysis can bridge the gap between school and workplace writing, providing students at least some notion of participation in an instrumental practice, they argue that such a course is a rare exception rather than the rule:

What is significant about the practicum writing, however, is the degree to which it differs from typical university writing and the degree to which it is tolerated
within that context only as long as it remains an exception. One such course is
tolerated, and then only because the best students are allowed entry. (p. 143)

What I find problematic about Conclusion 2 and Freedman and Adam's
characterization of the exception to Conclusion 2 is an apparent acceptance of the status
quo within the university setting. According to these scholars, writing at school is about
making learning explicit, about students showing what they have learned. Learning how
to write, then, is about participating in school genres, ostensibly to become more
accomplished in disciplinary ways of making learning explicit (as Dias et al. state:
"student writers came to adopt the intellectual postures (e.g., the modes of argumentation,
the constructions of reality) of scholars in that field" (p. 48). What goes unquestioned in
their conclusions and what Pardoe suggests (above) is 1) why so many educators, despite
these scholars' findings, continue to use some form of simulation in their classrooms, 2)
what might an instructor do differently than Adam, Freedman, and Smart's finance
professor (who encouraged students to wear suits to class) in attempting to create a
meaningful boundary-crossing experience and 3) what can we do to provide all students,
not simply the best, with such a boundary-crossing experience?

The answer to the first question, I believe, lies in the belief of many educators that
their students don't aspire to, nor will they seek employment as, scholars in a particular
field. More likely, especially with the continuing evolution of applied fields like
technical communication and management, students come to the university to prepare to
be practitioners in a field outside the university. Thus, instructors feel some obligation to
produce for example, technical writers, rather than compositionists; management
consultants, rather than management professors. Indeed, we see Bain, Dias et al.'s
finance professor, working to open up the subjectivity of "financial analyst" for his students to inhabit (p. 61).

Possible answers to the second and third questions are embodied in our work to create a computer-based simulation that can enable students to participate in social action like they might in a post-Fordist workplace. In many ways the computer interface is just that, an interface between the world of school and the world of work, an interface that can enable more than a few students to have a significant boundary-crossing experience within the confines of an academic setting.

Through the glass

We are teaching in a time when computer technology permeates our lives and the lives of our students. Many groups (though not all, and definitely not all in the same way) within the United States and throughout the world have felt the impact of the information age. As Manovich (2001) points out, more and more of our lives—both work and leisure—are lived working with computer interfaces:

The interface comes to play a crucial role in the information society . . . . In this society, work and leisure not only increasingly involve computer use, but they also converge around the same interfaces. Both "work" applications (word processors, spreadsheet programs, database programs) and "leisure" applications (computer games, informational DVD) use the same metaphors of GUI. The best example of this convergence is a Web browser employed both in the office and at home, both for work and for play. In this respect information society is quite different from industrial society, with its clear separation between the field of work and the field of leisure. (p. 65)

And, just as Manovich sees a blurring or even disappearance of the boundary between work and leisure, so interfaces like the Web browser help bring about a blurring of the boundary between school and work.
In thinking about the future of the Web, Brown (2000) compares its development to that of electrification after the invention of the first generator "a story of gradual development followed by an exploding impact" which includes, he goes on to suggest, "a new kind of information fabric in which learning, working, and playing co-mingle" (p. 12).

Along the same lines, Lankshear and Knobel (2003) suggest:

the proliferation of new social practices predicated on nothing more than networked computers and access to expertise makes it possible to admit distinctively new forms of curriculum pursuits into classrooms that can emulate 'mature' versions of social practices . . . (p. 168)

These new social practices are called fast capitalism by the New London Group (1996), who, in highlighting the characteristics of post-Fordist workplaces, paint a slightly different picture than Freedman and Adam (2000b) when it comes to thinking of learning as an explicit task goal of the enterprise. Following the observations of a number of scholars (Argyris, 1990, 1994; Chawla & Renesch, 1995; DiBella, 2000; Kim, 1993; Senge, 1990) who have built on Senge's (1990) notion of the "learning organization," the scholars of the New London Group argue that "in the most advanced of the postFordist, fast capitalist workplaces, traditional structures of command and control are being replaced by relationships of pedagogy: mentoring, training, and the learning organization" (p. 66). This transformation is accompanied by a terminology that crosses and re-crosses the borders between these new business and management discourses, on one the one hand, and discourses concerned with education, educational reform, and cognitive science on the other. The new management theory uses words that are very familiar to educators, such as knowledge (as in "knowledge worker"), learning (as in "learning organization"), collaboration, alternative assessments, communities of practice, networks, and others. (p. 65)
In addition, similarly to Dias et al. who argue that "the professional workplace typically exploits symbolic communicative systems more flexibly and diversely than does the university classroom" (p. 39), these scholars suggest that "with a new workplace comes a new language" (p. 66). They continue:

A good deal of this change is the result of new technologies, such as the iconographic, text, and screen-based modes of interacting with automated machinery . . . . But much of the change is also the result of the new social relationships of work. Whereas the old Fordist organization depended upon clear, precise, and formal systems of command such as written memos and the supervisor's orders, effective teamwork depends to a much greater extent on informal, oral, and interpersonal discourse. This informality also translates into hybrid and interpersonally sensitive informal written forms, such as electronic mail. (p. 66)

Furthermore, a discussion of social motive underlies the work of both groups. Both are intensely interested in why people in universities and workplaces do the things they do and to what ends. Where the New London Group's program seems to differ from that of Dias et al. is the New London Group's emphasis on changing—rather than simply reporting on—literacy pedagogy so that evolving literacy pedagogy will continue to be "relevant to new demands of working life" (p. 66). As stated above, I read Dias et al as taking very seriously the division between school and work and see them embracing the (affordances and) constraints embodied in the traditional university, with its disciplinary divisions and rules for sorting and ranking students, when formulating their pedagogy:

The social motive for student genres is characterized by an inherent and inevitable duality. On the one hand, such writing is "epistemic"—in the sense of enabling students, through the discourse production, to take on stances toward and interpretations of realities valorized in specific disciplines. At the same time, however, another fundamental activity of the university is sorting and ranking its students . . . (p. 44)

The team that developed and deployed the portals studied in this paper acknowledges the entrenched nature of this dual social motive. It certainly cannot be denied. However,
what we—and I believe the New London Group—hope to do is to expose students to situations in which they confront the complex network of social motives that inhere in organizations where roles other than student are available. In these roles, showcasing knowledge with university genres (ways of acting) is simply inappropriate, and students have to work to discern what types of activity are appropriate, given immersive problem spaces.

**Evoking Subjectivities and Social Motive: Tools, Rules, Division of Labor**

As I've argued in the preceding chapters, one way to make sense of the complex social environments that enable purposeful action is through activity theory. Jonassen (2000) suggests that we use activity theory to create learning environments by representing subject, object, and mediators of the target context. He also argues that "the activity must be studied in real-life practice with researchers as active participants in the process" (p. 110). I see the descriptive work of Dias, Freedman, Adam, Smart, and Paré as an important first step to simulating an environment which enables workplace-like activity within the classroom. The contrastive descriptions they supply (especially those provided by Freedman and Adam and summarized in Table 4-1 below) provide us with a set of target outcomes by which to evaluate any simulation we create. Not surprisingly, most of the differences Freedman and Adam posit between the school and workplace writing spring from the different rules and division of labor that comprise the discourse circulation in each context.

<table>
<thead>
<tr>
<th></th>
<th>Simulation Writing</th>
<th>Workplace writing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real audience</strong></td>
<td>instructor</td>
<td>supervisor</td>
</tr>
<tr>
<td><strong>Social Motive</strong></td>
<td>epistemic</td>
<td>praxis oriented</td>
</tr>
<tr>
<td></td>
<td>sorting and ranking</td>
<td>policy oriented</td>
</tr>
<tr>
<td><strong>Reader's Primary</strong></td>
<td>writer's knowing</td>
<td>value to senior reader</td>
</tr>
</tbody>
</table>
Jonassen suggests that the workings of learning environment depend upon how the designers of that environment decide to represent/enact the mediators (tools, rules, and division-of-labor) that characterize the activity. Regardless of these workings, though, the simulated environment is still enacted within a university classroom, with its own crystallized set of mediators and practices. I described the relationships among these elements in detail in Chapter 3, and Figure 4-1 shows these relationships.
Figure 4-1. Classroom activity system (entire)

Briefly, at the individual level, the subject of an activity is the individual engaged in the activity, in this case, the student and/or teacher. The objects which in the classroom are of an activity are the artifacts ("opening texts": e.g., textbooks, lectures) that the subjects transform into outcomes ("closing texts": e.g., notes, examinations, quizzes, problem sets, essays). Tools, like computers, are the means that subjects use for transforming the objects into outcomes.

At the same time mediators at the social level help determine how the activity system's objects are transformed into its outcomes. According to Kuutti (1996):

*Rules* cover both explicit and implicit norms, conventions, and social relations within a community. *Division of labor* refers to the explicit and implicit organization of a community as related to the transformation process of the object into the outcome. (p. 28)

Furthermore, as Kuutti notes: "The relationship between subject and object is mediated by tools, the relationship between subject and community is mediated by rules, and the relationship between object and community is mediated by the division of labor" (pp. 27-28).

Upon introducing a workplace simulation into a classroom, we create what Konkola (2001) has called a boundary zone. In this boundary zone, characteristics of both activity systems—the classroom and the simulated workplace—interact to provide a hybrid environment. Figure 4-2 shows the relationships that come into play when a rich simulation is used in a traditional classroom. Note the contradictions associated with the rules and division of labor. In Chapter 5, I explain how these contradictions provide space for student reflection and critique.
Figure 4-2: Workplace simulation as boundary zone.

The addition of workplace rules and division of labor to the classroom activity system, (which in this study is facilitated by the MyCase CMS), opens up roles or subjectivities besides student/teacher to people taking and teaching the course. Giddens (1984) speaks of "social position" as enabling a range of acceptable actions given the rules and division of labor that characterize a social activity:

Social positions are constituted structurally as specific intersections of signification, domination, and legitimation which relates to the typification of agents [subjects above]. A social position involves the specification of a definite 'identity' within a network of social relations, that identity, however, being a 'category' to which a particular range of normative sanctions is relevant. (p. 83)

What Giddens is saying here is that a social practice's rules and division of labor determine, to a certain extent, the social positions (subjectivities or roles) available to its...
participants; however, these identities are like categories; that is, the individual can act in a number of ways and still be inhabiting a particular subjectivity. In other words, a social position is

a social identity that carries with it a certain range (however diffusely specified) or prerogatives and obligations that an actor who is accorded that identity (or is an "incumbent" of that position) may activate or carry out: these prerogatives and obligations constitute the role-prescriptions associated with that position.  
(Giddens, 1979, p. 117)

Returning to Table 4-1, then, we can suggest affordances that might enable students to assume subjectivities and come to understand (and sometimes share) the social motive for the simulated activity in which they are involved. These affordances appear in Table 4-2.

**Table 4-2: Adapted from Freedman and Adam (2000, p. 137)**

<table>
<thead>
<tr>
<th>Real audience</th>
<th>Case-Study Writing</th>
<th>Workplace writing</th>
<th>Affordances of Omega portal for simulating workplace activity system</th>
</tr>
</thead>
</table>
| Instructor | Supervisor | • Instructor plays the role of "team lead" in consulting firm from the first day of class  
• Instructor speaks openly and often about classroom and simulation constraints to help students attribute proper significance for the actions they take in simulation |
| Social Motive | Epistemic Sorting and ranking | Praxis oriented Policy oriented | Praxis and policy evoked by constellation of artifacts and Web-based representation of situations within the organization |
| Reader's Primary Concern | Writer's knowing therefore: | Value to senior reader therefore: | Assignments are posed via video by simulated organization members. Students must determine what knowledge these individuals have and omit this "fluff" from their written work |
| Specification of shared knowledge | Omission of shared knowledge | | |
Table 4-2 (cont.): Adapted from Freedman and Adam (2000, p. 137)

<table>
<thead>
<tr>
<th>Reader's Primary Concern</th>
<th>Case-Study Writing</th>
<th>Workplace writing</th>
<th>Affordances of Omega portal for simulating workplace activity system</th>
</tr>
</thead>
</table>
| Writer's knowing therefore: | Value to senior reader therefore: | • Students confront a complex array of authentic "opening documents" that define the organization. They are free to draw from any of these with or without traditional academic citation practices as they see fit  
• Discussion about citation strategies covers how using sources becomes a measure of institutional power. For example, if I am using quotation marks around a passage, am I trying to distance myself from another organizational speaker? Or trying to leverage that individual's power? |
| Concerns about plagiarism | Institutional intertextuality | |
| Originality | Collaboration | • All assignments uploaded to shared file server where they can be viewed and used by other students  
• Feedback on initial drafts that directs students to drafts (residing in shared file space) composed by other students for exemplary text or organization |
| Goal of the Reader | To rank | To ensure best text | • Revision process that includes two passes at each document. The first pass requires that students revise according to comments from organizational character  
• Revised student text resides in file-sharing area where it is expected that other students will draw from it for future projects |
| Reader's comments | To justify grade | Collaborative Revision oriented | At least one reading of document by simulated organizational member who is not concerned with grade |
| Grade | Life beyond initial reading | • All assignments uploaded to shared file server where they can be viewed and used by other students  
• Assignment sequences the required students to use texts they and others have developed previously  
• Selected student texts (with student permission) become part of next running of simulation (i.e., they reside in the portal indefinitely) |
| Indeterminate material consequences and readerships | Students are asked if their material can become a permanent part of the Omega simulation to be used by other consultants in the future |

In our simulations, we try to make the role of consultant available to our students for least two reasons. First, the consultant's role is one where a person begins work at the
periphery, coming to an organization as an outsider, though an outsider that has some degree of legitimacy because she has been hired by the organization. Such is the case with our students as they are introduced to the learning environment (having them act as a manager or CEO assumes a history with the organization that they don't have the experience to enact). Second, the position of consultant allows enough room for interpretation so that students can enact the role in a number of ways. This second point became increasingly important as the student-consultants interacted with the environment and tried to understand the significance of their actions within the ongoing case context.

On the other hand, the role of "team lead" was the one I evoked for myself as the leader of the class. I felt this role enabled me to act as both an instructor and as a coworker with my students. Having worked as the leader of a small technical-writing consulting group before I returned to school, I felt comfortable in a role that for me represented an amalgam of boss, coworker, and mentor. And indeed, it was my experience in this workplace role that caused me upon encountering the work of Dias, Paré, Adam, Freedman, and Smart to disagree with some of their assertions about workplace writing, especially those specifically tied to authenticity and explicit learning on the job.

Thus, in contrast to the case writing students studied by Freedman, Adam, and Smart (1994) who were unsure of the role students were playing in the classroom simulation, as evidenced by the reaction to a question about their role: "I dunno. Maybe some consultants, maybe some management types . . ." (p. 203), all of the students in the Omega sections were certain of the role they were supposed to be playing, even though they conceived of it in different ways and even though several of them didn't embrace it.
Two of these students, when asked how they felt about taking the role of consultant, reveal two common themes we've discovered throughout our research: 1) students generally are less-than-excited about having to take a service course\textsuperscript{22} and 2) there's a learning curve associated with participating in a simulation, one that must be overcome if students are to participate fully in the experience:

Adam: Personally, I didn't want to figure out about the company. I didn't really care, I didn't really want to do it. I wanted to just sit there and do homework, and get my credits that I paid for. But then I guess after we worked at it for a while, it became a little bit more interesting. I don't know, it became fun, I guess. It just became a little more interesting. It wasn't as bad as I thought.

Jim: It's kind of hard getting over that first hump of I don't want to be here, you know, but then I'm saying what's going on? And as soon as you know what is going on, it was fun to be here. (Spring2004Session2Consultant, p. 2)

Still, when asked "If somebody asks you what is a consultant, what would you tell them?" roughly half of the students interviewed (n=20, this particular question) provided definitions in which they referred to their experience with the simulated organization (Omega), using it as a way to exemplify the role:

Eric: A consultant might help to give direction, I guess. Usually on some sort of problem. Like Omega didn't know where they were going, so we tried to give them some direction to go somewhere. An idea of how to do it. I'm guessing, that's how I interpreted this whole thing is that they, they figure out a problem for you and you get the direction for them. (Spring2004Session2Consultant, p. 3)

Or, more generally:

Todd: Somebody who studies the interior of a company. If I had to say what kind of consultants we were, we were studying the interior of our company, and come up with ideas, bring together different areas of the company to make better ideas towards management of the company. (Spring2004Session2Consultant, p. 1)

In our effort to provide a simulation that would amount to more than simply wearing suits to class for students, we tried to create an environment in which the mediating tools,
rules, and division of labor made available subjectivities more like the ones (for both teacher and student) characterized as having something to do with workplace writing in the table and diagram above.

What we found was that this simulation did impact these roles in a number of ways as evidenced by student perception of the actions they took in the class and their responses to discourse-demanding situations, especially with respect to sharing information, feedback and audience, and role/social motive.

**Methods**

The focus of this study is what is commonly called a technical communication service course. That is, it is a course that students from other disciplines must take in the English department in order to help prepare them to communicate within workplace contexts. At Iowa State University, this class is a requirement for many technical majors and the waiting list to get into these classes is long. Thus, most sections are composed of seniors, many of whom have not had a writing-intensive course since their first or second year at university.

We designed the study to ascertain how students in these classes and their teachers perceived the purpose of the class as well as their roles in the class. We also wanted to explore the actions students took as they worked on their writing in these courses. While the main focus of this study are two sections in which the Omega simulation was used, we have included data from comparison sections (a detailed description of these sections appears below) to better situate the responses, since the goal of the instructor of the comparison sections was much the same as the developers of the Omega simulation. A frequent user of Internet technology in the deployment of his course, he characterized
"the main purpose" of his technical communication course as: "To help the engineers and/or students to prepare for writing in their professional lives."

When asked "What sorts of special things do you do to help prepare them?" He responded:

Catman: Try to introduce them to the different document types, give them an opportunity to read rhetorical situations and adapt material to different kinds of audiences.

Interviewer: Okay, so when you say, ah, read rhetorical situations, can you unpack that a little bit?

Catman: What I do is create the scenarios where they have either complex sets of readers, or a reader who is a real problem and they have to be able to look at that and understand how do you write it so that you can address the needs of all the readers, or how can you write it in such a way that you are not going to offend your reader . . . (CatmanInterview, p. 1)

In talking about why he feels like detailed scenarios are important to use in professional communication courses, this instructor points out a problem with service learning or client projects with which any teacher who has attempted to set up these situations can empathize:

Catman: I think, part of it [why he started using detailed scenarios in his class] was that when they started coming out with the whole idea of the workplace scenarios and having people go out and get actual clients, philosophically that bothered me on a couple of levels. One, you put in the situation where, the consequences are real, and I am not sure the students were really ready for that. The other thing is you put them in a situation where it's either going to be a very good learning experience, or it's going to be a mediocre one, or a totally crappy one, or it's going to get scary. And I think it's the downside of having students go out and find their own clients. If we had the resources to line up clients like they do in other departments and colleges, I probably would feel differently. But a lot of it was just the unevenness of what they are going to get. And I thought artificial situations, yes they are artificial, they [students] know they are a game; they can actually have a little fun. But, I believe very strongly in the learning power in gaming and that games can be a learning experience. (CatmanInterview, p. 3)
For Catman, the simulation suggests an "evenness" of opportunity that may not be afforded to all students involved in client projects or service learning. As Catman points out, this equality of opportunity simply is not available when members of a class engage with different organizations that need work done. We can see also from this statement that this instructor is, as are the creators of the Omega simulation, a believer in the power of games. Thus we thought his classes would provide ideal sections to compare with the Omega sections, since both groups would be participating in what Dias et al. have characterized as simulations, though in different types of simulations (i.e., narrated situations vs. multimodally represented situations).

Finally, Catman characterized his use of computer technology in his class as follows:

Catman: I treat it [computer/web technology] mainly as a delivery system.

Interviewer: Okay.

Catman: Uhm, it's a way for people to have access to the assignments, it's electronic, ah, the paper, the paper costs that we have in this department, and how absolutely horrendous they are, they want us to keep the paper costs down, it's going to be the same out in business. And part of why I hope some students are, at least a lot of students seem to catch on, how to read on line. And, get the information without having a paper copy.

(CatmanInterview, p. 5)

Thus, his use of Internet technology is significantly different than the use to which it is put in the Omega portal, where collaboration among real and simulated people is a central application of networked computers. Catman tends to use Internet technology in a way similar to many instructors (discussed in the previous chapter) who use course/content management systems (CMSs) for posting traditional classroom materials (e.g., assignment sheets) to the Web.
Population

We gathered data from two sections ("Omega sections") of undergraduate technical communication that used the simulation and three sections ("comparison sections") that did not:

- Omega sections (two sections, spring 2004, summer 2004; total enrollment 48; instructed by Fisher)
- Comparison sections (three sections, spring 2004; total enrollment 73; instructed by Catman)

Participants volunteered (self-selected) for inclusion in the study. For this particular study, we did not track demographic variables, like age, race, or gender.

Because of obligations arising from project funding, one of the Omega sections documented here is from an engineering learning community (Agriculture and Biosystems Engineering—ABE and Agricultural Systems Technology—AST), a group of mostly male students from farm backgrounds who anticipate going on to work on the family farm, equipment dealerships, or agriculturally related businesses (Cargill, Deere, etc.). In interview, one team described this group in the following way:

Shaun: Especially the group [i.e., major] we're in. It's not easy to teach this group. I've been in other classes where other teachers haven't been quite willing to teach our group. So. It's a pretty different group to try to teach.

Interviewer: Oh, so the AST [Agricultural Systems Technology] group.

Shaun: Yeah. A lot of bullshit goes on.

Interviewer: Well, it is fairly male dominant in that area.

Ryan: Oh yeah. And that makes a little bit of difference too, the way guys act.

(TCAII, p. 38-39)
The other Omega section considered in this study was composed of a "generic" technical communication section with a mix of majors, ranging from engineering fields to biology and chemistry. All three comparison sections were similar "generic" sections.

**Data Gathering**

These methods are designed to assist in making our conclusions by providing evidence through two techniques, instructor and student interviews and a semester-end survey of students.

**Instructor interview and student focus groups**

*Background.* Much of our qualitative data was gathered through focus-group interviews with students and a one-on-one interview with the instructor of the comparison sections. Given limited project resources, this technique appeared to be the best way to solicit the insights of a number of students in a face-to-face, open-ended format.

*Description.* In the case of the instructor interview (Catman), open-ended questions were designed to help us understand how he envisioned the purpose of technical communication classes in general and how he embodied that approach in his classroom. See Appendix A for interview questions we asked Catman.

In the case of the focus-group interviews (students), we spent from thirty to forty-five minutes asking groups of from two to five students to share their opinions about working in the Omega environment. Members of our research team conducted these interviews. The interviewers were never responsible for giving the students a grade in the course and the student responses were not available to the instructor of the course until he/she had submitted grades.
The format of these interviews generally took the form of interviewer question followed by each student responding in turn. Students in these focus groups tended to converse among themselves, but still generally responded in turn to the interviewer's questions.

The unit of analysis considered below is generally the student response or utterance, defined as when a student begins speaking either after being asked a question or after another student finishes his/her response and ends when the student finishes speaking and another student begins to speak. While the questions were generally open-ended, students' responses could sometimes be categorized for the sake of a count. So for example, for questions like "In getting feedback from Omega executives, did it give you a feel of what a busy supervisor's feedback might involve?" I determined the number of interviewees who gave positive, negative, or indecisive responses. Where applicable, I provide these counts in the text where I analyze student responses to the open-ended question.

We used the results from the semester-end survey (described below) to help us organize and interpret this interview data. See appendix D for a complete list of focus-group questions. Table 4-3 details the number of students participating in these sessions.

<table>
<thead>
<tr>
<th>Session</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2004 Mid Semester</td>
<td>6 (of 24)</td>
</tr>
<tr>
<td>Spring 2004 End of semester</td>
<td>20 (of 24)</td>
</tr>
<tr>
<td>Summer 2004 Mid Semester</td>
<td>5 (of 24)</td>
</tr>
<tr>
<td>Summer 2004 End of semester</td>
<td>8 (of 24)</td>
</tr>
</tbody>
</table>
**Semester-end survey (Omega n=36) (Comparison n=20)**

*Background.* As I have discussed, Dias, Freedman, Adam, Smart, and Paré have made a number of contrastive statements about workplace and school writing. Part of our rationale for developing the survey that was given to students at the end of the semester was to see how students perceived the success of service courses in evoking aspects of what the aforementioned scholars have described as a workplace context.

Another reason behind administering the survey was to determine if students in the Omega sections and the comparison sections perceived these aspects at the same level and then to use any significant differences as a clue to help organize and interpret the focus-group data.

*Description.* We designed this survey to attempt to get at student perceptions about the effectiveness professional context simulated in their technical communication class, based on some of the characteristics of workplace writing forwarded by Dias et al. The questions were posed online and the available responses took the form of a Likert scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree. While we fully intended to compare the means between the Omega and comparison sections to determine significant differences in responses, we hoped mainly to use this survey to help us turn an informed eye to the focus-group data from the Omega. In other words, we hoped to use the focus group data to help explain and elaborate the survey results. The questions appear in the order they were asked in Appendix C. The numbers after the questions appearing in Table 4-4 below reflect this order.

The characteristics we were interested in looking at include audience, student and teacher roles, intertextuality, collaboration, feedback, and task environment. The survey
questions, the observations on which they are in part based, and our hypotheses about the outcomes appear in Table 4-4.

Table 4-4: Post survey questions and the observations by Dias, Freedman, Adam, Smart, and Paré on which they are based (table based in part on collation work by Crew (2000)).

<table>
<thead>
<tr>
<th>Question(s)</th>
<th>School</th>
<th>Workplace</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I used information from the work produced by other students in the class (without plagiarizing). (1)</td>
<td>originality of ideas and avoiding plagiarism are issues (Dias et al., 1999, p. 63); students' ideas belong to them (Dias et al., 1999, p. 12); closure achieved when grade assigned (Dias et al., 1999, p. 62); student writing is ephemeral: after a grade is assigned, it's rarely looked at again (Dias et al., 1999, p. 62); writers write solo (Dias et al., 1999, p. 12); value placed on individualism (Dias et al., 1999, p. 198)</td>
<td>workplace texts are resonant with others' words and rely heavily on intertextual references to others' works (Freedman &amp; Adam, 2000b, p. 55); originality and use of others' ideas are not concerns; ideas belong to the institution; texts can have a continued physical existence and role through document cycling and institutional files</td>
<td>Students in Omega section perceive themselves using each other's information to a greater extent than students in comparison sections.</td>
</tr>
<tr>
<td>There were times when I taught the teacher something in this class. (2)</td>
<td>guide-learner (prof-student) roles are static and fixed (Freedman &amp; Adam, 2000b, p. 45); roles are more clearly defined (Dias et al., 1999, 193)</td>
<td>guide-learner roles are shifting, indeterminate and multiple; social and political relations are more complex (Dias et al., 1999, p.192)</td>
<td>Students in Omega section see themselves playing a role other than student to a greater degree than students in comparison sections.</td>
</tr>
<tr>
<td>I played the role of a professional in addition to the role of a student in this class. (9)</td>
<td>comments and feedback are to justify grades, not for further revision (Dias, 2000, p. 25)</td>
<td>feedback is to inform further revision</td>
<td>Students in Omega sections see themselves as receiving professional feedback to a greater extent than students in comparison sections.</td>
</tr>
<tr>
<td>The feedback I got in the course was similar to feedback professionals get on the job. (3)</td>
<td>audiences of one who likely know more about the subject than the writer and are committed to reading the whole text (Dias et al., 1999, p. 12)</td>
<td>audiences are complex and varied, know less about the subject than the writer(s) and will read only what's useful to them because they have little time</td>
<td>Students in Omega sections see themselves producing materials for an audience other than the teacher to a greater degree than students in comparison sections.</td>
</tr>
<tr>
<td>I felt like I was producing things for an audience other than the teacher. (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4-4 (cont.): Post survey questions and the observations by Dias, Freedman, Adam, Smart, and Paré on which they are based (table based in part on collation work by Crew (2000)).

<table>
<thead>
<tr>
<th>Question(s)</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had to improvise during this class. (5)</td>
<td>the learning context is stage-managed, simplified and facilitated by profs (Freedman &amp; Adam, 2000b, p. 45; (Dias et al., 1999, p.190); the curriculum is carefully sequenced (Dias et al., 1999, p. 190)</td>
</tr>
<tr>
<td>It will be easier for me to understand the tasks required of me in the workplace than to understand the tasks required of me in the course. (6)</td>
<td>most guidance takes place before a text is completed (Freedman &amp; Adam, 2000b, p. 45)</td>
</tr>
<tr>
<td>I thought my group's product was better than I could have done by myself. (8)</td>
<td>writers write solo (Dias et al., 1999, p. 12); value placed on individualism (Dias et al., 1999, p. 198)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workplace</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>the learning context is improvisational and &quot;messy&quot; (tasks lack exact moments of beginnings and endings, evaluation criteria and sharp divisions of labour, (Dias et al., 1999, p. 202); the tasks cannot be simplified (Dias et al., 1999, p.192)</td>
<td></td>
</tr>
<tr>
<td>much guidance takes place through extensive iterative collaboration after a draft is completed (document cycling)</td>
<td></td>
</tr>
<tr>
<td>writing is collaborative; there is a more collaborative ethos</td>
<td></td>
</tr>
</tbody>
</table>

Results

Descriptive statistics from the survey appear in table 4-5.

Table 4-5: Descriptive statistics from post-semester survey.

<table>
<thead>
<tr>
<th>Question</th>
<th>Class</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>I used information from the work produced by other students in the class (without plagiarizing).</td>
<td>Omega</td>
<td>36</td>
<td>3.64</td>
<td>1.222</td>
<td>.204</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>2.50</td>
<td>1.539</td>
<td>.344</td>
</tr>
<tr>
<td>There were times when I taught the teacher something in this class.</td>
<td>Omega</td>
<td>36</td>
<td>2.69</td>
<td>1.283</td>
<td>.214</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>2.45</td>
<td>1.317</td>
<td>.294</td>
</tr>
</tbody>
</table>
### Table 4-5 (cont.): Descriptive statistics from post-semester survey.

<table>
<thead>
<tr>
<th>Question</th>
<th>Class</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>The feedback I got in the course was similar to feedback professionals get on the job.</td>
<td>Omega</td>
<td>36</td>
<td>3.61</td>
<td>1.225</td>
<td>.204</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>2.35</td>
<td>1.040</td>
<td>.233</td>
</tr>
<tr>
<td>I felt like I was producing things for an audience other than the teacher.</td>
<td>Omega</td>
<td>36</td>
<td>3.89</td>
<td>1.190</td>
<td>.198</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>3.10</td>
<td>1.483</td>
<td>.332</td>
</tr>
<tr>
<td>I had to improvise during this class.</td>
<td>Omega</td>
<td>36</td>
<td>4.14</td>
<td>.899</td>
<td>.150</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>4.00</td>
<td>1.026</td>
<td>.229</td>
</tr>
<tr>
<td>It will be easier for me to understand the tasks required of me in the workplace than to understand the tasks required of me in the course.</td>
<td>Omega</td>
<td>36</td>
<td>3.67</td>
<td>1.242</td>
<td>.207</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>3.45</td>
<td>1.099</td>
<td>.246</td>
</tr>
<tr>
<td>I felt like the information I produced for the course was used by others in the class.</td>
<td>Omega</td>
<td>36</td>
<td>3.44</td>
<td>1.081</td>
<td>.180</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>2.65</td>
<td>1.348</td>
<td>.302</td>
</tr>
<tr>
<td>I thought my group's product was better than I could have done by myself.</td>
<td>Omega</td>
<td>36</td>
<td>3.78</td>
<td>1.376</td>
<td>.229</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>3.15</td>
<td>1.496</td>
<td>.335</td>
</tr>
<tr>
<td>I played the role of a professional in addition to the role of a student in this class.</td>
<td>Omega</td>
<td>36</td>
<td>3.78</td>
<td>1.017</td>
<td>.170</td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>20</td>
<td>3.40</td>
<td>1.392</td>
<td>.311</td>
</tr>
</tbody>
</table>
In an independent samples T-test, which compares the means of the responses given by students in the Omega classes with the means of the responses given by students in the comparison sections, the survey results suggest that students in the Omega sections showed the greatest difference (significant at $\alpha = 0.05$) from the comparison sections in areas that had to do specifically sharing information with other students in the class (Questions 1 and 7), receiving (professional) feedback (Question 3), and writing for an audience other than the teacher (Question 4). A summary of these results appears in Table 4-6.

Table 4-6: Summary of results from post-semester survey. Shaded results are indicative of means that are significantly different at $\alpha = 0.05$. The null hypothesis is that students in the two types of sections studied using context-enriching approaches will perceive them in the same way.

<table>
<thead>
<tr>
<th></th>
<th>% of students answering strongly agree (5) or agree (4) to the following statements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Omega (N=36) (across two sections)</td>
</tr>
<tr>
<td>1</td>
<td>I used information from the work produced by other students in the class (without plagiarizing).</td>
</tr>
<tr>
<td>2</td>
<td>There were times when I taught the teacher something in this class.</td>
</tr>
<tr>
<td>3</td>
<td>The feedback I got in the course was similar to feedback professionals get on the job.</td>
</tr>
<tr>
<td>4</td>
<td>I felt like I was producing things for an audience other than the teacher.</td>
</tr>
<tr>
<td>5</td>
<td>I had to improvise during this class.</td>
</tr>
<tr>
<td>6</td>
<td>It will be easier for me to understand the tasks required of me in the workplace than to understand the tasks required of me in the course.</td>
</tr>
<tr>
<td>7</td>
<td>I felt like the information I produced for the course was used by others in the class.</td>
</tr>
<tr>
<td>8</td>
<td>I thought my group's product was better than I could have done by myself.</td>
</tr>
<tr>
<td>9</td>
<td>I played the role of a professional in addition to the role of a student in this class.</td>
</tr>
</tbody>
</table>

Discussion

The following sections detail our findings from the semester-end survey and focus-group interviews.
Sharing information: Questions 1 and 7

As I discussed in Chapter 2, the Omega portal has a file-sharing area to which students post their assignments to be commented on by an Omega employee (instructor or teaching assistant playing the role of an Omega employee). Students collaborate on all their texts, even those they are creating for an individual grade. This collaboration takes the form of both explicit peer review (within groups) and "implicit" peer review (i.e., reviewing other students' assignments that have been posted to the Omega document sharing area).

This tool enabled the transgression of two of the central rules that Dias et al. posit for school writing, that writers write solo and that originality of ideas and avoiding plagiarism are central concerns. Students are also informed early on that they are free to use any of the material from within the Omega portal without citing sources in any formal way (what Freedman and Adam call institutional intertextuality).

It appears that students in this study as well as in the study described in Chapter 3 perceive themselves as using this affordance to develop ideas about how the document should look (format) as well as to see how others have approached the assignment (content). For example:

Interviewer: . . . everyone's work is on the server. So you have physical access to what other people have written. Do you ever use those?

Ames: . . . If we're not sure where to go with a certain part of a project, what they are looking for. What Dave wants of us. We'll look at a different group and see what, if they're assignment is complete, we'll look at that and see what they came up with and where they went with it. And, you know, from there make a judgment call whether or not we think that they got it right and we'll go in a similar direction. Or that'll be one less way, if we decide it's not what they need, that'll be one less thing we have to consider. (Spring2004Session2 TraditionalApproach, p. 2)
What is interesting to note about this response the Ames' awareness of the complexity of situation he faces. He recounts modulating between at least two roles when he acknowledges that he and his groupmates are looking at a number of texts in an effort to understand their assignment. At the same time, they confront what they perceive to be expectations of at least two audiences the "they" in "what they are looking for" meaning the Omega people and "Dave" of "What Dave [teacher] wants from us." He also indicates that this action of viewing other documents during assignment interpretation and development requires skills in judgment of other students' work, not so much from the perspective of a published rubric, but from the perspective of the perceived need for discourse in the evoked context.

This practice differs somewhat from traditional writing classrooms in which there is a peer edit component. In the simulation, students have access to and share their "best (at the time) texts" in an effort to raise the quality of the work of the "consulting group" by making their "best (at the time) texts" even better, similar to the workplace practice of working for the best text as documented by Dias et al.

We might interpret Ames' response, then, as evidence that the text sharing tool has afforded a shift from classroom rules and division of labor into a more workplace-like configuration in which students use the texts of others as tools to evaluate and improve their own responses while also refining their notion of the needs forwarded by the "theys" evoked in the case—i.e., the person/people from the case who asked for the document as well as the audience the person who asked for the text envisions the text addressing.
Feedback and Audience: Questions 3 and 4

Freedman and Adam (2000b) note the common practice within school writing of providing most guidance before the completion of the text while in the workplace the common practice is to provide guidance "through extensive iterative collaboration after [a] draft is completed" (p. 45). As described in Chapter 2, I made two passes at each student text. The first was from the perspective the Omega employee who asked for the document. The fist-pass comments generally encouraged students to return to the case environment to try make their work fit better with the organizational objectives for the document they were creating. For example, the following comment was one I (in the role of Jake Steubens, director of marketing) commonly wrote of first drafts of extended definitions students were producing for a biotechnology glossary aimed at new Omega marketing employees. "Why is this process important to Omega? How does it fit in with our business strategy? Would you consider this an enabling technology?" In so doing, I believe my first-pass comments resemble feedback people get in the workplace which, as Adam (2000) observes:

provide useful information about the contexts in which the text will operate within the institution, how others will read it, and the decisions it may facilitate. The newcomer's ability to use these written comments will determine the speed and facility of her initiation into workplace culture. (p. 175)

I made the second pass after the student had revised according to the comments from the first pass. The comments I made on this second pass were more teacherly and to an extent aimed at justifying a grade, even though students were also required to revise these drafts as well. Still, in this second pass, I was able to evaluate how well or poorly the student responded to the initial comments. My feedback on this second draft, then, also contained recommendations about handling feedback from coworkers or supervisors.
At least two groups (eight students out of 48 in Omega sections) were not sure until late stages that Omega was a fictitious company (despite filling out consent forms for the study and being told this experimental section was to be played like a game).

Nevertheless, most students were very aware of the tension between producing texts for "the company" and for "the teacher." The teacher role as grader never completely disappeared for students. One student articulated what had become a common theme in the spring Omega section (pay vs. grades). When asked, "when you work on a project in this class, who do you envision as the audience?" this student responded:

Sandy: Well, we, ah, usually we watch the little video clips and stuff and we try to think about what this company or whatever, what they want, what they are looking for, so, I would say that we try to work for the company, if you will, yet, we always keep in mind that the bottom line is they are not paying us, but Dave is giving us our grades and that's the most important to all of us, so we keep that in pretty high consideration. (Spring2004Session1 Writing, p.1)

Students (16 out of 28 for the question cited below) expressed some form of frustration with the feedback I gave them in my role as an Omega employee. Their reasons ranged from perceived lack of detail in instructions about how to make the piece better to anger that there were few positive comments in the feedback (a conscious decision on my part based on the editorial feedback I have received during ten years of work as a technical writer).

Still, all the students interviewed saw some value in the multiple reviewing passes taken at papers, even if they were not willing to play the Omega game to its fullest extent:

I: In getting feedback from Omega executives, did it give you a feel of what a busy supervisor's feedback might involve?

Matt: Probably. Pretty short and to the point, so, that always helps instead of drawing it out. More questions to ask, that kind of a deal where he just stated what he liked and what he disliked and that was it. And so, and what we were missing. And so that helped.
Joe: A lot more than what you might expect from a teacher. I suppose that's probably more like a real situation. At times, someone might say, this is crap, fix it. So. And, you're not going to come across that in a teacher very often . . .

(Spring2004Session2 Feedback, p. 14)

Quite often feedback I provided from the Omega people had a lot to do with how students used information from the portal in their work. While students were under little or no pressure to formally cite texts drawn from the portal, they were tasked with "adding value" to those texts as they repurposed them. Often first drafts, especially those for complex genres like fact sheets, took the form of documents into which students cut and pasted fragments from other texts, like lab results, marketing reports, and press releases. In some cases, students made little effort to work these fragments into cohesive documents oriented toward the purpose outlined in the assignment (i.e., add informational value). Drafts of this kind incurred my wrath as an Omega employee. A comment I typed frequently on such work was: "I can cut and paste just as well as you. How is this information supposed to serve my needs at the meeting? Can you add value to this information and make it more useful for me and my audience?"

One of the groups that received feedback similar to that cited above from Omega CEO Kurt Danzer responded in the following way:

Tim: I really liked this Danzer guy. You know, he was really ripping on us sometimes, and I was frustrated with him. And, I was pretty impressed that Dave didn't take any of it personally. You know.

Ian: We called him some pretty derogatory terms. So.

Chuck: I think it helped. He was very impartial when he came to teach us like a lecturer who was giving us a final grade, but maybe not reflect, like we didn't know at first that he was reviewing our stuff, that it was another guy kind of telling us. Dave was great in that. I think it was a big difference.
Craig: I think it was very helpful to find out your mistakes so you can change them because you're going to remember it more. Especially knowing it wasn't Dave. Because I know, I'm just saying, Dave kind of, he was just kind of like the head guy. He wasn't really like the boss, because, I don't know, I just didn't get that from him. . . . . (Session2FeedbackSpring, pp. 7-8)

Again, we see the division of role that characterizes work with boundary artifacts and in boundary zones and to an extent how it enables students to think about the attributions of professional significance they make from classroom experience. The students were aware (at least eventually) that I was making both sets of comments on their papers, and they saw the value in both sets. The comments written from the organizational perspective helped students "find out [their] mistakes so [they] can change them" which they acknowledged would help them "remember it more." Also hinted at in the previous response is the centrality of the transformation/subversion of the teacher's traditional role to the students' perceptions of audience and professional feedback.

**Social Motive: Questions 1, 3, 4, and 7**

Taken together, questions 1, 3, 4, and 7 suggest that students in the Omega sections saw themselves participating in a document cycling process—particularly with respect to feedback and information sharing—that resembled the processes they would confront in the workplace to a greater degree that students in the comparison section. While some of this difference can be attributed to the overt differences in commenting/feedback procedures, I believe that the collaborative roles of consultant and team lead evoked in the case and enacted by the students and instructor (me) as well as the shared virtual workplace evoked by the simulation also contributed to students sharing in the social motive of people communicating within a high-tech organization.

*Sharing work*
For example, there are several activities that require me in the role of team lead to work directly with students to complete assignments. One is the extended definition assignment mentioned above. Once the students submitted their final drafts of this assignment, I assembled the definitions into a single document (a glossary), which was then added to the portal. In the two sections studied here, eight out of the ten teams involved in creating a public web presence for Omega opted to include this glossary as part of their site (usually in a section aimed at biotechnology "beginners"). Thus the texts the students created not only went through a (fictional) organizational revision process, but they were made available for use in other more complex documents (like websites or proposals) that the students created later in the semester.

Figure 4-3 shows how one group decided to incorporate this glossary into their site, placing a link to it on their main navigation menu.
Furthermore, the following conversation among students shows how this organization of work helped them see what Curtis (student below) calls "the purpose" of what they're doing. In this case the purpose and how he describes it does not fit easily into the "duality" of motive ("epistemic" (displaying knowledge for an instructor) and "sorting and ranking") Dias et al. (1999, p. 44) formulate for classroom writing. This snippet comes at the end of the focus group when the interviewer asked "do you have anything to add?"

Curtis: And you know what the point [of the assignment] is, you know what you are supposed to be talking about. It's not just like…

Molly: They [teachers who assign writing in other classes] pick a broad topic.

Curtis: Yeah. Or choose your own subject, that type of thing. Or choose a story out of a book, read this and then write. Describe it, technically. Okay. What is the grade, rather than for a purpose. I guess that's what I would say is that this had a lot more purpose than other courses. It wasn't just ….

Interviewer: So in turns of purpose, maybe future applicability, is that…

Molly: Completely.

Curtis: You could see where you would use it, plus you didn't feel like it was just assignments for the sake of do this, if you felt like you were going to do this to build, and this was going to actually be included in this, like you do the fact sheets, you do the, what's it called? Seemed like we did, how many, definitions and all those things kind of tied into it how would you go into a bio-tech company, and then how would you, if you were like a consultant, how would you break down the different things that you needed to know about it, and then add to a web site at the end. So the web site kind of tied everything all together. That you'd done all semester. And at first it just seemed like it was another assignment, but then you kind of got the idea that it was going somewhere. So it made it easier to see, and just feel, like, what you had to put into it, rather than, ….

Interviewer: Make a peanut butter and jelly sandwich. LAUGHTER.

(Summer2004Session2 Successful Omega, pp. 3)
Curtis associates the way texts build on each other and eventually become a part of
the organization ("So the web site kind of tied everything all together. That you'd done
all semester. And at first it just seemed like it was another assignment, but then you kind
of got the idea that it was going somewhere.") with his attribution of purpose, which I
read as a willingness to share in a social motive other than the earning a grade (Note he
states this explicitly when he says of his experiences in other classes "What is the grade,
rather than for a purpose.").

Molly and Curtis certainly see a difference between the writing they have done in
other classes and the writing they have done during the Omega simulation. There were
several students (5 of 8) in this particular interview set that cited examples of writing
assignments that they viewed a "purposeless" or to use Brown, Collins, and Duguid's
terminology "ersatz." One of these was writing instructions about how to make a paper
airplane and the other was writing instructions about how to make a peanut butter and
jelly sandwich.

As we can see by the interviewer returning to the peanut butter and jelly sandwich
assignment in the conversation above, the commentary on these types of assignments had
been a theme in this particular focus group. For these students, learning how to develop a
usable set of instructions, though it is certainly a competency valorized in the technical
communication field, was less than meaningful to this group, who felt that how the
assignment was situated was at least as important as what the they were being asked to
do. Within the same conversation cited above, Alan observed:

Alan: I would say the same thing, because when you are on one subject matter
you can really get detailed on it and understand it. Let's say you go out to
job and you are working at any given place, you're not going to be writing
Students' perceptions that they were building toward a purpose and dealing with a single or closely linked domains (e.g., biotechnology, agriculture, etc.) over time seemed to make them willing to engage their classroom work as if it might have some application aligned with their plans for the future. At the same time, the prolonged immersion within a domain seems to provide students with a better opportunity to understand the social motive for communicative action within that domain than a course in which students undertake several projects spanning multiple, seemingly unrelated contexts.

**Sharing location**

Finally, these types of rich-context-dependent activities and the partial assumption of workplace social motive would have been much harder to produce in a classroom situation in which students were not engaged with a group of electronic texts (Omega) from which they were drawing and to which they were adding throughout the semester. Students felt that the learning environment helped to provide this continuity and in doing so, contributed to the realism of the simulation. In the question cited below all students agreed (n=8, for the question) that the online environment helped rather than hindered their learning experience:

Interviewer: Do you feel that the on-line case environment helped or hindered your learning in this class?

Eric: I mean, it's one thing to come into class and attempt to say, okay now you are in a business, you know. But I mean, and you don't go to the building. You don't go to the building for the business, you don't go and convene all in one room. I mean, we're all over the place, I mean, the web site was kind of like the location, sort of, where everybody combined, and that kind of brought us together as a company, I think. So, all the company data was there, we would share files there, sort of brought it all together, whereas without it I don't think I would have
felt like I was in the company, and I don't think I would have treated it as a company. And acted like that, if it wasn't there, so I think it helped.

Interviewer: Interesting. What else? Help or hurt?

Ryan: This is kind of continuing on that, yeah, it helped, because you know, it kind of felt like we were really involved in a real world company. Because you know, even trying to write this investor bulletin, I was talking to someone who was trying to help me through it, and they said, well, knowing it's kind of like a real company on there with all the information that we have, we can't really make anything up about it, and can't make stuff up about competitors, because there are real competitors out there. So. You know, it gave us the experience of actually working for someone rather than here are a bunch of assignments, turn them in, get a grade. (TCAII, pp. 101-102)

In Eric's statement, we see the importance of the online tool enabling students to act in ways they might not otherwise have. In other words, the portal helped make this student willing to play by the rules afforded in the simulation by providing a workplace to which he returned when he needed to attend to his project.

Ryan carries this idea further, explaining how the real-world significance he attributed to the game caused him to play by a set of rules he might not have if he were tackling a purely "academic" situation in which there might be the tendency to "dry lab" or simply fabricate23 certain aspects of the assignment for expediency's sake. Thus, even though Omega was fictitious, it was richly so. In other words there were enough details about the company provided so that students could (if they chose) act as if it really existed.

Along the same lines, because we were all immersed in the same rich environment I was able to provide better feedback to students. I was able to comment on the technical

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23 Or, as one of the professors in our department who teaches a practical writing course is famous for saying when asked for additional details about one of the situations he creates for writers, "You decide."
accuracy of their statements and suggest alternatives to their formulation of technical and business concepts.

Another group of students (four in this interview group out of a total of 20 for this interview), while much less enthusiastic about the experience than the group above, still noted the effects of a prolonged immersion, even as they evidenced some of the tensions between classroom context and target (workplace) context that spring from the assigning of grades:

Matt: I think we all came to the consensus that we are looking for a grade and not really learn more about Omega, even though we did learn more about Omega. (Spring2004Session2 Feedback, p. 14)

Matt's statement that he learned about the organization in spite of his unwillingness to play a role other than student suggests one direction for further study. How might students participating in a simulation like Omega offered in a course within a discipline compare with students using the traditional curriculum when evaluated against concrete performance competencies?

The service course and the study: Questions where the difference in means wasn't significant

There were several survey questions for which there was no statistical significance at $\alpha = 0.05$ in the differences between the means of the groups. In other words, the null hypothesis for each question appears to be true: students in the Omega course responded no differently than those from the comparison course. Part of this closeness in means might come from the nature of the service course, in which instructors and students generally discuss professional matters and instructors work hard to devise assignments that seek to immerse students in workplace-like activity. In addition, advanced writing courses often ask students from technical fields (who are accustomed from classes in
which they have been asked to work problems and take tests for which there is generally one correct answer) to engage open-ended problems. Our interviews with both Omega and comparison sections indicate that these students often feel required to improvise as they work to complete assignments. I briefly discuss each of the questions that did not yield statistically significant results below.

**Question 2.**

*There were times when I taught the teacher something in this class.*

**Null hypothesis:** Students in Omega and comparison sections see themselves shifting guide-learner to a similar degree.

In both groups only 25% of the students agreed or strongly agreed that they taught the teacher something during the course. Clearly, students in both groups never completely forgot that they were working in a university classroom. In addition they didn't seem to feel they had the opportunity or the expertise to swap roles with the teacher.

We designed this question to try and get at a perception of the fluidity of roles between guide and learner within the simulation. However, in retrospect, it seems that the "teach the teacher" phrasing might have caused students to think in terms of the traditional banking-model teaching we worked so hard to overcome. In fact, focus-group data indicate that none of the students perceived me as playing solely the role of a traditional teacher (with the goal of sorting and ranking). Students described the role I played as everything from "team lead" to "boss" to "helper" to "mother." Catman never attempted to play the role of lead consultant, but did bring in various props, including teddy bears, to represent individuals (e.g., an angry customer) involved in the cases he used in his classes.
Questions 5 and 6.

I had to improvise during this class.
**Null hypothesis:** Students in Omega and comparison sections see themselves having to improvise to a similar degree.

*It will be easier for me to understand the tasks required of me in the workplace than to understand the tasks required of me in the course.*
**Null hypothesis:** Students in Omega and comparison sections see themselves having about the same amount of trouble interpreting assigned tasks.

A course that employs a simulation as described earlier in this chapter may not have any impact on students' perception that they are required to improvise. Similarly, such a deployment may not affect students' belief that an assignment in a writing course will be more difficult to interpret than a workplace assignment. Perhaps students feel that most classroom-based writing assignments are difficult to interpret.

In some cases, as when students were asked whether they had to improvise in class, a high percentage (83.3% in the Omega sections and 85% in the comparison sections) indicated that they agreed or strongly agreed that they did. Such high numbers should not be surprising to anyone who has taught a service course. In these courses students (who are accustomed from classes in which they have been asked to work problems and take tests for which there is generally one correct answer) often struggle with the more open-ended writing assignments they encounter. This may account for their sense they must improvise.

The same might be the case when students were asked about their ability to understand tasks assigned to them in the workplace versus the tasks assigned in the technical communication course. We designed this question, in part, to try to get at whether students felt they were receiving instruction before the task or during the process
of working on it. In retrospect, we might have simply asked students this question point blank, rather than asking about their level of understanding of the task.

**Question 8.**

*I thought my group’s product was better than I could have done by myself.*

Null hypothesis: Students in Omega and comparison sections see similar value in collaboration required by the course.

In this question we were trying to get at whether students felt more of a collaborative ethos in their work with the Omega simulation than the students in the comparison sections (72.2% Omega vs. 50% comparison said they agreed or strongly agreed). And while a reasonable percentage (22% more Omega students agreed or strongly agreed that their group work was better than their own alone than comparisons), the means were not significant at $\alpha = 0.05$.

Perhaps a more germane questions would have been to ask students whether or not they felt their group experiences in Omega and control sections were different to those experiences they had in other classes, in internships, or at work and then to follow up with an open-ended question about why. Such a question might provide insight into how the affordances and constrains of the online environment affect student perception of the work they do in groups and might have implications for group work across the curriculum.

**Question 9.**

*I played the role of a professional in addition to the role of a student in this class.*

Null hypothesis: Students in Omega and comparison sections see themselves to similar degrees acting as professionals

It could be that traditional case studies used in a technical communication course when coupled with instruction that emphasizes the "real-world" aspect s of the genres
assigned causes students to attribute the same degree of professional significance to their work as a course in which a simulation like Omega is deployed.

A relatively high percentage of respondents from both groups (77% Omega, 65% comparison) indicated that they agreed or strongly agreed that they played the role of a professional as well as the role of student in the class. Again, the similar means and high percentages could be attributed to the special nature of the service course in which professional/workplace contexts are a frequent topic of discussion.

**Conclusion**

Dias et al. never really consider a service course in their study, I suspect because they see tenets of the service course as opposed to their conclusions about the dual social motive for school writing and because of their reluctance to consider simulation (in any form, including traditional case studies) as a means to producing situations in which students might experience or role-play the social motives that result in workplace genres\(^2\).

That said, I believe that the null hypothesis held on several questions, not because we cannot simulate non-school social motive in the classroom, but because teachers (like Catman) who are interested in evoking non-school environments and the social motives for undertaking action within in them can do so with varying degrees of success (at least as students perceive it). I think that this success has to do with the willingness of the instructor to incorporate various tools (what I have called in the previous chapter primary, secondary, and tertiary artifacts) into the classroom environment in order to evoke rules

\(^2\) Or perhaps because the service course seems to be a construct of the many US writing programs with "workplace" as opposed to "disciplinary" orientations.
and division of labor along with a community and object not traditionally associated with schoolgoing.

In some cases, for instance, when an instructor secures an actual client for a class to "work" for, the students use their interaction with that client as a representation (tertiary artifact) of how workplace communication gets done. Indeed, the one course that Freedman and Adam (2000a) do cite as providing a boundary-crossing experience for students is an information-technology practicum in which the teacher arranges for students to work with local organizations on client projects. However, even during these client projects, the practices that students take part in can be more or less like those Dias et al. suggest characterize workplace writing than practices enacted within a simulation, especially if the simulation has grown out of what I call in Chapter 6 a network of learning: a group of practitioners, researchers, teachers, students, and parents who collaborate to produce and maintain a learning environment that enables students to play the role of practitioners in a particular field.

In the end, the move from work, to coop, to classroom-based client projects to simulation to traditional-case-based service course may be a matter of degree rather than, as Dias et al. see it, an abrupt disconnect between school and work contexts, especially considering Lankshear and Knobel's (2003) observations about "new social practices predicated on nothing more than networked computers and access to expertise makes" that I cited earlier (p. 168).

Finally, there a very "real" and important reason for simulating workplace practices in the classroom besides the most apparent one of providing students practice at picking up some professional genres from the inside: students must actively engage with an
unfamiliar context in order to get work done. While much of education (including Web-based education) is still based on the transmission model in which students watch or listen to lectures and take tests and quizzes, it is essential that we make subjectivities other than "student" available to the people we teach, especially if we hope to prepare them to thoughtfully inhabit similar subjectivities after their schooling.

Because the rules and division of labor and therefore the roles or subjectivities the simulation enables are different than those students (and teachers) are used to occupying in traditional classroom formats, the normal mode of operation is interrupted and they are required to reexamine their expectations and their approaches to learning and teaching.

References


Appendix A: Instructor interview

Questions for Catman (Summer 2004)

1. What do you see as the main purpose of your technical communication course?

2. What sorts of special things do you do to prepare students for the workplace?
   How do you find the students respond to these actions?

3. Have you always sort to evoke rich contexts for the students, or did you at some point in your teaching experience decide to do this?

4. Do you find your students trying to dissect the scenarios that you create or asking questions about those scenarios commonly. Or do they pretty much accept what you've given them?

5. How do you, to that line of question, how do you respond that? Can I change the situation?

6. Talk to me about how you use the bears, or the other props in your class.

7. How do you use computer technology in your 314 class. What do you see as the major purpose, not necessarily getting your students, not necessarily, or teaching skills per say, but like the technology that you use to sort of organize the course.

8. When you are doing you assessment, what, I mean, you are having them, you are jiving them a pretty rich scenario in a lot of cases, when you are doing your assessment, do you, I guess assess as you know, Mr. Thune teacher, or do you try to throw in elements of, you know, in this situation so and so, how do you combine those?

9. Can you talk a little bit about how you use the game in your first-year composition class?
Appendix B: Focus Group Questions

Tech Comm. Focus Group Script (mid semester)—Spring 2004

Assure the students (in Fisher's sections) that he will not be able to see/hear these tapes until after final grades have been filed.

Assure students that video is for purely research purposes, so that we can get accurate data. Video will be stored in a locked office and will not be displayed to anyone outside of research team.

Introductions

Briefly introduce yourselves, include:

- First name
- Major
- Internship/corporate work experience
- What you'd like to do after you graduate.

Attribution

Do you feel like the work you do in this class is more like a workplace experience than the work you're doing in other classes? How/why?

Division of labor (roles)

What do you feel you're learning in this class? Are you learning in a way that's similar to the other classes you're taking? How?

(The idea is to elicit some data about how students perceive their learning processes: similar in all classes, or different, depending on situation.)

How does the role the teacher plays in this class compare with the teachers in your other classes?

Do you think working in groups is a good idea in this class? Or would you rather complete each project on your own? Why?

Writing

When you work on a project in this class, who do you envision as the audience?

(Follow up, especially if first answer is "teacher") Are there any other audiences you envision?
How much to these audiences impact your writing?

Do you feel like you draw on the work of other people in the class as you complete your own work? (this "draw on" could take many forms—e.g., peer edit, suggestions, using text from other students' documents).

**Final Omega Focus Group Script—Spring 2004**

Given that the types of communication you are supposed to create in English 314 are written, oral, visual, and electronic, including web work and report/proposal writing:

- Would you have rather taken a traditional approach to these materials, with lecture, formally assigned readings and discussions, and group projects?
  - Why?/Why not?

- Do you feel that this traditional approach would have been more/same/less effective in preparing you for the communication tasks you face after graduation than the GradCorp class?

- Would you have spent as much time on your tech-comm class if roughly the same projects were involved, but within the framework of a traditional class?

Some people claim that the purpose of a communication class is to enable you practice communicating and the activities that characterize communication so that you can get better at them (like practicing the piano). (In comparison to other classes where you learn definitions or how to work problems.)

- Do you agree with this claim? Why/why not?

- What do you see as the primary activities that characterize communication?

- Do you think you would have gotten better practice in this class if it were offered in a more traditional format?

Let's say you were to take another class and the teacher said, "Pretend you are a consultant for a company . . ."

- How would you describe the role of a consultant (besides saying, "Oh shit, not this again")] to help the other students in that class understand the concept?

Did you feel that getting feedback from a couple of perspectives: "Omega employee" as well as the teacher . . .

- Helped you do better work in the class?
Helped you get a feel for what a busy supervisor's feedback might be like?
Made you angry?
Summer FG (Omega) Session 1

(mid semester) 6/8/2004

Introductions

Briefly introduce yourselves, include:

- First name
- Major
- Internship/corporate work experience
- What you'd like to do after you graduate.

1. Coming in to a technical communication class, what did you expect to learn? Why do you think you had these expectations?

2. What do you feel you're learning in this class? Are you learning in a way that's similar to the other classes you're taking? How? Why?

3. Do you feel like the way you're working in this class is more or less like a job/professional experience than the way you've worked in other classes? How/why?

4. How does the role the teacher plays in this class compare with the teachers in your other classes? Why do you think he acts this way?

5. When you work on a project in this class, do you envision audience(s) besides the teacher? Why (i.e., what makes/helps you envision this audience) or why not?
**Summer Focus Group 2**

Week of June 28, 2004

Assure students that Fisher won't see/hear tape until grades have been filed

**Introductions**
- First name
- Major

**What is Golden Rice?**
(Follow) How has your knowledge/opinion about Golden Rice changed as you've worked on the Omega engagement?

**What is biotechnology?**
(Follow) How has your knowledge/opinion about biotechnology changed as you've worked on the Omega engagement?

**What sorts of things do you feel like you had to do to participate successfully in the Omega engagement?** Be as specific as you can.
(Follow) Did you understand why you were doing these things? (i.e., what their purpose was?)

**What did you expect to learn in a technical communication class?**
(Follow) Did you learn those things in this class?

**Did you learn anything you didn't expect to learn in a tech comm. class in this class?**
(Follow) What was that?

**Do you feel like the online case environment helped or hindered your learning in this class?** Why?
Preface

In this chapter I talk about what many have characterized as the crisis in the professions and tie that idea in with what critical pedagogues have written about the problems inherent in vocational education. I forward the idea that the remediated environment and classroom activity we have created enable students not only to practice workplace roles, but also create spaces for reflection and critical action.

I argue that these learning environments accomplish this dual task because they enable students to practice using what Wartofsky (1979) calls "primary artifacts"—i.e., the tools they will actually use on the job (e.g., Excel, SPSS, Cameras, etc.)—but are themselves "tertiary artifacts" (p. 209): "domain[s] in which there is a free construction in imagination of rules and operations different from those adopted for ordinary 'this worldly' praxis" (p. 209). As tertiary artifacts, these representations are an important part of deploying what Schön calls the low-risk "virtual world" which enables students to develop instrumental knowledge even as they engage in critical reflection and action.

Drawing on examples from student work, I show how the spatial and temporal elements of these representations provide space for reflection, critical action, and even quotidian resistance.

I will submit a version of this chapter to *Communication and Critical/Cultural Studies*. This journal publishes scholarship that "promotes critical reflection on the requirements of a more democratic culture by giving attention to subjects such as, but not limited to, class,
race, ethnicity, gender, ability, sexuality, polity, public sphere, nation, environment, and globalization."

So that this article will make sense for the readership of the journal, I will need to include a brief overview of how the portals work. I will also need to document via a brief literature review calls for critical thought and action arising from disciplines other than rhetoric and professional communication.

**Introduction**

*The business of education is rather to liberate the young from reviving and retraversing the past than to lead them to a recapitulation of it.* John Dewey

The central question that this chapter seeks to address is: Do simulations like ours unproblematically reproduce dominant social practices in the classroom? Or alternatively, can classroom simulations afford opportunities for reflection and action that are somehow different than those afforded by traditionally mediated classroom approaches? Unlike the previous two chapters in which I used qualitative methods to help me make sense of limited quantitative data, this chapter uses qualitative data to support the concrete application of a theoretical framework. This application of Wartofsky's (1979) work on representation has implications for how we develop courses aligned with the learning goals we have for our students.

In light of what Schön has called the crisis of confidence in professional knowledge that we have witnessed in during the latter half of the past century, we need to think about how to help students make sense of and act in indeterminate situations, situations in which they cannot simply rely on the "applied science and technique" they have learned in their professional curriculum (Schön, 1987, p. 14). As Schön points out, indeterminate situations
often call for professionals to work to create well-formed problems that help them understand situations in ways that enable them to apply professional techniques. The artistry involved in conducting these acts of problem identification or "problem setting," he argues, is largely missing in professional education as it is now enacted.

Despite ongoing criticisms\(^{25}\) of the use of workplace scenarios in the classroom, the study described here suggests that a rich representation of context—like the ones in the Omega and Agile portals—when coupled with adept deployment in a course—can enable student reflection, critique, and action in ways that support the activity of problem setting as well as the more common classroom activity of "problem solving" (that is the application of time-tested techniques to solve the well-formed problems that arise from problem setting). I theorize how the simulations we created may enable reflection and critique using Wartofsky's (1979) theory of representation, which posits three types of artifacts—primary, secondary, and tertiary—that play a role in "historical human praxis" or "the fundamental activity of producing and reproducing the conditions of species existence or survival" (p. 200). The use of these three types of artifacts in concert enables experiences that, as Dewey (1938) states, "do something to prepare a person for later experiences of a deeper and more expansive quality" by "extracting at each present time the full meaning of each present experience" through reflection on situated action (pp. 47, 49). Thus, the use of primary, secondary, and tertiary artifacts in varying combinations can contribute to the development of what Schön calls a "reflective practicum," which is a "safe" environment in which students can practice using the tools of a profession as they reflect on the uses to which those tools are put:

\(^{25}\) With respect to technical communication, see for example, Moeller and McAllister (2002) and Bushnell (1999).
The practicum is a virtual world, relatively free of the pressures, distractions, and risks of the real one, to which, nevertheless, it refers. It stands in an intermediate space between the practice world, the "lay" world of ordinary life, and the esoteric world of the academy. It is also a collective world in its own right, with its own mix of materials, tools, languages, and appreciations. (p. 37)

More specifically, I suggest that these types of practical-reflective experiences may be enabled by using the affordances provided by computers for creating simulated space and simulated time.

Following the activity-theory framework I developed in earlier chapters, I conceive of space as what Merleau-Ponty (1974) calls a "spatiality of situation" rather than a "spatiality of position" (p. 100). In other words, "the 'here' of the body refers not to a determinant series of coordinates but to the situation of the active body oriented towards its tasks" (Giddens, 1984, p. 65). As I have attempted to show in the preceding chapters, simulated space can be made "richer" or "immersive" by more completely evoking situations (contexts) in which people can take action. In Chapters 1 and 2, I described this evocation of space in terms of a hypermediated Web environment designed to provide students with a sense of immediacy. In Chapter 3, I described this evocation of space in terms of authentic opening and closing documents. In Chapter 4, I described simulated space again in terms of a Web interface populated with a number of primary artifacts (e.g., spreadsheets, emails, etc.). I'll argue later in this chapter that constellations of artifacts deployed as simulated space provide "potentials" that students may or may not discover and act upon.

Tied closely to this representation of space is a representation of time. In the portals described in this study, the simulated passage of time enables students to get a sense of how the domains represented in the simulation "work" through the addition and removal of documents, through the communication that takes place among them as consultants and the
fictional characters with whom they interact, and through the apparently "random" (but really
teacher or designer constructed) exigencies that crop up during the course of their
engagement. In addition to helping students understand the practical elements of the
represented domain(s), their perception of the passage of time in terms of the simulation is
essential for enabling reflection and (ethical) action. As Giddens points out:

> Human action occurs as a *dureé*, a continuous flow of conduct, as does cognition. Purposive action is not composed of an aggregate or series of separate intentions, reasons and motives. Thus it is useful to speak of reflexivity as grounded in the continuous monitoring of action which human beings display and expect others to display. The reflexive monitoring of action depends upon rationalization, understood here as a process rather than a state and as inherently involved in the competence of agents. (p. 3)

Conduct and time are linked and because of this, any environment in which we hope to provide students with the opportunity to act (ethically) "in context" must have some representation of time.

I conclude the chapter by showing examples of how students acted and reflected as they worked with the Agile and Omega portals. I show how the combination of artifacts that define these portals contributes to both the reflective and practical aspects of a reflective practicum.

**Moving to a practical arts core**

Surveying the history of the American university, Steven Brint (2002) notes a marked change in recent decades: "the gradual shrinking of the old arts and sciences core of the university and the expansion of occupational and professional programs" which means that "... activities considered ancillary in an earlier age have moved to the center and become the leading engines of growth" (p. 231). As Brint explains, these declines in the arts and sciences core are both relative *and* absolute:
More than 1.1 million students graduated with bachelors' degrees in 2000-2001, compared to about 840,000 in 1970-1971. Under these circumstances, it is not easy for a field to decline in absolute terms, however poorly it may fare in competition with other fields. So, let me again add with emphasis: During a period in which the system grew by 50 percent, almost every field which constituted the old arts and sciences core of the undergraduate college was in absolute decline. This includes not only all of the humanities and social sciences (except psychology and economics) but also the physical sciences and mathematics. One could say that all of the traditional liberal arts fields, except those closely connected to health and business careers, have a receding profile in today's universities. (p. 235, italics in original)

A table evoking these changes in more detail appears Appendix C.

At the same time, though, the professions themselves have come under fire. Writing about the period from 1963 to 1981, Schön characterizes a world that sounds remarkably like ours in the first decade of the new millennium.

A series of announced national crises—the deteriorating cities, poverty, the pollution of the environment, the shortage of energy—seemed to have roots in the very practices of science, technology, and public policy that were being called upon to alleviate them. (Schön, 1983, p. 9)

And in terminology that is striking for its currency Schön goes on to state (Schön, 1983, p. 9):

Government-sponsored "wars" against such crises seemed not to produce the expected results; indeed, they often seemed to exacerbate the crises. The success of the space program seemed not to be replicable when the problems to be solved were the tangled socio-techno-politico-economic predicaments of public life. The concept of "technological fix" came into bad odor. (p. 9)

In the US, two of the most recent manifestations of this problem are the corporate scandals of Enron, WorldCom, Tyco and governmental scandal of the mishandling of intelligence about the (lack of) weapons of mass destruction in Iraq. One only has to glance at a book like The Smartest Guys in the Room (2003) to understand what Schön means when he attributes part of the problem with the professions to "the overweening pride of professional expertise" (p. 11):
Here's how another former employee describes the process: "Say you have a dog, but you need to create a duck on the financial statements. Fortunately there are specific accounting rules for what constitutes a duck: yellow feet, white covering, orange beak. So you take the dog and paint its feet yellow and its fur white and you paste an orange plastic beak on its nose, and then you say to your accountants, 'This is a duck! Don't you agree that it's a duck?' And the accountants say, 'Yes, according to the rules, this is a duck.' Everybody knows that it's a dog, not a duck, but that doesn't matter, because you've met the rules for calling it a duck."

And there was the ultimate problem. With Enron's financial team working feverishly to exploit the rules, there was no one willing to say that the duck was still a dog. Because they could come up with plausible rationales for why a given structure was technically valid, they believed they were on the right side of the law. They were, in fact, proud of what they were doing. In their view, they were doing what every other company was doing, except that they were doing it better and smarter, because they were Enron, where everything was done better and smarter. (McLean & Elkind, 2003, pp. 142-143)

In such a case the experts are betraying the trust that society—in the form of various stakeholders in Enron, including investors and employees—have placed in them. If we consider the role of the professional in the way Hughes (1959) has described it, we quickly notice an imbalance between professional license and mandate in the Enron scenario:

Most occupations—especially those considered professions... include as part of their being license to deviate in some measure from some common modes of behavior. Professions, perhaps more than other kinds of occupation, also claim a broad legal, moral, and intellectual mandate. Not only do practitioners, by virtue of gaining admission to the charmed circle of the profession, individually exercise a license to do things others do not do, but collectively they presume to tell society what is good and right for it in a broad and crucial aspect of life. Indeed they set the very terms of thinking about it. (p. 447)

The Enron scandal, as well as the others listed above, serve as examples of professionals who were more than willing to take advantage of the license granted to them, but less willing to fulfill the mandate to society that Hughes sees as coming in equal measure with professional license. In the example cited above this excess comes in the form of being
"smart" or finding ways to take advantage of the technical aspects of the situation.

Accountants flaunted their technical expertise.

Situations like the ones mentioned above, as well as an increasing level of litigation for "recourse against professional incompetence," have resulted in a "steady loss of professional autonomy" (Velayutham, 1995). The weakening of the contract Hughes posits between professionals and society is nowhere more apparent than in the Sarbanes-Oxley Act of 2002 which was passed in the wake of scandals in the accounting profession:

What these scandals had in common was skewed reporting of selected financial transactions. For instance, companies such as Enron, WorldCom and Tyco covered up or misrepresented a variety of questionable transactions, resulting in huge losses to stakeholders and a crisis in investor confidence. ("Sox-online: The vendor-neutral sarbanes-oxley site", 2005)

In this case, the US government, rather than a self-governing body of professionals, stepped in to ensure that the accounting profession fulfilled its societal mandate.

One question necessarily arises from the preceding material. As more and more students flock to professional programs, what can we as educators do, not just to teach them the skills they need to be "smart" on the job, but also to be "critical?" That is, can we find ways of challenging students to consider situations from varying perspectives, rather than simply pushing them to increase their technical proficiency with the tools of their profession?

**Profession or Trade?**

Schön locates at least some of the blame for this "crisis of confidence in professional knowledge" with the educational system that prepares professionals for their work. He claims that professional schools are often driven by what he calls "technical-rationality" which amounts to problem-solving techniques derived from science that can be applied to well-formed problems like what those in a textbook:
From the perspective of Technical Rationality, professional practice is a process of problem solving. Problems of choice or decision are solved through the selection, from available means, of the one best suited to established ends. But with this emphasis on problem solving, we ignore problem setting, the process by which we define the decision to be made, the ends to be achieved, then means which may be chosen. In real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling and uncertain. (Schön, 1983, p. 40)

Returning to the Enron situation as depicted above, we can see that the accountants were so concerned with showing their expertise by tailoring their financial statements to the rules while at the same time providing a convincing (though deceptive) picture of their organization's financial condition, that none of them attempted to reframe the issues at hand into a another type of problem, that of stakeholder interest.

At some level, then, professional education has become what Dewey (1916, p. 316) has characterized as a trade school:

Put in concrete terms, there is danger that vocational education will be interpreted in theory and practice as trade education: as a means of securing technical efficiency in specialized future pursuits.

Education would then become an instrument of perpetuating unchanged the existing industrial order of society, instead of operating as a means of its transformation. (p. 316)

While the first paragraph of this passage anticipates Schön's critique of technical-rationality in professional education, the second paragraph describes a problem much critical scholarship has identified with the contemporary university. Partially because of the concentration on teaching technical-rational techniques derived from scientific disciplines,26 partially because of the relatively recent belief in the West "that school learning should rightfully, and nontrivially correspond to the world outside of school" (Petraglia, 1998, p.

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26 Schön discusses the power/status relationships within the academy that have led to this situation at length, but these relationships are beyond the scope of my discussion here.
14), and partially because of the changing enrollments (i.e., demand for occupational/professional degrees), the university, many argue, is morphing into an institution that more than a few scholars characterize in ways that echo Dewey's evocation of a trade school.

For example, Bushnell articulates this view clearly when he paints technical/professional communication departments as: "training departments for corporate 'clients' who provide us with internships and fellowships" (Bushnell, 1999, pp. 175-176). Bushnell then goes on to cite a number of textbooks and articles that perpetuate this view. Likewise, Herndl characterizes as the "tyranny of the 'real'" the common tendency of instructors to transplant elements of workplace practices—as cultural givens—into their classrooms without providing adequate representation of how those practices evolved or how an individual might go about affecting change (Herndl, 1993, p.350).

One example of one such workplace representation appears below. I took this sample from instructor's web site syllabus for a professional communication course.27

To be successful, treat this class as a job. My role is to assign work, to provide instruction and guidance, and to evaluate finished products. Your duty is to come to work on time and do your tasks cheerfully and on schedule. If you have problems, talk with me. If you are going to miss work (class), notify me in advance by leaving a memo in my mailbox. Don't be misled by the fact that we come to work in a classroom. During this class, you are at work, which means that you will be expected to listen to instructions and solve problems. Take notes. You will be held responsible for instructions and writing advice provided only through lecture. Remember, your future employers won't distribute assignment sheets. (2005)

This syllabus passage is fraught with the language that indicates the instructor is choosing to unproblematically represent the workplace (and wider society) as a space in which people

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27 Note this passage is not from Catman's course, which was used as the comparison course for the study in Chapter 4.
simply go to work and perform their duties cheerfully. What this representation lacks, and what contemporary radical pedagogues emphasize, is the contestation and resistance that takes place in the day-to-day enactment of school and work. Courses that "teach a non-academic discourse without a careful cultural analysis" (Herndl, 1993, pp. 352-353) become little more than a flattened representation of "business as usual":

the discourse we refer to when we talk about the "discourse of engineering," etc. is all too often a reflection of the dominant position which flattens the discursive and ideological struggles that exist within any social or institutional practice. (Herndl, 1993, p. 359)

As I mentioned in the introduction, a richer representation of context as at least a partial solution for the need to teach professional practices but only if it also provides a chance for students to work on indeterminate situations in an environment where they can both reflect and practice effecting change. But to this point I have not clearly defined what I mean by "richer." Wartofsky provides us with a nuanced theory that links representations and their relation to a culture's central activities. I will use this theory to suggest a model for thinking about the content of professionally oriented courses as well as a framework for describing the activity that characterizes student work with the Omega and Agile portals.

Representing work

Much like Cole's conception of culture as medium, which I discussed in Chapter 1, Wartofsky's theory of representation elaborates the thinking of Vygotsky, Leont'ev, and Luria with respect to the role tools play in the development and perpetuation of human society.

For Wartofsky, "historical human praxis" is "the fundamental activity of producing and reproducing the conditions of species existence, or survival" (Wartofsky, 1979, p. 200). "What is distinctly human about this activity," he argues,
is that human beings do this by means of the creation of artifacts. Their production, as distinct from the foraging, scavenging or hunting activity of other animals, proceeds by a transformation of part of the environment into an extension of animal organs—as, e.g. tools are. (Wartofsky, 1979, p. 200)

Wartofsky goes on to state that that skill in the production and use of artifacts:

can be transmitted, and thus preserved within the social group, and through time from one generation to the next. The symbolic communication of such skills in the production, reproduction, and use of artifacts—i.e. the teaching of transmission of such skills in which mimicry or the imitation of an action becomes a characteristic human mode of activity. It is, in effect, this ability to represent an action by symbolic means which generates a distinctive class of artifacts, which we may call representations. (Wartofsky, 1979, p.201)

Representations of actions (representations of human praxis) are what Wartofsky calls secondary artifacts. These stand in contrast to primary artifacts which are used directly "in the production of the means of existence and in the reproduction of the species" (p. 202).

More specifically, secondary artifacts are:

symbolic externalizations or objectifications of such modes of action—'reflections' of them, according to some convention, and therefore understood as images of such forms of action—or, if you like, pictures or models of them; distinctive artifacts created for the purpose of preserving and transmitting skills, in the production and use of 'primary' artifacts (e.g., tools, modes of social organization, bodily skills and technical skills in the use of tools). (p.201) (See Table 5-1, below for examples of the three types of artifacts.)

As I noted in Chapter 1, then, we can think of school and schoolgoing activity as being concerned with "preserving and transmitting skills". As Cole (Cole, 1996) suggests:

human beings arrange for the rediscovery of the already-created tools in each succeeding generation. Becoming a cultural being and arranging for others to become cultural beings are intimately linked parts of a single process of enculturation. (p. 109)

However, thinking back to Herndl's observations about the flattening of discursive and ideological struggles inherent in representations of the world outside of school within the schoolgoing activity, we might consider these secondary artifacts having a reproductive
emphasis; that is, their goal is largely the reproduction of societal practices as they exist in the present. The next step beyond Wartofsky's notion of secondary artifacts is a way to account for changes in modes of action. Without such a mechanism, his theory would be on par with theories of social and cultural reproduction (Althusser, 1971; Bernstein, 2000; Bourdieu & Passeron, 1977; Bowles & Gintis, 1976) which Giroux argues are characterized by a "one-sided determinism," "a simplistic view of social and cultural reproduction," and an "ahistorical mode of theorizing" (p. 77). These shortcomings, Giroux suggests, result in the tendency to overlook the "partially realized elements of opposition" that always coexist with the dominant mechanisms of social and cultural reproduction" and which result in societal change (p. 100).

Wartofsky solves this problem by introducing what he calls tertiary artifacts:

... we may speak of a class of artifacts which can come to constitute a relatively autonomous 'world', in which the rules, conventions and outcomes no longer appear directly practical, or which, indeed, seem to constitute an arena of non-practical, or 'free' play or game activity. ... So called 'disinterested' perception, or aesthetic perception, or sheer contemplation, then becomes a possibility; but not in the sense that it has no use. Rather, in the sense that the original role of the representation has been, so to speak, suspended or bracketed. (p. 208)

It is from this game activity, then, that change arises:

If as I claim, an 'actual' world is a historically selected or achieved one, corresponding to a given level of social-historical praxis, (technology, social organization, etc.), then the 'possible' worlds provide candidates for conceivable change in this mode of praxis itself. The perceptual alternative provides the possibility of a practical alternative ... . Such imaginary worlds I do not take as 'dreams' or 'in the head', but as embodied representations ... . Once the visual picture can be 'lived in', perceptually, it can also come to color and change our perception of the 'actual' world, as envisioning possibilities in it not presently recognized. (p. 209)

Tertiary artifacts go beyond secondary artifact in that while they represent the tools and actions of society, they also provide space for experimentation and play, a space that Schön also suggests is necessary for creating the virtual world of the reflective practicum. From
this play, Wartofsky suggests, people can introduce change into their immediate (actual) context.

Table 5-1 shows the relationships among the three types of artifacts.

<table>
<thead>
<tr>
<th>Artifact</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary artifacts</td>
<td>used directly in the production of the means of existence and in the reproduction of the species</td>
<td>axes, clubs, needles, balance sheets, bowls, Flash, Photoshop, MS Word, Schrödinger equation, etc.</td>
</tr>
<tr>
<td>Secondary artifacts</td>
<td>representations of primary modes of action</td>
<td>lectures, demonstrations, tutorials, textbooks, manuals, traditional cases</td>
</tr>
<tr>
<td>Tertiary artifacts</td>
<td>&quot;domain in which there is a free construction in imagination of rules and operations different from those adopted for ordinary &quot;this worldly&quot;'' praxis&quot; (p. 209). &quot;the original role of the representation has been, so to speak, suspended or bracketed&quot; (p. 208)</td>
<td>play, games, simulations</td>
</tr>
</tbody>
</table>

We can think of the professional classroom, then, as a deployment of the three types of artifacts in varying combinations. It is how course designers and teachers choose to configure and incorporate these artifacts in our classrooms that partially determines what experiences our students have access to within our courses and how they perceive the activities they undertake in school.

**Representation for practice, reflection, and critique**

Interactions that involve all three types of artifacts enable students to engage in the practices that characterize the activity they are learning about and to reflect not only on their actions, but on the entire activity (domain). Gee (2003) formulates this situation as follows:

\[\ldots\] the learner can be actively enough involved in learning the domain to form an appreciative system that norms and guides his or her thought and action in the domain, but this system can remain largely unconscious and not reflected on in any very overt way. This is active learning by not yet critical learning. (pp. 97-98)

Critical learning, he argues, occurs when the learner
reflects overtly on the goals, values, feelings, and desires that comprise this system, to compare and contrast this appreciative system to others, and to make active and critical choices about the system.

Trying to balance primary, secondary and tertiary artifacts in professional courses can be difficult, especially with the pressure within the curriculum for students to achieve a number of "testable" objectives. Indeed for many instructors the concept of "reflective practicum" may seem like an oxymoron.

For example, Bushnell (1999) admits that while he feels his seminar in technical communication enables students to "examine various narratives created by technical and scientific writing, including their own, and to critique the conventional notion that those kinds of writing are objective and impersonal" (p. 182), he has not been successful in introducing the elements of his "subversive agenda" into his practicum courses. He believes the reasons for this failure are twofold: "the sheer amount of practical material to be covered" and "student expectations" (p. 185). In addition, Schön, in developing his idea of a reflective practicum, cautions that "[a] practicum may fail because its striving for realism overloads students with practical constraints or because (as architectural studios are often said to do) it leaves out too many important features of real-world practice" (Schön, 1987, p. 170).

Given the preceding discussion, I believe we can conceive of the problem of creating a reflective practicum or in Bushnell's terms help introduce a "subversive element" into a practicum by considering the impact of including artifacts from different levels of Wartofsky's hierarchy. These three types of artifacts taken in various measures can create varying spaces for action and reflection. Earlier in this chapter, used the word "potentials" to describe the possibilities that can arise from constellations of artifacts to which students give
meaning, depending on the students' level of noticing. Action potentials are spaces for action and reflection potentials are spaces for reflection.

Table 5-2 shows the relationship among the various types of artifacts and the types of reflection and action to which they generally contribute.

### Table 5-2: Articulation table Wartofsky and Schön

<table>
<thead>
<tr>
<th>Artifact</th>
<th>Examples from professional curriculum</th>
<th>Characteristics</th>
<th>Action potentials</th>
<th>Reflection potentials</th>
</tr>
</thead>
</table>
| Primary artifacts | balance sheet; spreadsheets; formulas; denotative definitions; meeting minutes | • Indexical (often products of dominant culture)  
• Efficiency emphasis  
• Technical Rationality | Problem solving | Instrumental reflection  
 i.e.,  
Process improvement |
| Secondary artifacts | lectures; textbooks; tests; problem sets | • Indexical (generally seek to reproduce dominant culture)  
• Efficiency emphasis  
• Technical Rationality  
• May, however, suggest alternative/critical approaches | Problem solving | Instrumental reflection  
 i.e.,  
Efficiency of learning (speed of download) |
| Tertiary artifacts | games; simulations | • Imaginative  
• Enables concrete criticism of dominant practices  
• Enables experimentation with alternative practices  
• Enables "subversion / appropriation" of primary and secondary artifacts | • Problem setting (problem naming and framing)  
• Development of new means | Critical reflection  
 i.e.,  
Problem definition |

Considering the preceding table, we can see that primary artifacts, the "already there" of society, generally point to what Schön calls technical-rational action, a selection from the available tools in order to solve a well-formed problem. Secondary artifacts, like traditional "how-to" textbooks and lectures, are also generally oriented toward this sort of efficiency-

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28 For more on noticing, see the section in Chapter 1 on anchored instruction.
centered problem solving approach. These two types of artifacts when included in the curriculum result in much of what we see in the day-to-day activities that take place in professional classrooms. Students work with the primary tools of the trade (e.g., financial statements) while learning about them from secondary artifacts like textbooks and lectures. And, generally speaking, traditional classroom methods provide an efficient way for imparting disciplinary rudiments to students while enabling the types of reflection that can result in students becoming better at working with the primary artifacts in as they are employed in a field.

When designed and used with an eye toward producing thoughtful/critical professionals, tertiary artifacts (i.e., games and simulations) can incorporate primary and secondary artifacts in ways that open up potentials for both action and reflection. Because the simulations include the primary and secondary artifacts, they, like more traditional classroom fare, make instrumental practice available to students, but because they provide additional potentials afforded by simulated space and time, they also may provide opportunities for (and perhaps actually encourage) critical reflection and action.

In the following sections, I show specifically how the potentials afforded by simulated time and space contributed to both instrumental and critical action and reflection in the courses using the Agile and Omega portals.

**Affordances of simulated space**

**Space for Action.** Omega and Agile contain a number of primary artifacts, like laboratory reports and financial statements as well as software tools, which are closely tied with the organizational representation that serves as a tertiary artifact in the classroom. Indeed, as I
pointed out in Chapters 2 and 3, the interface for these portals is nothing more than a representation of what an actual "in-box" might look like for a typical employee at one of these organizations.

Because of the hypertextual nature of this representation of organizational space, students, from the time they log into the environment, face an indeterminate situation and must struggle to set (frame) problems (i.e., figure out what to do), using know-how they have acquired from life, from their previous courses, and from what they have covered thus far in the course employing the simulation. Schön sees this framing struggle as an essential part of learning any new competency:

> The paradox of learning a really new competence is this: that a student cannot at first understand what he needs to learn, can learn it only by educating himself, and can educate himself only by beginning to do what he does not yet understand. (1987, p. 93)

One example is the Omega state-of-the-company report in which students are asked to formulate and support their assessment about the organization's health and future prospects while also providing a plan of action for the upcoming months. While their familiarity with the report genre helps them to understand some of the activities they must undertake to complete this assignment, they have to figure out just what a state-of-the company report is in this particular context and how producing such a report will help the organization take the direction the consulting group recommends. Students, then, must turn back to the case context to determine what the potentials for action are in this situation.

In the course described in Chapter 4, at the request of Omega CEO Kurt Danzer, all groups developed ideas about Omega and its place in the market, and several went further and suggested changes to what they saw as problematic workplace practices at Omega.
For example, one group, noting that the CEO seemed unwilling to authorize insurance coverage for same-sex partners (they gathered this from an email exchange that appeared in the site), researched corporate insurance rates at a number of companies and found one that would supply at the same price for the projected number of people. They provided an overview of this research and detailed pricing figures with their report.

Another group suggested that Omega designate a "knowledge manager" to ensure that some of the communication disconnects (including problems with the company's financial reporting) that had characterized the company's existence thus far be remedied. They provided a detailed plan for restructuring the information located in the Omega document server as well as budgetary estimates for developing and managing a more sophisticated intranet.

As we might expect with any indeterminate situation, different students with different histories noticed and emphasized different potentials in taking action within the classrooms in which this simulation was deployed. The point here is that because of the constellation of primary, secondary, and tertiary artifacts in these courses, students were able to decide for themselves (i.e., "frame" or "set") what the "real" problems were and then propose solutions, based on the know-how they gained from the course as well as the primary and secondary artifacts available to them within the simulation.

**Space for Reflection.** One of several reflective requests is made of students toward the end of their consulting engagement.
As part of their time reporting process\textsuperscript{29} students submit a timesheet as well as a paragraph or two about a topic of interest to the team lead (who is trying also to understand what is going on in each particular consulting engagement he/she is supervising). One of their final prompts (a complete list of prompts for these reflections appears in Appendix A) asks them to describe "one other document" they might produce to finish out their consulting engagement with Omega:

\begin{quote}
One other document
Think about
Now that you have worked as a consultant at Omega for several weeks, you are pretty familiar with what is going on in the organization. Think about one communicative action you would take (i.e., create a document, say something to someone, send an email, etc.) if you were given the chance.
Write about
Describe the communicative action you thought about above. What would it be? How would you deliver (perform it)? What impact do you hope it would have?
\end{quote}

This call for reflection would make little sense unless students were immersed in an environment that evokes the details in a situation with enough concreteness to elicit more than a general response.

A cross-section of the responses to this prompt serve to show how students' actions range from mostly practice-oriented and instrumental to critical. In the more instrumental reflections students generally placed an emphasis on the primary and secondary artifacts included in the course, as in the following in which a student talks about the importance of email (primary tool) for getting his message to everyone efficiently:

If I were to send out a message to Omega employees, I

\textsuperscript{29} Students, not unlike consultants, are asked to keep track of the amount of time they allocate to various project tasks. At the end of the engagement they produce an "actual-vs.-budget" report in which they compare the schedule projections they set forward at the beginning of the project and the number of hours they actually worked. They then draw conclusions about why these numbers differ and what they might change about their work process to make it more effective. This report also requires them to produce a team self-assessment based on the success criteria they have developed at the project's outset.
would probably use email. I think most people are like me in that I check my email multiple times daily. I am also more apt to read an email rather than a letter or other paper that I can easily set down and get covered up. With email, I see it every time I open my inbox until I read it and then get rid of it. I feel that email is very effective as long as the message is kept short and to the point.

In this case the student reflection focuses on the primary artifact of email in great detail. He is thinking about how to get things done more efficiently. The game environment (tertiary artifact) has provided him with a context in which this type of reflection can be meaningful and indeed this type of reflection is important for improving things at work (though some scholars might criticize the emphasis placed on efficiency). At the end of the reflection, he shows the influence of one of the secondary artifacts provided in the course: a reading about how to write an effective email ("short and to the point").

The reflection potentials offered by the simulation also allow for students to respond critically to the immersive environment. For example, another student's response to the same prompt appears below. Notice that this reflection also talks about an email, but in this case, the student chooses to concentrate on taking action that will change the organization, rather than simply making it more efficient.

Now that I've worked for Omega for a while now, I would like to write an email on ethics. I would like to talk to [Danzer] about his ethics and what he thinks about marketing products to the public that may not be as great as they are made out to be. I would like to know what his thoughts are on twisting the truth (lying) to the public, so that he can make a buck.

This student has formed her impression of Danzer from a constellation of artifacts present in the portal. Nowhere is it directly stated that Omega's CEO is a liar. In fact, what this student has perceived as lies, other students perceived as miscommunication between researchers and executives.
The preceding reflections are just two examples of how the configuration of online space we created within the Agile and Omega portals provides potentials for reflections ranging from instrumental to critical. The Omega and Agile environments as tertiary artifacts are filled with these potentials, which are basically primary and secondary artifacts that when considered together represent a situation that might, depending on how students frame their activities, demand attention and afford space for instrumental and/or critical action.

Table 5-3 summarizes various potentials (constellations of artifacts), what that particular potential might represent to students, and how various students acted when they noticed these potentials.

<table>
<thead>
<tr>
<th>Constellation of artifacts (&quot;potential&quot;)</th>
<th>Representation of Observed student actions or reflections</th>
</tr>
</thead>
<tbody>
<tr>
<td>• financial statements</td>
<td>heavy losses thus far but high margin on pharmaceutical corn products</td>
</tr>
<tr>
<td>• news stories about contamination food supply in both StarLink and Prodigene cases</td>
<td>uncertainty about the potential damage to the food stock if GMO corn/rice makes its way in</td>
</tr>
<tr>
<td>• video testimony of Greenpeace activist about dangers of contamination—test over multiple generations</td>
<td>contradiction of why a company that is working to develop a cure for cancer is also developing a protein to kill people</td>
</tr>
<tr>
<td>• Memo stating that Omega has not tested VitA Rice over multiple generations</td>
<td></td>
</tr>
<tr>
<td>• memo outlining Omega's participation in project to develop a neuron-destroying protein that is otherwise non-toxic to environment</td>
<td></td>
</tr>
</tbody>
</table>

Table 5-3: Action potentials in Omega portal
<table>
<thead>
<tr>
<th>Constellation of artifacts (&quot;potential&quot;)</th>
<th>Representation of</th>
<th>Observed student actions or reflections</th>
</tr>
</thead>
</table>
| • video of CEO talking about increased amounts of vitamin A in VitA rice  
• clinical trial data that shows some varieties of VitA rice producing the same amount or less than unmodified native strains | CEO uncertainty; CEO lying; unreliable data; | • one group argued in their state of the company report that the company needed to use larger sample sizes for its trials.  
• Another group suggested the CEO visit the lab weekly to make sure he understands the results of the trials.  
• students demanded an ethics statement, including reporting guidelines for scientific and financial data (see below) |
| • video – CEO speech outlines plans for selling VitA Rice to southeastern Asian countries  
• news brief details Syngenta's donation of golden-rice technology to poor farmers in the region  
• video – director of research and development reports that contract farmers are refusing to plant their fields because of what they’ve been told by environmental activists about impact on native varieties | conflict between profit motive and humanitarian motive; imperialistic drive of US company | • students argue in state of company report for dropping of VitA Rice line and concentration on pharmaceutical corn  
• students suggest similar donation of VitA Rice—which has better disease resistance than Syngenta's variety  
• students recommend that Omega focus on other aspects of Vita rice like color and disease resistance, which Syngenta's product doesn't have |
| • reference library shows countries that are most in need of VitA Rice are least able to pay for it  
• financial statements show that Omega is in dire need of funds | conflict of profit motive and humanitarian motive | • students recommend that Omega become strictly a research and development company and get out of the seed / protein production business  
• students recommend that Omega dump the VitA Rice line and become a for-profit organization |
Table 5-3 (cont.): Action potentials in Omega portal

<table>
<thead>
<tr>
<th>Constellation of artifacts (&quot;potential&quot;)</th>
<th>Representation of</th>
<th>Observed student actions or reflections</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Omega's targeted ecosystem process (OTEPE) seeks to create GMOs out of varieties that already exist in a region</td>
<td>• should a company be able to take genetic material from varieties that grow in developing countries without somehow compensating those countries?</td>
<td>one group created a memo defining genetic piracy and then suggested a policy for ensuring fair compensation for genetic material used in the creation of GMOs using OTEP</td>
</tr>
<tr>
<td>• Farmers in these regions have been developing these varieties by traditional selection for thousands of years</td>
<td>• does Omega have obligation to make its technology available for free to developing countries (a la Syngenta)?</td>
<td></td>
</tr>
<tr>
<td>Omega's CEO has made the decision not to insure cohabitating partners</td>
<td>how many people have same-sex cohabitating partners, and will this number really make a difference in the insurance rate?</td>
<td>students researched insurance corporate insurance rates at a number of companies and found one that would supply at the same price for the projected number of people</td>
</tr>
</tbody>
</table>

Because such a variety of potentials can be made available within the deployment, no running of the simulation is ever exactly the same as a previous running. In addition because the simulated can easily be "seeded" with new artifacts that may contradict or somehow modify students' interpretation of the body of artifacts that are already there, instructors can take the course in any direction they like. For example, one focus within the Omega simulation might be global resistance to genetically modified organisms (GMOs). Reacting to an email that might come into Omega from a concerned group, an instructor (in the guise of an Omega director or in the guise of team lead) might ask students to prepare reports about the perceived dangers of GMOs or to document the success or failure of GMO initiatives in various developing countries.

Finally, part of providing space for critique and action is the necessity of providing alternative routes for students who object to the work that takes place in and for a
biotechnology company. In the case of the Omega simulation, what we call a "shadow sequence" is available for students who object to "working for" a biotechnology company. The students in this alternative assignment sequence help found an organization dedicated to raising awareness about GMOs (see Appendix B for an overview of this sequence). The students develop many of the same documents created by those students engaged with Omega. The sequence is also designed to afford them the same opportunities for revision and document sharing as those working with Omega. As of this writing, no students have chosen to participate in this alternative assignment sequence, though several have, during the Omega engagement—after learning more about the industry—expressed in their reflections and in their recommendations to the company ways to ensure economically and scientifically ethical behavior. But the very existence of this alternative assignment sequence is another way the simulation affords space for critical action.

**Affordances of simulated time**

**Time for Action.** Perhaps the clearest way in which the Omega and Agile portals enable students to immerse themselves in the world of the simulation is through their depiction of time in terms of simulation events, rather than classroom events. In other words, students (as consultants) are asked to complete assignments (submit deliverables) based on simulation exigencies (i.e., the Director of Marketing is attending a trade show; the management team is having a meeting; regulators are coming on site) rather than classroom exigencies (i.e., we need to get your state-of-company-report in before spring break).

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30 Early in my career I was asked by an interviewer whether I objected to working for a software company whose major client was Brown and Williamson, a tobacco company. Though I took the job, the experience has stuck with me and is one of the chief reasons why I believe it is important to provide students who may have objections to biotechnology to enact them within the classroom.
Another way simulation time is underlined and emphasized within the Omega and Agile portals is through various public performative acts\(^{31}\) where students go on record as taking an action that alters their relationship with the organization and with the other participants in the simulation. Thus students can consider themselves as they were before and after the act in question. The best example of one of these acts is the non-compete contract students are asked to sign before they begin working with Omega. This agreement outlines expectations Omega has for its consultants and includes the following section that covers expectation's for consultant's employment choices after the Omega agreement:

> Consultant agrees not to divulge and trade secrets or other proprietary information encountered during the engagement to competitors or entities Omega management deems potential competitors for two years following the consulting engagement.

The wording in this clause is problematic from the perspective of an individual who wants to seek work after the Omega engagement. Omega management can call virtually any company a potential competitor, if it wishes. While some students do not see an issue with this wording, others opt to modify the agreement. When students confront this document in class, I begin by asking them to read and sign. I generally don't say anything else and wait to see if students raise issues on the document without prompting. In cases where no one in the class seems to have issue with the document, I begin to ask them questions about the agreement, especially with regard to the troublesome passage cited above. This technique serves well throughout the simulation. Very often students will find issues that I had not considered without my prompting, but occasionally I find it necessary to give them hints about things they should think about as they proceed.

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\(^{31}\) Austen calls this type of speech act an illocutionary act. An illocutionary act is "an act which, if performed in the conformity with the pertinent conventions, has the potential to impact the social and moral order" (Kaufeld, 2001, p. 740).
Two examples of students' reworking of the non-compete agreement appear below (Figures 5-1 and 5-2). These are both samples from students who did not require prompting to find issues with the document.

**Figure 5-1: Response from student who raised specific ethical concerns**

The student who modified the preceding agreement talked frequently about the Enron scandal in class and was particularly concerned about ethical violations (with respect to accounting practices or with respect to the organisms themselves) that the company might commit. As a result, he indicated that his conditions for working for the company included the right to report these violations. He also wished for a more particular definition of "proprietary information" and so he elaborated this to include "methods" and "technology." Finally, he felt that two years was too long to ask him not to work for a competitor, so he
changed the time to six months and specified that Omega would deliver a list of organizations they deemed competitors.

Another student, see figure 5-2 below, was more concerned about the amount of work he would be required to do, as well as the compensation he would receive for that work.

![Image of handwritten note]

**Figure 5-2: Response from student who raised concerns about quantity of work and rewards/penalties for that work**

In this case the student marks out the part of the introduction to the deliverables that says "but not limited to," calling it "open and vague." He also wants to ensure that "completion of these requirements guarantees an A grade for three credit hours."
For each of the examples above, I (in the role of an Omega human resources person) returned to the students a photocopied version of the marked up documents pictured above with additional feedback from the Omega representatives. In the case of the first document, I listed a number of companies Omega deemed direct competitors and in the case of the second student, I briefly outlined the quality criteria he would have to meet in order to receive credit. The effect of this document cycling, was again, to get the students to think in terms of the simulation's time horizon, rather than in terms of classroom time/events.

**Time for Reflection.** In addition to the illocutionary acts that help students mark case time, the instructor's ability to simulate the movement through time affords opportunity for reflection that is different than simply reading about happenings at T₁ and T₂ and then being asked to compare them. In the Agile experience, for example, students made a decision using the primary artifacts available at T₁. Movement forward in time is, of course, represented superficially in the assignment for the next project, which includes an indication of the time shift (for example from 1998 to 2001). However, more importantly for students' sense-making process, documents comprising/resulting from organizational activity taking place between T₁ and T₂ appear in the environment when the students engage it at T₂. After making another decision at T₂, students are then asked, given the new information they have acquired at T₂ (i.e., now that they've seen what really happened) what would they change about their decision and why.

Interestingly, within the deployment of a tertiary artifact like Agile the "what really happened" becomes a question that guides the students back to the site rather than a simple narrative statement like, "Polaris decided to build a streetbike." Thus students look to the
primary artifacts again to assess their initial thoughts and to understand subsequent actions.

One example of this type of reflection appears below:

If I could change one thing to our first recommendation (Group #4), it would be to find a different niche market in the cruiser category rather than focus on the female scooter market.

Initially, I thought it would be unthinkable to try and complete with Harley Davidson, but there are other "cruiser" markets. This demand falls outside HD's core customer. The female bike, that we initially thought may be a segment to consider introducing, but only if the main line of cruisers are a success. Organization A [Polaris] was our second choice when we determined which organization should enter the market.

In this mostly instrumental reflection, we see the student refining her grasp on some of the concepts that she has learned earlier (competition, market, customer). The student formulates "what really happened" in terms of the various segments of the motorcycle market represented in the case. She makes sense of "Polaris decided to build a streetbike" by thinking in terms of the market/demographic data provided in the case at T1 and the Polaris Victory sales figures presented at T2. The viability of multiple cruiser markets or subsegments comes as a surprise to her and seems to be the chief way she explains a decision her group did not fully anticipate (that of Polaris to build a cruiser).

And indeed, it is just this element of surprise that Schön (Schön, 1983) associates with what he calls "reflection-in-action":

the practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomena before him, and on the prior understandings which have been implicit to his behavior. (p. 68)

The simulated passage of time enabled by the Agile portal facilitates students encountering these moments of surprise by allowing them to "see what happened" in situations that would normally take years to develop. The following group of students noted that this affordance had some impact on what they felt they were taking away from the course. The following
text comes from the conversation that ensued in a focus group when they were asked:

"Having just talked about what you felt like you learned from the Agile case, do you felt like you could have learned those things as well or better from one of the other teaching methods used in the class? Lecture, book cases?":

... 

Lacey. I think I leaned more towards dirt bikes, so it surprised me when this all kind of turned out the way it did

Kevin. (in audible) - but both of us would have said, why challenge Harley, and go for the dirt bikes, sticking with what you know, but in hindsight, at least so far, it looks like it's been a decent decision.

Lacey. Which is great to see, because I would have recommended dirt bikes and then to go - Oh they went with "this" and it's actually, maybe not a bad decision. It's just like, whoa... that's the ultimate - fail class, right there.

Erin. Maybe it's our conservative nature saying "don't challenge the big dog"

Kevin. They certainly saw room and now we realize that it did make some sense. What could we now.... if we're looking at another case in the future, it encourages me, anyway, look and see, yeah, maybe there's a big dog out there, but is there any way that we can challenge it. What are their weaknesses . . .

Erin. This one is going to stick with me more than any other case that I've ever done. I don't remember most of the stuff from classes and the cases, but this one, because we got so into it and we learned so much about it... I want to see what happens, and I will actually remember this when I make future decisions...I'll say, Oh what would have Polaris have done? Which is nice to have a case that I can carry with me and I wish I had more cases that I would remember like that.

(BUAll, pp. 45-46)

In order to be surprised, students need to be deeply engaged in some type of action. In this case, the students were trying to determine which of four organizations should enter the domestic motorcycle market and with what type of product. They were employing the primary artifacts deployed in the scenario to try and make a decision. When the actual
outcome of the situation was shown to them (as I have noted above, through the release of additional data into the portal), they were surprised and forced to turn back and look again at the potentials presented in the simulation to try and understand what happened.

Lacey associates this surprise with being "wrong" in the traditional school sense when she says "whoa... that's the ultimate - fail class, right there." On a test, she might have lost points for getting the wrong answer. But within the simulation this "mistake" is not really such, because in the tertiary world of Agile consulting, even Polaris' actual decision or "what really happened" comes under scrutiny as just one of a number of possible decisions that might have been made given the situational potentials. In the Agile case, as I noted in Chapter 3, there is no "answer person" (the role traditionally played by the teacher) marking answers as right and wrong. Students evaluate and learn from their own performances through looking at the situation developing through (simulated) time.

Kevin underlines the affordance this conjunction of conduct with simulated time provides for reflection when he says "but in hindsight, at least so far, it looks like it's been a decent decision." The actual outcome of the Polaris decision seems to indicate that the company made a good choice in several respects (based on definitions of success crystallized in the primary artifacts associated with the case—i.e., turning a profit).

Returning to the work I cited in Chapter 2 that formulates transfer as "patterns of participatory processes across situations" (Tuomi-Gröhn & Engeström, 2003, p. 25), we can see how the students in the preceding conversation, especially Erin, describe their experience with Agile in terms that support such a conception of learning. Erin emphasizes how the extended immersion with the portal has contributed to her taking something away from the case and the class ("This one is going to stick with me more than any other case that I've ever
done"). Throughout the focus-group interviews, students emphasized the importance of the extended engagement with the Agile materials for enabling them to use the primary artifacts not only to evaluate situations for the purpose of making recommendations, but also for providing affordances for reflecting on their recommendations, given new information about what really happened at Polaris and in the domestic motorcycle market. Like the students in Chapter 3 who seemed to become more engaged with the case because they were, in part, responsible for piecing together the story, Erin seems to believe that because she spent a good deal of time and effort making sense of an indeterminate situation, she will have some idea of how to tackle such situations in the future ("I will actually remember this when I make future decisions").

Conclusion

When deployed in the professional classroom, constellations of primary, secondary, and tertiary artifacts can afford spaces for both instrumental and critical action and reflection. The shape these spaces take depends in part on the way the three types of artifacts are deployed. For example, in a training course, the emphasis is often on a single primary artifact, like a piece of software. The instructor in such a course focuses on the procedures for using the software tool, using secondary artifacts like quick reference sheets or step-by-step training manuals that do little to evoke the contexts in which the tool might be used. In a traditional university course, the instructor may concentrate on teaching students to use a number of primary artifacts, like spreadsheets and accounting rules, using secondary artifacts like textbooks or traditionally narrated cases that make some attempt to evoke the context in which the tools are used.
However, when a tertiary artifact like a game or simulation is employed in conjunction with the primary and secondary artifacts, students get to experiment the expanded range of potentials that characterize an indeterminate situation. What makes Omega and Agile tertiary artifacts provocative is their representations of organizational space and time. These representations force students to make sense of indeterminate situations by identifying or "framing" problems and then using (or developing) expertise to suggest solutions.

In addition, especially because of the affordances provided by a flexible representation of time, students can participate in several problem setting (framing) and solving cycles. Each of these cycles provides an opportunity for reflection on actions taken during the previous cycle and potentially a modification of the students' approach to both the future deliberative moments in the simulation, but also similar moments they will confront in their lives and professionals and citizens.

Our hope is, then, that by acting in environments that resemble those they will confront as workers, but having the option to play at acting in different ways and having the ability to reflect on those actions students get the most out of the classroom experience while preparing themselves for the future by working/playing in an environment that represents the affordances and constraints of a knowledge-intensive organization.

References


Appendix A: Weekly Prompts for Consultant's Journal

Data gathering

Think about
For this week you read Doheny-Farina's article "Writing in an Emerging Organization." Think about how Doheny-Farina gathered his data for the article. Think also about the conclusions he drew from the data he gathered.

Write about
Write about the ways you envision yourself gathering data for the work you will do on the Omega engagement. How to these data gathering techniques compare with those you used to complete the interview assignment?

Team charter

Think about
During the past week, you learned about the different roles that make up a good team. You also learned a little more about yourself through taking a personality test. What role do you think you might best fill in your team? Why? Are there others who might fill that role equally as well? How will you determine who does what?

Write about
Write about the role you think you will play on your team. Explain why you feel that role is the best one for you. What sorts of tasks do you envision yourself doing to fulfill your role?

Organizational narratives

Think about
During the past week, you read and thought a lot about the stories or narratives that help define an organization. Do you think some narratives are "stronger" than others within organizations? In other words, do people put more credence in some stories than in others?

Write about
Identify what you believe to be two potentially conflicting narratives at Omega. Which one do you put the most credence in? Why?

Biotechnology and you

Think about
During the past week, you familiarized yourself with some of the issues surrounding genetic engineering and its impact on the world food supply. What are some of the central issues in the discussion about GMOs? What are some of the central issues with respect to multinational corporations and global food production?

Write about
Are you satisfied with Omega's public portrayal of itself in light of the issues you just thought about? Where would you suggest Omega make changes in its "public presence"? How would you suggest they do so?
International communication

Think about
During the past two weeks, you concentrated on some of the issues surrounding farming and exporting products to another country. What sorts of communication issues exist in when a company in the United States seeks to export to or even set up shop in another country? Think in terms of not only language differences, but of larger (and often more influential) cultural issues. Does every country in the world love the US?

Write about
Identify one problem that Omega has already encountered with respect to marketing the VitA Rice in China and Southeast Asia? How can they remedy this problem through tactful intercultural communication?

Oral presentation

Think about
You just finished giving an oral presentation to the other GradCorp consultants and to representatives from Omega. What do you think were the strongest parts of your presentation? The weakest? What was one thing another group did that you will try to incorporate into the next presentation you do?

Write about
Why do you think your presentation was helpful to Omega? How did you ensure that it would be? What role did you personally play in developing and delivering the presentation?

Web presence and narrative

Think about
You are now working on developing a public Web presence for Omega. Think back to the organizational narratives you discussed earlier in the consulting engagement. Which narratives do you want to portray in the site you are developing? Are there any narrative threads you want to downplay? Why? Is this sort of manipulation ethical?

Write about
Reflect on how you are embodying organizational narratives in the Web site you are designing. Which narratives are you foregrounding (i.e., emphasizing)? Which are you downplaying? Why?

One other document

Think about
Now that you have worked as a consultant at Omega for several weeks, you are pretty familiar with what is going on in the organization. Think about one communicative action you would take (i.e., create a document, say something to someone, send an email, etc.) if you were given the chance.

Write about
Describe the communicative action you thought about above. What would it be? How would you deliver (perform it)? What impact do you hope it would have?
Appendix B: Omega Shadow Sequence

Since Omega has recently moved to Evergreen, you and your teammates have decided to create a grassroots organization that opposes various aspects of biotechnology. During the next several weeks, you'll create a number of documents that define that organization and make its views known to the public.

Organizational charter

Develop a document that outlines the goals of your organization and articulates its mission in the form of a mission statement. Identify the tasks you'll need to complete and the tools you'll need to master in order to:

- Create a glossary of biotechnology terms
- Create a graphically intensive informative/argumentative datasheet
- Prepare a report about organized resistance to the biotechnology
- Develop an oral presentation about the impact biotechnology is having/might have on a country in Southeast Asia
- Design and develop a website for your organization

Definition

Define a biotechnology term and explain what you think people should know about how it is used. This term will be used in a glossary of biotechnology terms designed to help the public develop a better understanding of this controversial field

Datasheet/product information sheet

Create a graphically intensive information sheet designed to explain your views on biotechnology and to encourage people to share them. Or, develop an informative brochure/datasheet designed to inform the public about some aspect of biotechnology (or Omega).

Activist report

As a team develop a report about some aspect of the organized resistance to biotechnology. You might think about characterizing the different types of resistance and the organizations that practice those types.
Biotechnology in SE Asia (oral report)

Develop a presentation about farming or biotechnology in Southeast Asia or Latin or South America.

Website

Create a website for your organization.
### Appendix C: Shifting Demographics of the US University

#### Table 5-4: Growing, Stable and Declining Fields, 1970-1995 (Brint, 2002, p. 234)

**Bachelor's Degree Fields**

<table>
<thead>
<tr>
<th>A. Growing fields</th>
<th>B. Stable fields</th>
<th>C. Declining Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Fields with Fewer than 1% of BA/BS degrees in 1995-1996</strong></td>
<td><strong>I. Fields with Fewer than 1% of BA/BS degrees in 1995-1996</strong></td>
<td><strong>I. Fields with Fewer than 1% of BA/BS degrees in 1995-1996</strong></td>
</tr>
<tr>
<td>Law/Legal Studies</td>
<td>Architecture</td>
<td>Library Science</td>
</tr>
<tr>
<td>Transportation-Related Studies</td>
<td>Area/Ethnic Studies</td>
<td>Philosophy/Religious Studies</td>
</tr>
<tr>
<td></td>
<td>Communications Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Theology</td>
<td></td>
</tr>
<tr>
<td><strong>II. Fields with 1-5% of BA/BS Degrees in 1995-1996</strong></td>
<td><strong>II. Fields with 1-5% of BA/BS Degrees in 1995-1996</strong></td>
<td><strong>II. Fields with 1-5% of BA/BS Degrees in 1995-1996</strong></td>
</tr>
<tr>
<td>Public Admin./Services</td>
<td>Agricultural Science</td>
<td>English Literature*</td>
</tr>
<tr>
<td>Visual/Performing Arts</td>
<td>Home Economics</td>
<td>Physical Sciences*</td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td>Mathematics*</td>
</tr>
<tr>
<td>Computer/Info Systems</td>
<td></td>
<td>Foreign Languages/Literature*</td>
</tr>
<tr>
<td>Parks/Recreation/Fitness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protective Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal/General Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interdisciplinary Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>III. Fields with More than 5% of BA/BS Degrees in 1995-1996</strong></td>
<td><strong>III. Fields with More than 5% of BA/BS Degrees in 1995-1996</strong></td>
<td><strong>III. Fields with More than 5% of BA/BS Degrees in 1995-1996</strong></td>
</tr>
<tr>
<td>Business</td>
<td>Engineering</td>
<td>Education+</td>
</tr>
<tr>
<td>Heath Professions</td>
<td></td>
<td>Social Science/History+</td>
</tr>
<tr>
<td>Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological/Life Sciences</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


*Decline in both absolute and relative terms for all four fields.
+Decline in both absolute and relative terms for both fields.
Chapter 6: Summing up and looking forward

The question I set out to address at the beginning of this dissertation was given the shifting emphasis of higher education toward what Brint calls a "practical arts" core (p. 232), how can institutions of higher education better use technology to educate professionals?

Remediation and the "whole task"

In attempting to answer this question, I have forwarded the notion of "remediation" as one means of tackling an problem that theorists like Schön (1983; 1987); Brown et al. (1989); Bransford et al.(1990); and Schank et al. (1993/1994) have identified with professional education. This problem is what Bransford et al. call the "inert knowledge problem" or what Engeström (1987, MSWord Version, Chapter 3, p. 37) calls the simply the "closed problems" we generally present to students. Miettinen (1999) formulates the this situation as follows:

School learning is characterized by memorization and reproduction of school texts. It is accompanied by an instrumental motivation of school success that tends to eliminate substantive interest in the phenomena and knowledge to be studied. The fundamental problem is that knowledge learned in such a way is difficult to use and apply in life outside the school. (p. 325)

In every case, educational theorists associate the inert knowledge problem with the context in which students operate and how educators represent professional work within that context. Each of the preceding researchers has also suggested means of solving the problem of decontextualization. Schön suggests a "reflective practicum" in which students not only practice technical problem solving, but engage in the process of problem setting (or framing) in which they practice formulating problems from indeterminate situations before applying technical-rational techniques. Brown et al. forward the notion of the cognitive apprenticeship
in which traditional apprenticeship approaches like modeling, coaching, and fading (i.e., doing less and less for the student as she becomes more adept) are applied to the types of thinking that characterize various professions, including those in academe. Bransford et al. recommend anchored instruction where students often watch a video that sets up a scenario and provides opportunities for a teacher to guide students' noticing of various aspects of that scenario (p. 123). Schank et al. forward the notion of a goal-based scenario (GBS), which is similar to anchored instruction but attempts to create environments in which important issues "arise naturally" during the students' engagement with the scenario making the introduction of key issues less dependent on teacher intervention than in anchored instruction (p. 307).

Miettinen summarizes the spirit of these efforts when he writes about the object of the "learning activity" as

> the generation and use of knowledge in solving vital societal problems. This kind of redefinition of the object of learning at school implies a program of recontextualizing the knowledge, of bringing the knowledge back to the context of creation and use. (p. 333)

This effort at recontextualization results in attempts to present students with what Newman, Griffin, and Cole (1984) call a "whole task," which includes a representation of the social context from which a task arises:

> A "whole task" thus becomes specifically a task considered in the context of the activity or higher-level goals that motivate it. Whenever there is a task, there is always a whole task. But in some settings, like the laboratory, the classroom, or wherever there is a hierarchical division of labor, the higher-level goals may not be under the actors' individual control. In other cases, the actors formulate the instrumental relation between the goal of the task and the higher-level goal they are primarily trying to achieve. (p. 191)

I argued in Chapter 1 that Bolter and Grusin suggest that remediation is tied to "our apparently insatiable desire for immediacy" (p. 5), for removing all evidence of mediation to
provide an experience of the pure presence of the object represented. In the chapters that followed I attempted to show how the portals we created enabled students to interpret the classroom tasks with which they were presented in a way other than what Miettinen calls above "instrumental motivation of school success" (p. 325); that is, we tried to provide an environment in which rather than having their access to the higher-level goals of the activity co-opted by an instructor or by the classroom environment itself (see Newman, Griffin, and Cole above), students were able to understand the tasks they were assigned in a context like the one from which those might arise outside of the classroom. The central goal of remediation conceived in this way is presenting students with the whole task as they might encounter it in a professional activity system.

**Remediation and its impact**

There are two major threads that run through this research on the portals, then. The first is concerned with how we attempted to create environments that would simulate a "whole tasks" as they might be encountered in the workplace. Using activity theory, I suggested that a Web-based environment in which we simulate the tools, rules, and division of labor that characterize the activity in a particular profession is one way of evoking a whole task for students. I suggested that a course/content management system (CMS) configured as it might be within a particular workplace, rather than outfitted for traditional classroom practices, is one way of representing a non-school activity system. This representation, in turn, affords students and instructors the ability to act as if they are governed by the rules of the simulated activity system.

The second thread seeks to explain how students and instructors perceived their encounters with these environments. In the studies reported above, students and instructors
thought that the Web-based simulation indeed affected their perception of the work they were doing in their professionally oriented courses.

The management students interpreted the actions they took within the Agile simulation as what Anderson et al. (2001) call transfer-oriented cognitive processes, like analysis, evaluation, and creation. In addition, students seemed to associate these transfer-oriented processes with workplace rather than school activities, suggesting they saw their work within the simulation as more closely aligned with their motivation for being in school than the case work and the work they undertook using CMSs (especially WebCT™) in other courses.

Similarly, technical-communication students who used the Omega portal were more prone than their peers in sections that used traditionally narrated cases to feel like they were 1) writing for a professional audience, 2) receiving feedback similar to that which they might get at work, and 3) understanding—and at times sharing—a social motive for the assigned work other than the one they normally attributed to their schoolgoing activity. These results again suggest that the Web-based simulation helped students to feel like they were engaging in the "whole task" as it might be confronted by a workplace writer and thus getting the opportunity to make sense of workplace activities (including genre) from the "inside." What is needed now (and what I outline below), of course, is research to determine whether working within these contexts actually affected students' performance when they moved from the classroom to the workplace (transfer studies).

Finally, I have also shown that representations of the workplace within the classroom are not necessarily recipes for the reproduction of capitalistic practices, but instead can provide opportunities reflection on and critique of those practices if designers and instructors make such affordances (potentials) available within a case instantiation.
Implications for future research and development

Because this research has concentrated chiefly on learning environments and the perceptions of those working within these environments, the implications for future research are apparent. This research needs to concentrate on the impact such environments have on students when they begin working outside of school (transfer studies). It should also explore ways in which we might assess the work of students who interact within such environments (assessment studies). Future work should also explore the interplay of expertise that takes place in determining how various professional practices are represented using one or more mediating tools (boundary-object studies).

Finally, a good deal of thinking needs to go into considering how teaching and learning practices like the ones detailed in this paper may affect the post-secondary-education activity system, especially with respect to how we develop and maintain course content as well as how we evaluate and reward those involved in various aspects of that development and delivery (networks-of-learning studies).

Transfer studies

We need to determine whether and how participation in these types of simulations impacts students' work outside of school when they make their way into internships, coops, and jobs. One method for pursuing such research might be to conduct a longitudinal study with students as they participate in their disciplinary curriculum (which would include a simulation) and during their first weeks and months on a job. Methods might include questioning students about the relative applicability of all parts of their curriculum to the work they find themselves doing in an effort to determine if the simulations (in particular) made any impact on the students' ability to practice a profession. Researchers might also
question supervisors about the degree to which the newcomer achieved a certain level of competence and how that process has proved similar to and different from the acclimation undergone by other novices.

**Assessment studies**

Additional research also needs to be done about assessing student performance within environments in which "students are putting together, themselves, the material which will enable them to learn and to create true operative and ad hoc knowledge" (Ickx, 2002). Because organizational simulations really do require a good deal more informal, interpersonal communication than traditional classroom instruction, we need to devise ways of assessing these practices, beyond looking solely at (required) posts to an online discussion board. In part this assessment has to come from the students themselves. As Ickx rightly asks:

> if the group of students develops its own knowledge and puts it into practice, isn't the group the best judge? . . . Shouldn't those members express, in all transparency, their level of preparation and success, without the need of judges or "experts," since they did not learn from those masters?

Simulations are still exacted within the school context and therefore the requirement that we sort and rank students is not likely to disappear anytime soon. However, given an environment in which students are collaborating, either tacitly through viewing each other's completed drafts before submitting assignments, or overtly by working in groups to complete assignments, the desirability of concretely assessing their performance in these areas seems high.
Boundary-object studies

It would also be interesting to study the negotiation process that takes place when individuals from a number of disciplines come together to design and implement such a simulation, especially with respect to how the affordances and constraints of a boundary object shape the interactions between experts and the interplay of professional expertise (either a tool like MyCase, which is specifically designed for creating a number of different online organizations, or simply the concept of "disciplinary simulation"). Such a study might answer questions about how the content of various disciplines is used or reshaped within other disciplines and how, then, we might better prepare students for the types of interdisciplinary communication and collaboration that seem to be becoming the norm in the 21st Century.

Networks-of-learning development

In writing about how to create meaningful e-learning, Garrison and Anderson (2003) develop the idea of a community of inquiry as a
teacher-guided, non-authoritarian community where societal knowledge is revealed in an equivocal, multidisciplinary manner whose goal is to structure relationships (order) to achieve understanding . . . (p. 27)

And indeed this notion of professional/vocational instructor's job is foreshadowed by Miettinen (1999) when he elaborates Coombs' (1985) concept of network of learning, describing the phenomenon as a collaboration among "educational researchers, researchers from relevant subject fields, practitioners, teachers, parents, and students" (p. 340). These collaborations, he notes, result not only in the crossing of boundaries between school the professions for the students involved in such networks, but serve as environments in which
the "fears, aspirations, hopes, and the world view of the researchers and the practitioners" are conveyed to others in the community.

I see these communities or networks as essential for providing the type of professional education Brint argues is becoming part and parcel of the contemporary university. As Miettinen suggests: "if the object of the learning is an activity system, some form of cooperation with practitioners of the activity must be included" (p. 339).

I believe an important part of such communities are boundary objects like the MyCase tool which can enable teams of people to create and sustain learning environments that place students in the presence of whole tasks, even when those tasks are somewhat attenuated by the school environment. While course/content management systems like WebCT™ and Blackboard™ are what Star (1989) calls boundary objects: "both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" (p. 46), the whole tasks they are designed to present are those of school going (i.e., viewing course schedules and taking quizzes). As the scholars I cited above argue and as I have tried to show in this paper, decontextualized tasks more work (in the form of imagining how the knowledge gained in class might be applied outside of class) on the part of students to "formulate the instrumental relation between the goal of the task and the higher-level goal they are primarily trying to achieve" (Newman et al., 1984, p. 191).

Recontextualizing tasks will require that instructors change their approach to teaching, even if only for the part of a semester or for the course in the curriculum in which such simulations are used. It also has implications for how universities sort and rank their own employees because developing and leading students through a simulation often requires that
the instructor have recent experience in the profession represented in the simulation. One of
the teachers involved in a network or learning Miettinen observed formulates situation this
way:

    it is necessary for the teacher to follow what is happening in practice. The teacher
    should also practice what he teaches, not only study the things he teaches. But how?
    Another job, an additional job to which the school has a positive attitude. It is almost
    a necessary condition. It is impossible to study these things from books alone. (p.
    340)

Often, these types of jobs are the exception, rather than the rule for tenure-line university
professors and as such explains the difficulty of representing scenarios that seem real to their
students. If we decide that remediated learning environments do contribute to better
preparing our students to participate thoughtfully in their lives beyond the university, we will
need to make university life viable for individuals who wish to develop such environments
by considering this work as relevant for promotion and tenure.

    Finally, as Nelson (1990) and others have pointed out, how we situate our instruction\(^{32}\)
affects how students perceive its relevance and even the level of effort they are willing to put
into assignments. While I am certainly not suggesting a simulation as elaborate as the ones
documented in this paper is necessary for every advanced class in professional curricula, this
research suggests we need to think carefully about how we structure our courses, especially
with respect to the opening texts, social processes involved in transforming those texts, and
the closing texts we require of our students. The choices we make with respect to these
elements determine whether our classes become meaningful experiences for students or only
a stepping-stone on the path to a credential.

\(^{32}\) even how explicit we make our assignments
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Chapter 7: Epilogue: The Web Application and Administration Interface

This chapter describes various technical aspects of the MyCase system, including:

- hardware and system software configurations of the servers involved in portal deployment,
- database schemas behind the various "tools" (e.g., email tool, polling tool) that instructors can incorporate into portals, and
- key middleware code that enables communication between Web pages (including Flash objects or "movies") displayed on client (i.e., student or instructor) computers and software/media stored on servers.

As the preceding list suggests, the chapter begins with a description of the hardware and system software and then moves to each tool in turn.

Hardware and System Software

As it is currently deployed, the MyCase system relies on services provided by three machines, each of which enables one or more affordances provided within the portals. Table 7-1 provides details about these servers, including key system software and resident application objects.

Note that all of these services can exist on one machine. Piecemeal funding and interdepartmental collaboration led to the current deployment.
Table 7-1: MyCase hardware and system software

<table>
<thead>
<tr>
<th>Machine</th>
<th>Key system software</th>
<th>Resident application objects</th>
<th>Owner/Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>MyCase server</td>
<td>• Windows Sever 2003</td>
<td>• ColdFusion pages (templates/components)</td>
<td>English / Ross Hall</td>
</tr>
<tr>
<td></td>
<td>• Internet Information Services (IIS)</td>
<td>• Flash objects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Macromedia ColdFusion</td>
<td>• Databases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Mysql</td>
<td>• Portal instantiation scripts</td>
<td></td>
</tr>
<tr>
<td>Multimedia server</td>
<td>• Windows Server 2000</td>
<td>Video streams</td>
<td>Agriculture and Biosystems Engineering / Davidson Hall</td>
</tr>
<tr>
<td></td>
<td>• Flash Communication Server</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mail server</td>
<td>SMTP (Simple Mail Transfer Protocol)</td>
<td>None (email forwarding and delivery)</td>
<td>Academic Information Technologies / Durham Computer Center</td>
</tr>
</tbody>
</table>

**Portal setup**

MyCase was built to be deployed on a server similar to the one described above as "MyCase server." The MyCase software is essentially a set of HTML/ColdFusion forms that enable designers to manage portal content, hence, the reference to it in previous chapters as a content management system (CMS).

Figure 7-1 is an overview of this architecture.
Figure 7-1: MyCase logical architecture

The content management system resides on a central server (the "MyCase server cluster" above). Designers and instructors add and remove content and determine how/when content is displayed within a portal using a Web interface. Students interact with the portal content using another Web interface (in the case of the studies developed above, one that looks like an organizational "inbox.")
A group of SQL scripts replicates database table structures for each portal to be built. ColdFusion scripts create the directories (i.e., file structures) necessary for portal instantiation. However, the Administration Interface allows a developer to change these paths according to the hardware architecture of a particular installation.

Figure 7-2 shows the portal set-up parameters table and part of the Administration Interface that is available for changing those parameters.

<table>
<thead>
<tr>
<th>parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
</tr>
<tr>
<td>creation_time</td>
</tr>
<tr>
<td>start_date</td>
</tr>
<tr>
<td>org_name</td>
</tr>
<tr>
<td>org_motto</td>
</tr>
<tr>
<td>org_mission</td>
</tr>
<tr>
<td>instructor_email</td>
</tr>
<tr>
<td>store_location_image</td>
</tr>
<tr>
<td>store_document</td>
</tr>
<tr>
<td>store_person_image</td>
</tr>
<tr>
<td>store_movie</td>
</tr>
<tr>
<td>store_support_file</td>
</tr>
<tr>
<td>redirect_url</td>
</tr>
<tr>
<td>local_movie</td>
</tr>
</tbody>
</table>

![Fig 7-2](image)

**Set scenario parameters**

Edit the parameters below to tailor MyCase to your situation.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Date</td>
<td>2005-10-01</td>
</tr>
<tr>
<td>Organization Name</td>
<td>Omega Molecular</td>
</tr>
<tr>
<td>Organization Motto</td>
<td>Feeding the world, better.</td>
</tr>
<tr>
<td>Organization Mission</td>
<td>No statement yet!</td>
</tr>
<tr>
<td>Instructor Email</td>
<td><a href="mailto:ddfshe@iastate.edu">ddfshe@iastate.edu</a></td>
</tr>
<tr>
<td>Location Images Path</td>
<td>D:\omega\IntraNet\Locations\Images</td>
</tr>
<tr>
<td>Person Images Path</td>
<td>D:\omega\IntraNet\People\Images</td>
</tr>
<tr>
<td>Documents Path</td>
<td>D:\omega\documents</td>
</tr>
</tbody>
</table>

**User, document, and stream management**

The most complex tool available to developers enables the following:

**Security and user management**

- Validating portal users via username and password,
• Creating, changing, and deleting portal users who belong to "information-sharing" groups,

• Creating, changing, and deleting information-sharing groups that determine which artifacts within the portal a particular user can see,

• Tracking—page by page and artifact by artifact—users' interaction with the site

**Message, document, and stream management**

• Scheduling and displaying messages on the site homepage directed at all students or members of one information-sharing group,

• Uploading and deleting of documents and entry and editing of document metadata (including dates which document becomes (in)visible within portal and information-sharing group(s) allowed to see document), and

• Uploading and deleting of video streams and entry and editing of stream metadata (including information-sharing groups allowed to see the document).

Figure 7-3 shows the table structures for this tool. A brief description of the affordances listed above appears after the table. (Tables: caught, message, groups, users, document, document_type)
Security

Security maintained by the ColdFusion application framework. This framework also enables the tracking of user activity.

Within the ColdFusion application framework, the file application.cfm is invoked each time a ColdFusion page is requested. For example, if a student requests the file
foo.cfm, the file application.cfm runs first, ensuring that the student has logged in. application.cfm establishes session management for the application and stores the fact that the user has logged in within the server system registry. Each time a user requests a page, application.cfm checks this registry to make sure the user has validated and established an active session. The following code does this checking.

```cfml
<CFIF NOT Session.LoggedIn>
  <CFIF (CGI.SCRIPT_NAME IS NOT "/genY/login.cfm")
    AND (CGI.SCRIPT_NAME IS NOT "/genY/validate.cfm")
    AND (CGI.SCRIPT_NAME IS NOT "/genY/registration.cfm")
    AND (CGI.SCRIPT_NAME IS NOT "/genY/registrationProcess.cfm")>
    <CFLOCATION URL="login.cfm" ADDTOKEN="No">
  </CFIF>
</CFIF>

If the user has not logged in (using login.cfm and then validate.cfm) he or she is sent to login.cfm in order to log in. Otherwise, the user is granted access to whatever page he or she has requested (foo.cfm).

Figure 7-4 provides an overview of how this validation structure works as well as a logical view of the entire application framework.

Figure 7-4: MyCase application framework (adapted from Brooks-Bilson, p. 189)
User Tracking

To track usage of the site, we again use the facility provided by `application.cfm`. Because `application.cfm` is invoked before each page is served to the user and because the user's id is stored in the system registry until he or she logs out, we can insert the name of the page visited as well as the user ID of the person who visits the page in database table for later analysis.

The following ColdFusion code (from `application.cfm`) inserts the page information into the tracking table. This snippet takes advantage of the common gateway interface (CGI) variables that are provided by the Web server and the client's browser software. In this case, we use this data in CGI variables `script_name` and `query_string` to track user progress through the site. Thus, the code below enables us to insert into the tracking table for each user request the date, time, name of the ColdFusion page requested, and database query attached to that request.

Analysis of this data involves developing an sql "translator script" which transforms script names and query strings from the database into "human readable" (i.e., meaningful) page names, artifact requests and hit counts.
<cfset InsertDate=DateFormat(Now(),'m/d/yyyy')>
<cfset InsertTime=TimeFormat(Now(),'h:mm:ss tt')>

<cflock  timeout="20"
  scope="Session"
  type="exclusive">
  <cfset session.pageName=CGI.script_name>
</cflock>

<cflock  timeout="20"
  scope="Session"
  type="exclusive">
  <cfset session.pageDetail=CGI.query_string>
  <cfif isDefined("session.userId")>
    <cfif CGI.query_string is not ">"
    <!--- if the login is successful, log the user in. Otherwise, redirect them back to the login.cfm page --->
    <cfquery datasource="genY">
      insert into tracking (userId, pageName,pageDetail)
      values
      (<cfoutput>'#session.userId#',
      '#session.pageName#', '#session.pageDetail#'</cfoutput>)
    </cfquery>
    <cfelse>
      <cfquery datasource="genY">
        insert into tracking (userId, pageName,pageDetail)
        values
        (<cfoutput>'#session.userId#', '#session.pageName#', 'NULL'</cfoutput>)
      </cfquery>
    </cfif>
  </cfif>
</cflock>
**User management**

Though not specifically studied in the preceding chapters, MyCase enables a designer to assign a user to an "information-sharing" group. Assignment to such a group determines which artifacts a student can view. A student assigned to Group 1, for example, can only view artifacts specifically made available for Group 1. The database flag that coordinates these information-sharing/hiding is `groupViewId` and is present in document, video and user tables.

This facility is designed to enable the study of how students share information within a group of four, when each has access to a slightly different picture of organizational space. It is also designed to simulate the different levels of access people within an organization have to data.

**Message and document management**

MyCase enables designers and instructors to enter, delete, and schedule messages for display on the portal homepage. These messages can be directed at all students or to members of one or more information-sharing groups. (Table: `message`)

MyCase enables designers and instructors to upload and delete documents to appear in the workgroup server tool. MyCase enables folders for various departments to be created, edited, and deleted. As mentioned above, documents can be assigned to a specific information-sharing group (`groupViewId`) (see Figure 7-3). This assignment corresponds with a group number assigned to students who are to access a particular document. (Tables: `document`, `documentType`)

In addition, the instructor or designer can set dates for when the document will become visible within the portal (`dateIn`) and when it will "disappear" (`dateOut`) (see Figure 7-3).
Figure 7-5 shows the management interface for documents.

**Add a document to the Work Group Server**

To add a document, complete the fields below.

**File:**

**Server Folder:** Accounting

**Title:**

**Description:**

**Date in:** mm/dd/2005

**Date out:** mm/dd/2005

**Group visibility:**

- Group 1
- Group 2
- Group 3
- Group 4

**Submit**  **Reset**

*Back to Admin Center.*

**Figure 7-5: Document management interface**

**Stream management**

Videos are streamed to users though a Flash object (movie) deployed within a ColdFusion page. The Flash object manages the display of metadata about the video stream (using Flash Remoting, a way of transferring database information directly to a Flash object without writing an intermediate XML file) as well as the playback of the video stream, which it calls from the Flash Communication Server.  *(Table: caught)*

Figure 7-6 and the text that follows describe this process in greater detail.
Figure 7-6: Streaming overview
When the page opens in the browser, the Flash object establishes a connection with the multimedia server. \texttt{video\_cc} below is the name of the video playback component within the Flash object (This playback component is the box, play button, and slider within in which Ron's picture appears above).

```actionscript
myConn=new NetConnection();
myConn.connect("rtmp://learn.ae.iastate.edu:1935/omegaApp/video");
video_cc.connect(myConn);
```

At the same time, the Flash object establishes a remoting connection to the MyCase server and makes a call to a ColdFusion object (\texttt{documents}) that lives on that server.

ActionScript that establishes a remoting connection and calls the ColdFusion object (\texttt{documents}) and the method (\texttt{getPhillips}) that gets list of movies marked as belonging to a logical group (in this example, those containing the interview with Ron Phillips).

```actionscript
if (inited == null) {
    inited = true;
    gateway_conn = NetServices.createGatewayConnection("http://mycase.engl.iastate.edu/flashservices/gateway");
    // get a reference to a service
    omegaService = gateway_conn.getService("genY.remoting.documents", this);
    omegaService.getPhillips();
}
```

The \texttt{getPhillips} method is as follows:
When the user clicks on clip title, the Flash object places a call to the ColdFusion object again, this time calling a method (`getDescription`) that that returns information about the clip.

**Actionscript:**

```actionscript
function getDescription_Result (result){
    var SearchResults = result.getItemAt(0);

    summary_txt.text=SearchResults.myDescription;
}
```

**ColdFusion method (`getDescription`):**

```cfml
cffunction name="getDescription" access="remote" returntype="query">
    <cfargument name="streamName" type="string" required="yes" default=""/>

    <cfquery name="getDescription" datasource="omega">
        select description as myDescription
        from caught
        where movie="#arguments.streamName#"
    </cfquery>

    <cfreturn getDescription>
</cffunction>```
When the user clicks the view button, the flash object calls the stream that has been highlighted in the list from the multimedia server and that has been optimized for the connection speed indicated at the top of the page.

**ActionScript:**

```javascript
document_pb.onRelease = function() {

    var speedVal = connectSpeed.getValue();

    if(speedVal == "modem"){
        myDocId = myDocID + "_56k";
        omegaService.artifactVisit("Phillips",myDocId);
        video_cc.play_ns.setBufferTime(10);

        video_cc.play_ns.play(myDocId);
    } //end if for speed from rb

    else{
        myDocId = myDocID + "_100k";
        omegaService.artifactVisit("Phillips",myDocId);
        video_cc.play_ns.setBufferTime(4);

        video_cc.play_ns.play(myDocId);
    } //end else for speed from rb

} //end of action taken when button is pushed
```
**Organizational eMail**

The organizational mail tool is managed largely through two database tables (see Figure 7-7, below) and the SMTP server (see Table 7-1, above). (Tables users, omegamail)

Students can send email to any of the people appearing within the organization's intranet. This tool inserts the student's message in the database and sends an email to the instructor (using SMTP server). The instructor can then respond to the student question in character as a member of the organization. This response is also stored in the database, where the student may access it. The message is also sent to the student's personal email account, where it appears as if it came from the individual to whom the student sent the initial email. Figure 7-8 shows the interface and a response from the course instructor.
The organizational intranet is composed of four tables, each corresponding to one area of information provided therein: organizational events, people, locations, and organizational news. (Tables: event, person, location, org_news)

Figure 7-9 shows the database tables for the intranet.
Figure 7-10 shows the pages used to modify an existing character. Similar pages exist for locations, events, and news stories.

**Update Characters**

Click on a name to modify a character.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Location</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danzer, Kurt</td>
<td>Chief Executive Officer</td>
<td>Evergreen</td>
<td><a href="mailto:danzer@omega.com">danzer@omega.com</a></td>
</tr>
<tr>
<td>Gates-Patano,</td>
<td>Director of Research and Development</td>
<td>Evergreen</td>
<td><a href="mailto:gatesp@omega.com">gatesp@omega.com</a></td>
</tr>
<tr>
<td>Laurel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gleiser, Joel</td>
<td>Lead Agronomist</td>
<td>Evergreen</td>
<td><a href="mailto:gleiger@omega.com">gleiger@omega.com</a></td>
</tr>
<tr>
<td>Jackson, Virginia</td>
<td>Director of Finance</td>
<td>Evergreen</td>
<td><a href="mailto:vjackson@omega.com">vjackson@omega.com</a></td>
</tr>
<tr>
<td>Lopez, Maria</td>
<td>Human Resources Manager</td>
<td>Evergreen</td>
<td><a href="mailto:mlopez@omega.com">mlopez@omega.com</a></td>
</tr>
<tr>
<td>Maleckal, Chandra</td>
<td>Researcher</td>
<td>Evergreen</td>
<td><a href="mailto:cmaleckal@omega.com">cmaleckal@omega.com</a></td>
</tr>
<tr>
<td>Miesher, Michelle</td>
<td>Head Agronomist</td>
<td>Evergreen</td>
<td><a href="mailto:miesher@omega.com">miesher@omega.com</a></td>
</tr>
<tr>
<td>Rich, Shelly</td>
<td>Field Research Lead</td>
<td>Evergreen</td>
<td><a href="mailto:srich@omega.com">srich@omega.com</a></td>
</tr>
<tr>
<td>Steubens, Jake</td>
<td>Director of Marketing</td>
<td>Evergreen</td>
<td><a href="mailto:steubens@omega.com">steubens@omega.com</a></td>
</tr>
<tr>
<td>Talburt,</td>
<td>Marketing Specialist</td>
<td>Earth City</td>
<td><a href="mailto:talburt@omega.com">talburt@omega.com</a></td>
</tr>
<tr>
<td>Lawrence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkle, Amy</td>
<td>Accounting/Finance Intern</td>
<td>Evergreen</td>
<td><a href="mailto:aturkle@omega.com">aturkle@omega.com</a></td>
</tr>
<tr>
<td>Weston, Jon</td>
<td>Asst. Dir. of Finance</td>
<td>Evergreen</td>
<td><a href="mailto:weston@omega.com">weston@omega.com</a></td>
</tr>
</tbody>
</table>
Polling

The polling tool enables instructors to deploy polls that ask students to choose among two, three, four, or five choices. Poll results are calculated instantly and displayed upon request. Students can (optional) also enter the reasons why they voted the way they did. Voters are allowed only one vote for each poll. Storing a poll id along with a user name in the table ip_poll_track and then checking this table before recording a vote enforces this rule. (Tables: users, ip_poll_track, new_poll, comment_poll)

Figure 7-11 shows the polling tables.
Like the intranet management interface documented above, the poll management interface allows instructors to create, edit, and delete polls. Figure 7-12 shows the page that enables poll editing and deletion.
Manage a Poll

View poll results.

Edit the text in the boxes and click Update.

Delete this poll

Delete all polls

Figure 7-12: Polling management interface

Reference Library

The reference library tool enables students to enter useful Web sites into the database so that other students can use them. Students can start new topics under which they can then file entries. This tool is much like a portal-wide book marking function through which sites of interest can be maintained though the course of the semester and beyond. (Tables: ref_topic, ref_entry)

Figure 7-13 shows the reference-library tables.
Figure 7-13: Reference library tables

Figure 7-14 shows the reference library management interface.

1. Enter the URL for the site you are adding to the library. (Include the http:// prefix). You can copy and paste the entire URL from your browser into the space below. The space will hold up to 250 characters.

   http://

2. Enter keywords or phrases that others might use to search the Web to find similar sites. Separate these words or phrases by commas (e.g., genetic, DNA piracy).

3. Give the entry a title. You can use the one from the site itself or another that you make up.

4. Describe the elements of the site you think are most useful.

5. Click Submit to finalize your entry. Click Reset to clear the fields and start over.

Figure 7-14: Reference library management interface

Document sharing

Document sharing is enabled by a purchased component: Digital Crew (http://www.digital-crew.com) CF_FileManager. This customized ColdFusion tag provides
affordances for enabling file uploads and downloads, while maintaining site security through blocking upload and execution of files of unknown or disallowed types. (No database tables)

Because the server-side code for CF_FileManager is ColdFusion, we are able to, as in the case of other site tools, use application.cfm to gather information about documents uploaded and downloaded by site users as well as to ensure its secure use.

The code snippet below shows how to set parameters for this component within the ColdFusion page on which it is to appear.

```cfdccom component="dcFileManagerV3" folder="d:\fall05Uploads" width="100%" height="100%" folderfilter="" filefilter="" showToolbar="yes" allowfiledelete="yes" allowfolderdelete="no" allowfilerename="yes" allowfolderrename="no" allowaddfolder="yes" allowfolderbrowsing="yes" allowuploadfile="yes" allowsort="yes" allowfiledownload="yes" confirm="yes" alloweditfiles="no" showstatus="no" foldermask="GradCorp Document Sharing: "></CF_DCCOM>
```

Figure 7-15 shows what the preceding code looks like within the Omega portal.

![Figure 7-15: Document sharing interface. CF_FileManager embedded in Omega portal.](image)
Figure 7-16 provides an overview of the parameters available for users of CF_FileManager.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIDTH</td>
<td>Width of component</td>
</tr>
<tr>
<td>HEIGHT</td>
<td>Height of component</td>
</tr>
<tr>
<td>FOLDER</td>
<td>Folder for file manipulation</td>
</tr>
<tr>
<td>TITLE</td>
<td>Title of component</td>
</tr>
<tr>
<td>ALLOWFILE_DELETE</td>
<td>Allow deletion of files</td>
</tr>
<tr>
<td>ALLOWFILE_REFRESH</td>
<td>Allow refreshment context</td>
</tr>
<tr>
<td>ALLOWFOLDER_DELETE</td>
<td>Allow deletion of folders</td>
</tr>
<tr>
<td>ALLOWFOLDER_REFRESH</td>
<td>Allow refreshment context</td>
</tr>
<tr>
<td>ALLOWFOLDER_RENAME</td>
<td>Allow renaming of files</td>
</tr>
<tr>
<td>ALLOWMIO_FOLDER</td>
<td>Allow adding of folders</td>
</tr>
<tr>
<td>ALLOWUPLOAD_FILE</td>
<td>Allow upload of files</td>
</tr>
<tr>
<td>ALLOWFOLDER_RENAMING</td>
<td>Allow folder renaming</td>
</tr>
<tr>
<td>ALLOWCOPY</td>
<td>Allow files and folder copying</td>
</tr>
<tr>
<td>ALLOWSORT</td>
<td>Allow sorting of data</td>
</tr>
<tr>
<td>ALLOWSDOWNLOAD</td>
<td>Allow download of files</td>
</tr>
<tr>
<td>SHOWTOOLBAR</td>
<td>Show Simple Tool bar</td>
</tr>
<tr>
<td>SHOWSTATUS</td>
<td>Show Status Bar [YES/NO]</td>
</tr>
<tr>
<td>SHOWBROWSEBUTTON</td>
<td>Show Browse Button</td>
</tr>
<tr>
<td>SHOWMOUSEBUTTON</td>
<td>Show Mouse Button</td>
</tr>
<tr>
<td>STYLE</td>
<td>Style for control to be rendered</td>
</tr>
<tr>
<td>DLCLICK_EXTENSIONS</td>
<td>List of clickable file extensions</td>
</tr>
<tr>
<td>DLCLICK_ACTIONS</td>
<td>List of clickable file actions</td>
</tr>
<tr>
<td>UPLOADACCEPT</td>
<td>Accepted upload MIME types</td>
</tr>
<tr>
<td>FILEFILTER</td>
<td>Files to be list</td>
</tr>
<tr>
<td>LOCKEDFOLDERFILTER</td>
<td>Locked folders list</td>
</tr>
<tr>
<td>FOLDERMASK</td>
<td>Mask real path name</td>
</tr>
<tr>
<td>SHOWHIDDENFILES</td>
<td>Show hidden files</td>
</tr>
<tr>
<td>SHOWHIDDENFOLDERS</td>
<td>Show hidden folders</td>
</tr>
<tr>
<td>ALLOWFILEPROPERTIES</td>
<td>Allow File Properties</td>
</tr>
<tr>
<td>ALLOWFOLDERPROPERTIES</td>
<td>Allow Folder Properties</td>
</tr>
<tr>
<td>DLDOWNLOADTYPE</td>
<td>Download Type</td>
</tr>
<tr>
<td>ITEMORDER</td>
<td>Order of menus</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>Language for CF_FileManager</td>
</tr>
<tr>
<td>LEADING_SLASH</td>
<td>ISAPI Filter Compatibility</td>
</tr>
<tr>
<td>ALLOWEDITFILES</td>
<td>Allow editing of files</td>
</tr>
<tr>
<td>TEXTEDITLIST</td>
<td>List of editable file types</td>
</tr>
<tr>
<td>FILEDESCRIPTIONS</td>
<td>File description list</td>
</tr>
</tbody>
</table>

Figure 7-16: Document sharing interface tag parameters. ("Cf_filemanger v3.2 documentation and product information", 2006)
Discussion board

The discussion board is enabled by a purchased component: Digital Crew (http://www.digital-crew.com) CF_WebBoard. This customizable ColdFusion tag enables the designer or instructor to manage threaded discussions.

As is the case with CF_FileManager above, the server-side code for CF_FileWebBoard is ColdFusion, enabling us to use application.cfm to gather information about use of this tool as well as to ensure its secure use.

The code snippet below shows how to set parameters for this component within the ColdFusion page on which it is to appear.

```cf_dccom component="dcWebBoard" width=100% height=100% username="funny" password="niceTry" datasource="genY" class="instructionText" allowfoldersubscription="no" adminmode="no">Omega Discussion Board</cf_dccom>
```

Figure 7-17 shows what the preceding code looks like when deployed within the Omega portal.

Figure 7-17: Discussion interface. CF_WebBoard embedded in Omega portal.
We are also able to integrate our **users** table with the CF_WebBoard tables in order to prefill parts of the discussion form with the user's first name, last name, and email address.

(Tables **categories, folders, threads, users**)

Figure 7-18 shows the discussion board tables.

**Figure 7-18: Discussion board tables**

Figure 7-19 shows the management interface provided by the CF_WebBoard component.
Conclusion

In this chapter I have tried to provide an overview of the MyCase tool. Obviously this document doesn't provide technical specifications detailed enough to "go build one of your own," but it does show that building and deploying a CMS of some complexity is possible, even with limited time and budget.

While I suspect that the technical details within this overview will be of limited use to many readers, I do believe it provides a picture of how we pieced together a CMS using home-grown as well as commercially available and free software components. Thus it depicts the development process as essentially rhetorical or at least recombinant, one in
which we created a new system with affordances and constraints that differ somewhat from existing educationally-oriented CMSs.

It is in those differences and the impact they had on students' and instructors' perceptions of their work with the system, then, that the chapters before this sought to elucidate.

References