Design Research Report

Innovative Teaching Practices Supported by CourseWorks:

The Case of the Writing Process in the Logic and Rhetoric Course

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Introduction

In Spring 2002, Columbia University launched CourseWorks@Columbia, a course management system that allows faculty members to develop their course Web sites by creating and organizing digital content and activities for their classes.

Since the launching of the system, the Columbia Center for New Media Teaching and Learning, CCNMTL\(^1\), has been collaborating with faculty to assist them in understanding the system and envision possible uses of its features for the enhancement of their teaching practices. These experiences have created a unique research opportunity to explore the pedagogical uses and potential ways of enhancing CourseWorks’ features.

Framed within a Design Research approach, CCNMTL partnered with faculty members and studied the uses of CourseWorks for addressing some of the educational challenges they face in accomplishing their curriculum goals. The point of departure for such a research approach is rooted in genuine teaching and learning challenges that prompted the development of educational activities within CourseWorks.

Grounded in actual teaching praxis, this approach fosters an understanding of the role of CourseWorks’ in teaching and learning, as well as the potential enhancement of the system based on the experiences of the faculty and students.

This report presents and discusses one such research experience, and suggests ways in which course management systems can be studied in order to advance the current understanding of these systems as they are utilized in institutes of higher education.

\(^1\) The Columbia Center for New Media Teaching and Learning www.ccnmtl.columbia.edu
A Design Research Approach for Studying CourseWorks@Columbia

We have recently witnessed the proliferation of discussions and debates focusing on the role of course management systems [CMS] in higher education. These discussions usually conclude by emphasizing the need to exploit pedagogical potential CMS for the enhancement of learning experiences (Carmean & Haefner, 2002.) This is generally based on the assumption that CMS can enable a series of principles that represent constructivist teaching and learning practices, such as collaboration, ongoing communication among students, active participation of students through different learning activities, and multiple ways of representing content and materials, among others (Carmean & Haefner, 2002.)

Undoubtedly, digital technologies offer new opportunities to foster these important principles in the classroom. However, in order to effectively explore pedagogical experiences that are enabled by a particular course management system, it is important to understand how the instructors’ teaching challenges and purposes inform the potential uses of the system. In other words, it is important to reflect upon the pedagogical uses of a particular CMS based on how actual pedagogical challenges can be addressed through its tools and resources within a specific context.

Examination of the pedagogical potentialities of a singular system and its features will generate new insights and understandings with regard to the benefits and constraints of CMS, as well as how instructors implement the system to enhance their teaching practices. Ultimately, these insights will lead to a grounded process of improvement of the system, one that is based on actual pedagogical experiences.

The Columbia Center for New Media Teaching and Learning is currently examining the Columbia University CMS - CourseWorks@Columbia - within a Design Research framework (Edelson, 2002; Bereiter, 2002; Collins, Joseph & Bielaczyc, in press) in order to explore the pedagogical uses of the system and develop understandings for its improvement.

The Design Research approach adopted and implemented by CCNMTL can be summarized as the identification of educational problems or challenges, followed by the iterative design, development, and assessment of interventions to address them. By implementing this approach, CCNMTL seeks to create a context-based understanding of how certain innovative practices unfold in educational settings, as well as the insights they provide. Hence, the Center ultimately aims to build on these innovative experiences through collaborative research with faculty and to contribute to the construction of a knowledge base for the purposeful use of CourseWorks@Columbia in teaching and learning.

From a Design Research perspective, studying the pedagogical uses of CourseWorks@Columbia involves partnering with faculty members and discussing their teaching practices. This conversation unfolds through a series of discussions according to stages:
1. **Initial Understanding of Curriculum**: understanding the course context, content, goals and activities.
2. **Problems and Challenges**: exploring the teaching and learning challenges involved in accomplishing the course goals or developing course activities.
3. **Design Hypothesis**: discussing pedagogical principles and activities that can address the course challenges.
4. **Design of Educational Experience**: defining and developing a pedagogical intervention based on the identified hypotheses.
5. **Educational Experience**: implementing and monitoring the intervention in the classroom.
6. **Discussion of Research and Evaluation**: assessing the process and articulating conclusions for its improvement.

It is important to emphasize that the design research process flexible and iterative: for example, discussion of the hypotheses to address teaching challenges augments our understanding of the curricular context, thereby enabling the development of refined interventions. As we engage in implementing the intervention, we gain information to resolve possible problems and address the drawbacks of the experience in the classroom.

CCNMTL’s approach for studying the university CMS involves another important aspect: the collaborative nature of the research experience with faculty partners. One of the Center’s missions is to create a culture that integrates new media in education, one that is rooted in purposeful pedagogical uses of technology. Approaching the study of CourseWorks@Columbia from a Design Research perspective allows the Center to explore and promote actual innovative uses developed through the university CMS by a diverse range of faculty and instructors. This contributes to the creation of a repertoire of pedagogical practices that represent the university experience with the system.

One such innovative use was implemented in the course Logic and Rhetoric (ENGL C1007), which consists of a core curriculum in the form of a seminar that has been required for first year undergraduate students at Columbia University since 1986. It is offered by the Undergraduate Writing Program (UWP)\(^2\), previously named the Composition Program. The course will undergo curricular modifications beginning in the Fall 2003. The designer of this version of the course and director of the Undergraduate Writing Program, Joseph Bizup, together with its Associate Director, Alexandra Rudnitsky have sought a partnership with the Columbia Center for New Media Teaching and Learning (CCNMTL)\(^3\) in order to integrate the technology tools that will support and enhance some of the learning activities of the new curriculum. CCNMTL concluded that CourseWorks@Columbia presents the most appropriate technology tool to enhance this experience. This report describes the design research process developed by

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\(^3\) Columbia Center for New Media Teaching and Learning, [http://www.ccnmtl.columbia.edu](http://www.ccnmtl.columbia.edu)
CCNMTL in partnership with the UWP’s director and instructors in order to design and assess the particular uses of CourseWorks within the new course curriculum.

**Part I: Project Context, Purposes and Challenges**

**I.1 – The course: Curricular content and pedagogical framework**

In August 2002, Joseph Bizup, Director of the Undergraduate Writing Program, contacted the CCNMTL to establish a partnership to support a curricular change in the undergraduate core curriculum course English, C1007: Logic and Rhetoric. The collaborative project with CCNMTL constituted a central component of this curricular change. Dr. Bizup sought assistance for designing an environment to promote and maintain collaboration among students across a large number of sections of the course. A description of the content, goals, and pedagogical challenges involved in this project is presented below.

**I.1.a – Content, goals and activities**

The course Logic and Rhetoric is intended to introduce students to the art of essay writing in such a way as to allow them to explore the connection between thinking and writing, as well as to explore and appreciate writing as a creative process. To that end, the course has developed several objectives.

First, the course aims to provide the skills necessary to read and understand expository prose. It therefore intends to help students become adept readers of the rich and dense text genres that they are likely to encounter in their college career. In addition, the course is intended to teach and promote different ways of responding to those readings in writing. Specifically, the course is designed to support the development of the skills involved in writing expository academic prose that is well organized, logically sound, rhetorically effective and grammatically correct. Furthermore, the course introduces students to college level research, with the goal of fostering active intellectual curiosity that generates higher learning in an academic setting. Hence, it introduces research techniques, including the use of the library, the conventions and principles of documentation, the analysis of sources, and the art of synthesis.

These objectives should lead to the development of the critical thinking skills necessary to support students as they engage in the writing process during their academic career. These objectives are grounded in the assumption that throughout their academic careers, students will engage in reading and/or research that will, in turn, serve as the basis for the development of varied academic pieces of writing.

The activities designed to enable students to achieve the course goals have been organized within two cycles within the semester. The first half of the semester allows students to read, respond, and discuss readings by established writers as examples of various genres their the writing process. The second half of the semester enables students
to participate in the development of a collaborative critical research project in which they use and further refine the skills developed in the first cycle.

- First part of the course: readings, discussions, and writing responses

During the first part of the course, students read various segments of the book, *Ways of Reading*[^4], which serve as the basis for class discussions about content, logic, and rhetoric. Additionally, they present models that illustrate the various types of writing styles which are intended to inform the students’ own writing.

These readings elicit short written responses which provide students the opportunity to ponder passages or issues that interest them, to make connections between different texts, to further develop ideas from class discussion, and to "try out" potential essay topics. The discussion of these response papers generates extended class discussion among students. Finally, the continuous engagement of students in creating written pieces develops a positive habit of frequent writing which benefits their academic careers.

Class discussions are aimed not only at understanding and responding to the required readings. They also focus on strengthening the ability of students to engage effectively in the writing process by incorporating conversations about the topics that are addressed in *The Bedford Handbook for Writers*[^5]. In addition, students engage in discussions related to exercises that develop their writing skills. A particular subset of these exchanges concentrates on reading and commenting on classmates’ writing samples.

Additional readings and class conversations are related to understanding the enterprise of research. By reading and discussing the book *The Craft of Research*[^6], students learn about the steps and tasks that the research process entails, namely, deciding on topics and proposing research questions, collecting data, deriving claims and supporting evidence with the data, as well as writing and revising research reports by means of draft and revision procedures.

- Second part of the course: collaborative critical project

In the second half of the semester, students undertake a collaborative critical research project. The goal of this project is to implement the knowledge and skills developed during the previous part of the course in an experience that realistically mirrors the students’ future academic writing endeavors. The collaborative critical project thus fosters the students’ engagement in a writing process that is based on research. The project challenges students to formulate a research question, search library resources, write preliminary and annotated bibliographies, share sources of information and discuss

them during group presentations, and compose essays based on their own and their peers’ research.

The members of each course section negotiate the selection of a topic that is of interest to them. Instructors may utilize different techniques to facilitate this process in their sections. In general, they consist of some kind of instructor-moderated proposition, open brainstorming among students about possible topics of interest, or computer-mediated discussions about the topic. Groups undergo several cycles of such negotiation until they arrive at a consensus.

Once the topic is selected, the class is divided into approximately four research groups with three members in each. Students begin searching for possible sources of information related to the topic using all available resources (e.g. library and the Internet). Students may explore subtopics that are associated with the general global one.

Approximately two weeks after the research project is assigned, all students are required to compile a preliminary bibliography, in the MLA format, which consists of nine potential sources of information that is relevant to the topic. The purpose of this activity is to initiate students into the investigation process and to promote information sharing.

About a week later, each collaborative group is required to expand the bibliography further by selecting and annotating nine sources from the total provided by the students. The annotations consist of a full citation for each source, followed by a one-paragraph summary and comments upon its interest or significance. The purpose of this activity is to promote an early assessment of the identified sources. Collaborative groups then select one source of information that represents their perspective of the research project to share with their peers. It is the group’s responsibility to distribute digital or hard copies of the source.

Each group proceeds to conduct an in-class presentation of their particular perspective on the topic. The presentation is based on four annotated sources that are selected from the original set of nine. A 30 to 45 minute segment of the session is dedicated to the presentation itself. The particular source that each group selects to share is open for discussion during the remainder of the presentation session. The seminar format of the class, which numbers approximately twelve students, allows for an informal setting in which the students gather around a table, the presenters describe their issues of interest, and the rest of the class comments at the end of the presentation.

Following the presentations, each student is required to submit a writing plan, that is, a short essay that illustrates the approach to the individual final essay. The purpose of this writing plan is to “try out” their ideas before committing to a full draft. The writing plans constitute the transition between the collaborative and the individual engagement in this project.

The final paper, another individual task, is submitted in two drafts followed by a final version. As part of the classroom activities, students collaboratively “workshop” the first
drafts of half of the members of the group, and the second drafts of the remaining students, during four different sessions (three students per session). These workshops consist of providing collaborative feedback on the strengths and weaknesses of each paper. In order to facilitate this task, essays that are “workshopped” must be distributed prior to the workshop session.

The nature of the collaborative project requires that all of these pieces of information be shared within members of each group and with the class as a whole. While bibliographies and sources for presentation need to be shared to develop an understanding of the topic and the perspectives from which individual writing papers can be developed, the individual drafts of the final paper also benefit from sharing so as to facilitate peer review and critique.

In order to explore and understand the learning experience and the kinds of support that will need to be developed, the Undergraduate Writing Program will first implement the new version of the course in 15 pilot sections out of approximately 80 regular sections during the Fall 2002 and Spring 2003 semesters. Students were unaware of the pilot versus traditional section during registration. Joseph Bizup, the Director of the Undergraduate Writing Program, Alexandra Rudnitsky, the Associate Director, as well as one instructor, are led the implementation of the new curriculum. In addition, fourteen other instructors volunteered to teach these pilot sessions together. They met once a week in a colloquium to discuss the progress and challenges encountered in the process.

I.1.b – Pedagogical framework, assumptions, and challenges
This version of the Logic and Rhetoric course, and particularly its collaborative critical research project, is based on certain assumptions regarding meaningful learning in the context of undergraduate education in general, and the writing process in particular.

Collaboration constitutes a central point of departure for the design of this course. Instructors recognized that the course emphasizes “learning with and from … [all] classmates”. From the perspective of writers as they engage in the writing process, instructors indicated that “few writers work alone; they rely on friends and colleagues to listen to ideas, to read drafts, and to help with copyediting”. Thus, a number of the students’ activities are directed toward achieving the project goals in collaboration with peers in small groups.

Therefore, when students begin to undertake their individual tasks, the support activities allow them to learn from collaboration. Students’ review and critique classmates’ papers by offering suggestions on organization, logic, rhetoric and grammar. This provides students the opportunity to discuss their writing skills. It also allows them to examine the work of their peers and their approaches to writing. Consequently, they are able to incorporate new ideas and insights into their own writing. The collaborative workshops provide safe environments for students to find modeling and support.

This project also emphasizes the need to provide multiple opportunities for students to reflect on their learning. Instruction illustrates the premise that “writing can be considered a ‘practice’: an act that can be learned through repetition, error, and instruction”. Students undergo the writing experience by means of successive refinements of different drafts of their essays. The feedback they receive from peers and instructors is extends beyond a grade that judges the merits of the written work and provides an opportunity to improve the writing. It also allows students to revise and edit their work while continually reflecting on their strengths and weaknesses as writers.

Another pedagogical assumption underlying the design of these learning activities is based on the importance of preserving the actual complexity of real-world writing tasks. In other words, students are expected to formulate and define a research topic for their project as well as identify the question they intend to address in their final papers. In addition, students must explore and search through collections of sources in the library to identify those that will be most appropriate and beneficial.

The learning activities are also contextualized by their actual experience as undergraduate students. They are developed on the basis of realistic tasks they must perform within their undergraduate core curriculum, such as reading academic texts, responding to these sources by writing, researching topics of interest, and so forth. The goal of the course

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7 CourseWorks Syllabus, Instructor: Lundskær-Nielsen
8 CourseWorks Syllabus, Instructor: Levine
9 CourseWorks Syllabus, Instructor: Rudnitsky
thus reflects research endeavors in which students will be engaged throughout their academic careers, and that will later serve as the foundations for their written reports in any given academic subject. Therefore, the learning activities are directly relevant to the students’ academic life in its similarity to actual tasks they will undertake throughout their educational endeavors.

The goals, content and activities described above assume that Logic and Rhetoric presents a complex learning experience which requires collaboration and communication to develop an understanding of the writing process. Hence, it presents several challenges to consider.

First, since the course constitutes a learning experience that mirrors the complexity of real world, students need to construct an understanding of different aspects of the writing process as they engage in different tasks. Throughout these writing activities, students encounter many opportunities to develop their understanding of rhetorical styles and research processes that require academic writing skills. These simultaneous avenues of knowledge construction in a complex realistic context demand a significant allocation of time and space to develop supporting discussions. However, physical and temporal constraints impede the possibility of such considerable allocation of resources. Therefore, there is a need to overcome those constraints such that the complex learning experience is implemented successfully.

In addition, the exchange of sources of information necessary to provide and receive feedback for the collaborative research project and individual essays assumes an increased demand for reproduction, digitization and distribution. Interestingly, an important number of these documents are produced digitally (students bibliographies, writing plans, and essay drafts). Thus, by the very nature of the material created in the course, students and instructors engage in a digital exchange of documents. It is important, then, to provide a digital environment in which these documents are accessible to all students. The environment must also be accessible to all the sections of Logic and Rhetoric first year students. Hence, the environment must consider the technical requirements of computer technologies needed to access the documents as well as the technology literacy of its target users.

The quantity of documents that are exchanged also poses an additional challenge. According to the collaborative project assignment handout, a variety of documents must be exchanged at different points during the semester. For example, students exchange bibliographies, sources of information, presentation notes, writing plans and drafts of papers. This suggests the importance of the organization of the digital environment for allowing students to place and retrieve the documents from its appropriate subsections as they become relevant to the different stages of the collaborative project.

Moreover, the course emphasizes reflection on the learning process as underlying the complex and collaborative knowledge construction through an extended period of time. It thus reveals an additional challenge for the design of tools to support this learning experience. Conversations will take place during the first half of the semester regarding
course readings and later on the topic of the collaborative project. During the collaborative project itself, students will identify a general and broad topic of inquiry, which they will develop and refine through narrower subtopics, bibliographies and drafts of essays. This calls for the need to create and maintain archives of the knowledge discussed and addressed throughout the semester. Thus, when students engage in reflection, they will be able to return to previous conversations and documents, access previous discussions that may be relevant to their current perspectives on the project, identify the strengths and weaknesses of their previous arguments, and review the thinking process that led them to develop the ideas in the final written essay.

Finally, the curricular change entailed by this learning experience, together with the implementation of the supporting technology tools, presents the challenge of training and supporting different target users. Faculty and instructors need to learn how to set up and maintain the digital environment that will support their students’ learning endeavors. Similarly, students must to learn how to interact with the environment so that it generates the desired collaborative learning experience.

I.2 – Design Research Problem

Based upon the challenges described in the preceding discussion, the design research problem that must be addressed may be delineated according to four dimensions:

1. Complex knowledge construction is required in order to simultaneously develop multiple kinds of skills as students engage in the research and writing process.
2. Collaboration may be hampered by the requirements of reproduction/digitalization, distribution, access and organization of the documents.
3. Reference to prior conversations and documentation is essential to engage in reflection about the learning experience.
4. Training the instructors and students in utilizing the technology tools is critical to facilitate the collaborative critical research project.

I.3 – Design Hypotheses

In order to address the challenges identified above we formulated design hypotheses, in collaboration with the faculty, which underlie the development of the digital environment:

- If a digital environment enables students to discuss the various types of knowledge they require, as well as negotiate possible topics for the collaborative project, then classroom time will be maximized to cope with the demands of this complex learning experience.
- If the organization of a digital environment allows for the distribution and access of documents that will be shared as part of the project, then instructors and students will be able to focus on more relevant aspects of the collaborative experience.
- If space is constructed for small group collaboration, the preparation of supporting steps for the development of the project will be facilitated.
If access is available to conversations and documents throughout the semester, students will be able to benefit from revisiting these resources and reflecting upon their learning experience.

If the Logic and Rhetoric course adopts an efficient means to organize and facilitate the collaborative knowledge construction process, then the implementation of the project across a large amount of sections will be facilitated.

I.4 – The pedagogical intervention: Main design decisions

CourseWorks@Columbia, the open source course management system that Columbia University adopted to support its educational endeavors, was chosen as the digital environment to enable and implement the learning experience conceived by the new version of Logic and Rhetoric. The CCNMTL design team concluded that this kind of learning experience, one that is driven by in-and-out of classroom activities, directly corresponds to the features of CourseWorks. The faculty partners were open to the integration of CourseWorks as the technology tool to support the project and they developed the instructors’ orientation for the implementation CourseWorks within the pilot version of the course.

A critical support component entailed the development of a CourseWorks website for each section of Logic and Rhetoric. The website consists of tools such as class files and discussion board to facilitate the collaboration and distribution of documents. Students and faculty members share source materials, response papers, and written feedback by means of this system.

As with any new tool, it is important that each group of users firmly understand how, when and why to use these tools. This entails identifying and exploring alternative designs that facilitate the communication and distribution of documents. The section below describes the design research decisions that adapted CourseWorks as a digital environment for the collaborative critical research project in the course.

I.4.a – Support for the complex learning experience

I.4.a.1 – The discussion board

CourseWorks’ discussion board feature presents a useful tool to support the complex knowledge construction of various domains and skills that students are expected to acquire, namely, logic and rhetoric in writing, grammar, and research skills. It can also support the exchange of conversations and discussions related to the collaborative critical research project, such as defining the final topic for exploration. Classroom time can therefore be maximized by on-line collaboration, knowledge construction and reflection through asynchronous communication. Moreover, even if negotiations are carried out during class hours, informal meetings among students outside of class via telephone conversations, or computer-mediated communication, posting those decisions online enhances the productivity of classroom time. Hence, the use of this medium can promote
and expand the scope of exploration by eliminating temporal boundaries that constrain classroom discussion.

In addition, students can engage in a more thoughtful response to their classmates’ comments when they have adequate time to analyze them and perhaps conduct some research to support their responses. An asynchronous environment thus allows students to read, critique and assimilate their peers’ perspectives before attending class sessions. Instructors can then utilize the materials generated in the discussion board to spur discussion in the classroom. Finally, asynchronous communication also helps to maximize class time by engaging students outside of the classroom, thereby using actual classroom time to provide supporting or complementary discussion to further refine the topics in class.

Thus, it was decided that instructors would use the discussion board to support and extend class conversations about the readings and possible topics for the research project. Instructors were also advised to activate the discussion board with limited abilities for students to create new topics (“threads”), unless they fully understood the distinction between creating a new topic thread and replying to previously posted messages.

I.4.b – Facilitation / Enhancement of collaboration

The design team suggested the creation of a number of folders in the “Class Files” area that would lead the students through the sequence of steps involved in the Collaborative Critical Project.

I.4.b.1 – The class files section

In order to meet the needs of the collaborative project assignment, CCNMTL recommended an organization structure within the “Class Files” section that enables an effective exchange of documents and files. After discussing several options with the program director, it was decided to create a separate and independent folder to mark each milestone of the collaborative project, stored within a folder named “Final Project”. Thus, each step of the process is captured by a separate space, thereby contributing to a clear organization system which illustrates significant milestones.

These subfolders were numbered (as part of the folder name) to ensure a display according to the order in which they were used during the semester. As a result, the system is programmed to display the folders in numerical order rather than according to the default alphabetical order that is counterintuitive.

The design team also suggested the creation of separate spaces within these two sections of CourseWorks (the “Discussion Board” and the “Class Files” area) for small group work. These spaces took the form of folders in both sections, with access limited to the
members of the group. They were intended to support discussion and for document exchange in preparation for the class presentations on subsets of the project topic.

I.4.c – Support for the process of reflection

As already noted, an underlying tenet of this course is the importance of reflection as a meta-cognitive activity that contributes to strengthening student writing. Therefore, the two CourseWorks sections described above also provide the environments to support such reflection. All conversations and documents posted to CourseWorks are available for continuous reference throughout the course of the semester.

I.4.c.1 – The discussion board

CourseWorks’ discussion board also serves as an archive of the discussions so that students can refer to them at any time during the semester for support of their ongoing efforts to learn about writing. Students can also access their previous conversations about the topic for the collaborative critical research project to help focus and refine their own writing efforts.

I.4.c.2 – The class files section

Access to files posted in the “Class Files” section throughout the semester aids in the process of reflection by providing a repository of focused information that is pertinent to the subject at hand. It also contains the series of drafts that students create as part of the process of the research project. Students thus access these documents to exchange feedback with their classmates. This feedback contributes to student reflection about their writing style, organization, and so forth.

I.4.d – The support for use of CourseWorks

Scalability played an important role in the design of an educational experience facilitated by CourseWorks. Therefore, training the first tier of users in charge of the implementation of the design solutions was an essential task. CCNMTL recommended appropriate training for instructors to set up this infrastructure in their CourseWorks web site not only for document exchange, but also for the support of ongoing discussion. The training aimed to ensure consistency of web site support across all the sections. It was assumed that written instructions and guidelines are insufficient for setting up each course web site. Therefore, the design team also developed appropriate documentation to assist and guide instructors in the setup of the digital environment for each section. Such documentation can facilitate scaling 16 pilot sections of the revised course to the entire group of 80 sections per semester.

Documentation was designed to specify the setup and functioning of the “Discussion Board” to support knowledge negotiation, and the “Class Files” to enable the distribution of documents. The project manager created early drafts of the documentation according to the specification of the faculty partner: type and location of required folders and type
of postings in each folder. Instructors expressed interest in the documentation to help them set up their websites.

The documentation was developed with input from the discussions with the instructors of the pilot sections. The CCNMTL design team created two guides for the integration of CourseWorks in the collaborative project, one for the instructors and another to support the efforts of students. Both guides were available as a word document or as a portable document file. They were uploaded to the CourseWorks web site to allow the instructors to access, download, modify, print and/or post them for delivery to the students.

**Part II: Implementing and Assessing the Project**

The second part of this report describes the implementation and assessment strategies to integrate CourseWorks within the Logic and Rhetoric course. We begin with a description of the specific means of implementation and assessment, followed by a discussion of the conclusions and insights gained from our efforts.

**II.1 – Implementation and assessment strategies**

**II.1.a – The intervention in the classroom**

The project’s implementation was initiated by the set-up of the CourseWorks web sites for each section of the course. Most instructors had set up their website during the first half of the semester and some also led discussions on the Discussion Board.

Instructors underwent several informal training sessions during their regular instructor meetings and also participated in a meeting hosted by the CCNMTL design team which provided an overview of CourseWorks. Although many instructors had already used CourseWorks, the purpose of the training session was to demonstrate how to optimize the setup and “Class Files” section to support their students’ learning efforts. The meeting convened in the form of a round table conversation rather than a formal workshop. The instructors requested and received written documentation to guide them through the setup process. All the instructors succeeded in setting up the “Class Files” section for their course.

Some instructors also received individual assistance while setting up their CourseWorks websites. These instructors voluntarily requested additional help by contacting the Project Manager during their Pilot Instructor meetings. Others requested and received assistance over the phone while they were actually setting up the websites.

A CourseWorks web site was established to facilitate communication, exchange of documents and ideas related to the implementation of the Pilot version of the Logic and Rhetoric. Course directors utilized the website as a resource tool for the new curriculum and also as a tool to train the instructors on how to implement the new curriculum.
However, the use of this web site by instructors was not as widespread as had been expected. Certainly, files that needed to be circulated were uploaded to the “Class Files” area. Nevertheless, the discussion board was not actively exploited as a place to share ideas and implementation difficulties encountered by Pilot sections. Instructors were requested to post a mid-term evaluation of the integration of CourseWorks in the new version of Logic and Rhetoric. Their responses were uploaded as word document files in the “Class Files” area of CourseWorks rather than in the form of a dialogue in the discussion board.

Following the setup of each section’s website, instructors introduced the digital environment to the students by a variety of means. Most instructors downloaded and printed the “CourseWorks Collaborative Critical Project Student Guide” that was distributed in the Pilot Instructor Colloquium CourseWorks website. Some instructors encouraged student to test the system (e.g. with postings). These instructors created testing categories in both the “Discussion Board” and in the “Class Files” area so students could experience the process of posting prior to their required contributions as part of their learning activities. At least one instructor reserved a session in the computer laboratory to guide students through a workshop on CourseWorks as support for the collaborative critical research project efforts.

II.1.b – Assessment questions and strategies

The purpose of conducting assessment activities was to determine whether CourseWorks functioned efficiently as a digital environment to support and facilitate complex collaborative knowledge construction. Such a process of quality assurance yields suggestions and recommendations for future design and facilitates its implementation across multiple sections of the course. Assessment activities occurred during and after the implementation, and comprised of three main methods.

CourseWorks section website observation

One of the earliest research activities was the observation of 9 out of the 16 Pilot sections, which were selected by by the project manager on the basis of availability for access on the system. Observation tasks focused mainly on understanding the kinds of learning experiences that the “Discussion Board” and the "Class Files" area were supporting. More specifically, observations intended to describe the kinds of conversation that groups were conducting on the discussion board. They also attempted to identify the features of the "Discussion Board" which engaged students in conversation as well as the technical difficulties and enhancements that resulted from those features.

In addition, observations of the "Class Files" area attempted to describe the students’ experience of uploading and downloading files: location of uploading, content of files,
the stage of the educational experience, and obstacles that were encountered during the process. It was also aimed at understanding the utilization as well as the benefits provided by the designed structure as support for the steps of the project. Observations also helped identify the use of associated naming conventions for files that were uploaded to different folders of the "Class Files" area. These observations yielded helpful findings and raised questions for discussion with the instructors and the students.

**Student survey**

The student survey was intended to gain insight on the CourseWorks experience from the students’ perspective by focusing on their perceptions of the interactions that occurred on the "Discussion Board" and “Class Files” area. The survey concentrated on aspects such as the Board’s facility of use and structure, the ability to allow for small group communication and exchange of ideas, to enhance preparation for class discussions, to clarify questions on course content and assignments, and to help define the collaborative critical project.

Finally, the survey requested information about the usefulness of the CourseWorks documentation. The findings of this report are based on the voluntary responses of 71 students representing all sections of the Pilot version of the course.

**Instructor Interviews**

Instructor interviews focused on the learning experience mediated by CourseWorks, but from the perspective of the instructors’ implementation. Instructors were asked to comment on their views of the implementation of the new version of the course, particularly with respect to the collaborative critical research project. They were requested to describe their overall impression of the support that CourseWorks provided as a digital learning environment. Specifically, the survey focused on the applications of the "Discussion Board" in their session, their usefulness to the learning experience, their difficulties and possible alternative uses to consider in the future.

In addition, interviews also questioned the instructors about their experience with the "Class Files" area. They commented on such aspects as uploading and downloading files, the structure of folders in the area to support the different steps of the project, and naming conventions used to organize files within the folders. Instructors were asked to discuss other areas of CourseWorks that they found useful. Finally, they were asked to comment on the usefulness of CourseWorks’ written documentation. Four instructors agreed to participate in the interviews.

**Class observations**

A minimum amount of class observations was also performed during two sessions of one section of the course. These observations focused on the integration of CourseWorks and its resources within the learning experience. Class observations also aimed to identify
whether the resources provided in CourseWorks contributed to or hindered the classroom experience.

II.2 – Summary of findings

II.2.a – Instructors’ overall assessment of the project

II.2.a.1- Curricular change

In order to assess the effectiveness of CourseWorks for the development of the course activities, we believed that it was also necessary to examine the instructors’ evaluation of the revised curriculum. This innovative context illustrated the potential for meaningful use of technology, and therefore it represented an essential component of our effort to interpret the use of technology in the course.

Instructors were requested to provide their perspectives on aspects such as the enhancement of student learning with the new version of the course, the overall development of the project in the classroom, the development of collaboration among students to fulfill the project’s goals and its ability to stimulate thinking skills.

Half of the instructors who were interviewed observed that the new version of Logic and Rhetoric significantly engaged students in the learning tasks. The instructors also indicated that it provided a more enjoyable teaching experience. The most valuable feature was the use of readings to model different writing genres and to prompt students’ responses. As a result, this contributed to facilitate class discussions, which are viewed as beneficial for the process of complex collaborative knowledge construction.

Instructors also commented on the positive development of the learning experience that was generated by the collaborative critical project. Generally, instructors perceived this project as a successful educational experience in which students accomplished the course’s learning goals.

All instructors characterized the learning experience in terms such as “it went well”. Students succeeded in selecting a project topic without major obstacles. Only one instructor indicated that it was hard to arrive at a consensus about the topic in her section. She suggested that perhaps she should have initiated the conversations earlier in the semester, and that class discussion was the most effective strategy to develop this task. In general, though, instructors described group presentations as successful.

However, these instructors did not agree on the amount of time that was devoted to the development of the project. While half of the instructors stated that students lacked adequate time to work on the second draft of the final paper, other instructors suggested that the project provided appropriate time, as students would otherwise have lost patience with the activity.
Instructors also highlighted some of the educational benefits of this version of Logic and Rhetoric. They identified its purpose and application as realistic in terms of what students were able to accomplish. Moreover, instructors felt that the project succeeded in helping students acquire basic research skills. Finally, they concurred that students showed investment in their work because of the different stages through which they progressed.

Instructors also noted that the project fostered collaboration, which enhanced students’ learning. Instructors valued the fact that the project allowed not only for collective but also individual work. They also suggested that students preferred to define their arguments according to their own individual ideas rather than according to those of the group as a whole. This aspect of the design allowed for the development of threads of thought that derive from the group topic but follow individual paths. Finally, students enjoyed the opportunity to engage in peer review, thereby improving their own writing process by comparing the different ways of tackling the same assignment requirements.

II.2.a.2 – The curricular change and its relationship to the course digital environment

Instructors also commented on the overall support that CourseWorks provided to the collaborative critical research project, specifically in terms of educational, technical, and structural dimensions.

First, the educational dimension refers to innovative or enhanced educational activities resulting from the integration of CourseWorks. For example, instructors characterized CourseWorks as a “useful hub of communication and access of information for the class”. In this regard, it was described as “fairly effective”. However, instructors expressed the need for a better understanding of the system to yield additional benefits for the educational experience.

Second, the technical dimension refers to the features and performance of CourseWorks’s technology which affect the implementation of the learning experience. Instructors indicated that the technical features comprised the weakest aspect of support for the course and the project. They described CourseWorks as a “slow and clunky system”. Moreover, in terms of the interface for posting relevant course information, they noted a lack of flexibility in the system, specifically an inability to add sections on pages (e.g. top or left side frames). They also complained that the input boxes are too small, and that they were unable to determine which boxes of information would display on the actual course page. In addition, the location of the link to post files associated with the syllabus section also proved problematic.

Lastly, the structural dimension refers to the organization of documents. The instructors tended to use the introduction page as a portal, rather CourseWorks’ corresponding subsections, to contain all the course information. This was due to the facility with which instructors were able to replicate the familiar process of creating a single document syllabus in a traditional text file. Moreover, instructors felt that the CourseWorks space is “too broken down” because of the need to enter multiple windows in order to access the information displayed in a single subsection of the site. Furthermore, some instructors did
not appreciate CourseWorks’s ability to transfer course documents between semesters because of the variations they introduce from one semester to the next.

Instructors acknowledged that they lacked adequate understanding of CourseWorks’ organization structure for messages and files, such as chronological versus alphabetical displays. However, they agreed that posting student essays proved useful for two reasons. First, it helps to prevent students’ lateness because of last minute printing of assignments. Second, it eliminates instructors’ commute for the express purpose of picking up papers.

One instructor described an interesting application of the syllabus section to archive the class activities and discussions rather than to outline course expectations for the semester. She eventually discontinued this practice as she discovered that students did not refer to it or used other means of obtaining an update on class events (e.g. e-mail).

Instructors also offered their insights on students’ experience with CourseWorks. For example, they described problems of access to the system from off-campus locations, although they acknowledged an improvement since December. In addition, they attributed other difficulties in to students’ lack of understanding of the system, especially among those with limited computer literacy. Instructors indicated that even students, who generally described themselves as technology-literate, did not always succeed in navigating CourseWorks.

Finally, instructors commented on their willingness to utilize CourseWorks again to support the collaborative critical research project. All instructors responded in the affirmative to this question. As one instructor observed:

“...Since students are progressively growing more attached to the computer and Internet, it's good to use it this way [for educational purposes]”. Instructor # 16

II.2.b – Support for the complex learning experience: The discussion board

As in the School of General Studies¹⁰, instructors refrained from using the "Discussion Board", mainly to avoid the difficulties and frustrations resulting from lack of technology literacy and access problems. Nevertheless, several educational uses of the "Discussion Board" were integrated in support of the complex learning experience. Observations yielded the following common applications:

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¹⁰ School of General Studies (students), http://www.gs.columbia.edu/viewbook/students.htm
The applications described by the instructors were more or less consistent with those identified by the observation of the class section web sites:

- Responses to readings (guided mostly by an analysis question or students’ posted questions)
- Review of the grammar book
- Review of the research book
- Workshop for student’s drafts
- Initiation of discussions about the topic (1 instructor requested that students print "Discussion Board" messages and bring them to class for further discussion)

According to previous data, 4 out of the 9 web sites that were observed as well as half of the instructors who were interviewed demonstrated the use of the "Discussion Board" to initiate the topic for the collaborative critical research project. Nevertheless, only a very small number of students agreed or strongly agreed that the discussion board facilitated the task to define the project.

Instructors and students evaluated the usefulness of CourseWorks to their learning experience. Instructors were aware that, even though they encouraged asynchronous conversations (replying to classmates’ messages as opposed to merely posting their own ideas), such dialogues did not generally occur online. Students continued to display some reluctance to participate even though posting on the "Discussion Board" was a “required” part of the course in at least one section (points were to be assigned for posting online comments).
Despite the general trend described above, students referenced their classmates’ postings during actual class discussions and expanded upon each other’s ideas. Half of the instructors considered the use of the "Discussion Board" as useful to ensure that students read their assigned material. Moreover, half of the instructors recognized the value of their exposure to students’ understanding of the readings prior to the actual class session. In addition, instructors valued the "Discussion Board" as a place to voice opinions that, for one reason or another, are not expressed in class (e.g. because of time or student learning styles). They therefore felt that the Discussion Board can minimize students’ anxiety by enabling them to post their ideas in the comfort of their own home.

The problems to create and reply to categories, threads and messages were examined by means of observations, instructor interviews and the student survey. It was observed that instructors who utilized the Discussion Board created well-defined categories to promote conversations in the context of the section (e.g. “Class Minutes”, “Benjamin – ‘The Work of Art in an Age of Mechanical Reproduction’”, The Bedford Handbook). However, a quarter of the sections that were observed showed that students created threads instead of replies to messages. Instructors mentioned the lack of technical knowledge on how to participate in asynchronous discussions as part of the cause for this behavior. Additionally, half of the instructors inferred that students chose to create new threads within categories as opposed to replying to the original posted message because they perceived their task as a requirement to post their own ideas about the topic of discussion.

In addition, regarding the technical difficulties related to the use of the “Discussion Board”, instructors observed that the slowness of system detracted from its effective utilization since students preferred to e-mail the instructor in order to satisfy the course requirements instead of navigating through messages at the mercy of the system’s speed. Instructors voiced concern about the lack of mobility of files across sections of CourseWorks (as opposed to within sections, which is a capability that already exists) to help maintain the organization of the digital spaces.

The survey also asked students whether the "Discussion Board" was too difficult to use because of its technical requirements, but they did not seem to consider the environment as technically difficult.

Finally, instructors were specifically asked to provide their opinions about other possible uses of the "Discussion Board" for the collaborative project. They indicated applications to enable students to prepare for the presentations, as well as to expand the scope of class discussions and additional use of the workshop for student essays. In this regard, they viewed the "Discussion Board" as an environment that encourages freedom of expression, without the pressure from the presence of their classmates. In this way, students can participate and provide suggestions or voice disagreement with other approaches to writing.

II.2.c – Facilitation / Enhancement of collaboration: The Class File Section
The creation of space for small group discussion and exchange of documents is another design feature to support collaboration. However, observations indicate that these group folders were seldom created or utilized.

The "Class Files" comprise the main hub to enable collaboration among students within each section of the course. Observations, responses to interview and survey questions by instructors as well as students, provided information about the effectiveness of this feature.

Students voiced their opinions regarding general usability issues in terms of support for the learning experience. The majority of students indicated that that the technical requirements did not pose any difficulties. Considering the effectiveness of CourseWorks for small group work, barely a third of the students agreed or strongly agreed that the class files contributed to successful communication and information sharing between project teams. This is consistent with the fact that these spaces were seldom created or used, as noted above. However, the "Class Files" area was generally acknowledged as a place for the group to view others’ work and presentations, thereby contributing to collaborative learning.

On the other hand, one instructor described the “Class Files” area of CourseWorks as “the most frustrating part of the site”. She compared it to “the old gopher sites” and claimed that the section “does not work like a website somehow”. According to this instructor, the file tools entail too many steps. Therefore, this section of CourseWorks was described as inefficient and slow. In addition, the “Class Files” tree structure also proved to be confusing because of the plus and minus signs that signal a hierarchical order of different levels of files.

The following chart illustrates the number of sections that created and used the different folders of the collaborative critical research project in their course sites:

<table>
<thead>
<tr>
<th>Folders</th>
<th>Amount of sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final project</td>
<td>Less than half</td>
</tr>
<tr>
<td>Preliminary</td>
<td>Approximately half</td>
</tr>
<tr>
<td>Annotated Sources</td>
<td>Approximately half</td>
</tr>
<tr>
<td>Presentations</td>
<td>Less than half</td>
</tr>
<tr>
<td>Writing plan</td>
<td>Approximately half</td>
</tr>
<tr>
<td>First Draft</td>
<td>Approximately half</td>
</tr>
<tr>
<td>Second Draft</td>
<td>Approximately half</td>
</tr>
<tr>
<td>Final Draft</td>
<td>Approximately half</td>
</tr>
</tbody>
</table>

Less than half of the sections created the “Final Project” folder, though all sections created the “Preliminary Bibliographies” folder. One of those sections included the
“Annotated Bibliographies” as part of the documents to be uploaded to the “Preliminary Bibliographies” folder. Seven out of the nine observed sections created and used the “Sources to Share” folder. Only approximately half of the sections created and used the “Presentation and Discussion” folder. Six out of nine sections created and used the “Writing Plan” folder. The “First Draft” folder was created and used by all sections. The “Second Draft” folder was created and used by seven out of the nine sections. The “Final Draft” folder was created and used by four of the sections, and it was also created but not used by one other section.

The chart below describes the number of files posted into each of the folders of the collaborative project:

![Amount of files posted per folder](chart)

The extent of creation and use of folders in the CourseWorks sites that were observed was similar to the quantity of files that were posted. Most sections created and used the “Preliminary Bibliographies” and “First Draft” folders. These folders also hosted the largest number of files. The “Presentation and Discussion” and “Final Draft” folders were created in the least amount of sections and also contained the least amount of files.

Instructors also commented on the creation and utilization of the different folders. Half of the instructors stated that they only created folders to support the steps of the collaborative critical research project. Moreover, avoided creating the higher level “Final Project” folder because they did not want to incur extra navigation layers within the system.

One instructor utilized the “Sources to Share” folder to post useful resources that she compiled for her students. Another instructor was observed posting many files on behalf of small groups in her section. Her action was due to her ability to convert different types of files to portable document files [PDF] that were accessible to all students.

The “Presentations” folder was used in various ways by some sections. The collaborative critical research handout specified that this folder be used to post “a one-page synopsis,
outlining what you plan to do”. One instructor indicated that she had students use this folder to post notes from the presentation. In contrast, another instructor indicated that the “Presentations and Discussion” folder was not used because students engaged in face-to-face preparation for the presentations.

Similarly, students posted documents in the “Writing Plan” folder for a variety of reasons. One instructor requested that students post their writing plans to make them accessible to other students for comments and peer review. Half of the instructors indicated that the folder was utilized to collect the students’ documents.

Instructors commented about the use of the “First Draft” and “Second Draft” folders. In some cases, only “workshopped” drafts, were required to post their documents into these folders. Students generally brought hard copies of their papers into class for the workshop. Observations demonstrated that some students posted in both folders even though their essays were not “workshopped”.

Instructors also recommended possible modifications to the “Class Files” folder structure. One of the instructors suggested consolidating the preliminary and annotated bibliographies together in one folder by combining the two steps in the sequence of the project. This may simplify CourseWorks and enhance its support value for the course. Another suggestion recommended limiting the folders to those required for weekly posting, thereby minimizing the confusion in the posting of files.

Finally, instructors suggested the possibility of a general Logic and Rhetoric course website with the folders’ structure already created so it may be automatically exported to each individual session site and customized by instructors as needed.

Observations also yielded information on the protocol for naming the files posted in the "Class Files" area. Slightly less than a quarter of the posted files followed the suggested protocol for naming the files to be posted. Almost half of the postings showed some modified version of the suggested designation while slightly less than a quarter used a different title. Modifications included modifying the sequence of the components of the naming protocols which resulted in changes in the alphabetical order in which the files are displayed. A very small percentage of postings were made by groups for which no protocol was suggested in the handout.

Instructors discussed the reasons for which naming protocols were not implemented rigorously. Half of the instructors stated that students simply forgot to implement the protocols that were suggested and did not have the ability to rename the posted files. One of the instructors did not enforce the naming protocol because she viewed it as unnecessary due to the small amount of students in the section. Other instructors did acknowledge that naming protocols were “useful to move documents to the right folder” in order to maintain the folders organized and avoid posting files to an inappropriate folder.
Course website observations, instructor interviews and responses to student surveys also attempted to identify problems in posting and downloading files that may impede the collaboration among students. For example, according to the observations of the course web sites, at least one out of the nine sections revealed explicit concerns regarding the printing of files posted in the "Class Files". In addition, problems with the system did not enable students to determine whether their files had, in fact, been posted. There also was evidence that the contents of the posted files had actually been included as the content of the notes section of the posted file in four out of nine sections. Five out of nine sections also demonstrated lack of student knowledge in terms of the appropriate location to post their files.

Instructors offered their views as to why posting to the inappropriate folder was an issue in their sections. Some instructors indicated that the screen for posting files was confusing. For example, the pull-down menu that assigns a file to a folder is not very noticeable when it is browsed quickly because it resides below "the fold" and below the "submit" button. Therefore, this screen was described as counter-intuitive even for technology savvy students. According to instructors, students were unaware that they had posted their files to the wrong folder because the system did not provide any confirmation that the posting was successful or that it was assigned to some other folder. Instructors also pointed out the inability overwrite previous versions of posted files or to move them in order to maintain an organized environment.

Observations also confirmed concern regarding the compatibility of files in terms of the document type and different software versions used by students to create their documents. In addition, some instructors noted that slow Internet connection can impede collaboration when large documents are exchanged. As a result, one instructor preferred the use of portable document format files, which cannot be altered, in order to preserve the integrity of the documents. This preference continued even in the case of increased file sizes.

In terms of the "Class Files" organization across all the sections, it was observed that only one out of 9 sections represented a model of class files organization in that all the files were appropriately assigned to their corresponding folders. No files were placed outside of the folder hierarchy. An interview with the instructor later indicated that she moved incorrect files to their proper locations throughout the semester.

II.2.d – The CourseWorks documentation

Observations, instructor interviews and the student survey provided information about the CourseWorks support documentation for helping instructors set up their web sites and for students to utilize it for collaboration and knowledge construction. Two out of nine sections provided students with the CourseWorks documentation guide as a downloaded file. The majority of the instructors who were interviewed indicated that they provided documentation to students in some form or another, mostly in hard copies. One instructor reserved a computer classroom to demonstrate CourseWorks and allow students the opportunity for hands-on practice.
Instructors and students assessed the usefulness of the CourseWorks documentation. One instructor indicated that the guide was unnecessary because the site was self-explanatory. Half of the instructors found the documentation clear and helpful. Another instructor mentioned the need to view the screens of other sections of CourseWorks in order to set them up and use them.

About a third of the students mostly agreed or strongly agreed that the documentation facilitate their use of CourseWorks. Although instructors that were interviewed described the documentation as very helpful, students did not seem to share the same views.

Finally, instructors also commented on the support that they and their students received during the learning experience in the use of CourseWorks. One instructor indicated that she did not receive adequate support for setting up and maintaining the web site. She specified that she was trying to access ACiS instead of CCNMTL for that support. Moreover, according to half of the instructors, students did not receive timely responses to e-mails or phone calls regarding technical help with the system. They indicated that walk-in support was the only effective means to receive assistance. Instructors therefore suggested the need for a dedicated CourseWorks ‘help person’ to ensure the scalability of this project for full implementation next year.

**Part III: Discussion**

The findings described in the previous section imply a number of improvements in the design of the CourseWorks, its documentation and overall support for the project.

CourseWorks provided general support for the Logic and Rhetoric activities. Students and instructors can therefore benefit from several system improvements to maximize such support. For example, CourseWorks often exhibits slow performance in displaying the discussion board postings and class files. Improvement of the system speed can facilitate its utilization and enhance the learning experience as expected by the design research hypothesis. Hence, students and instructors will turn to alternative ways to meet the requirements of assignments, such as direct e-mail to instructors, hard copies of handouts, and so forth.

Instructors also sought more flexibility to choose the kinds of elements, order and display format in order to add a page. In addition, the ability to upload and convert documents that instructors had prepared in other types of software was also a system improvement that was suggested. Moreover, several instructors engaged in unintended use of several parts of CourseWorks. This calls for a more precise specification of the purpose of the sections, as well as documentation of these alternatives.

Additional improvements to the documentation can help instructors and students benefit from CourseWorks to support their learning experiences. For example, Explanations of
the structure and organization of postings and files in the discussion board and class files should be made more explicit to students and instructors.

III.1 – Support for the complex learning experience: The discussion board

The critical research project begins with selecting and defining the scope of a specific topic that will engage students in the research efforts throughout the second part of the semester. The findings of our investigation suggest the need for course instructors to collaborate in the design of the project with special attention to this important initial stage.

Instructors can also share and assess useful techniques for maximizing the potential of the discussion board in this context. Such an exchange of ideas would also enable the instructors to identify the most effective ones. Once a technique is adopted for use, it should be specified in the class documents. Instructors can therefore engage in assessing the ways in which in-class conversations can incorporate and build on discussion board conversations stimulated by the techniques and applications previously identified and implemented.

The difficulties that observations revealed in posting files to appropriate locations in the "Discussion Board" or the "Class Files" area can be resolved by introducing system features that allow files not only to be moved within a section but also to be moved across sections in CourseWorks. This way, files that are uploaded to an inappropriate section can be relocated to the appropriate folders to ensure continuity of the collaboration efforts.

As evidenced by observations, creating and replying to discussion threads in the "Discussion Board" is essential to the participation in online conversations that support and extend the complex knowledge construction process. Messages that are posted as threads do not function as replies to the original message, thus affecting the flow of conversation. Therefore, CourseWorks documentation should describe more precisely how to use the "Discussion Board" to engage in such online conversations. Explicit explanation of the purpose of creating new threads (or categories) as opposed to new replies should be incorporated into the documentation so that users (instructors and students) are able to judge whether to create a new reply or thread to achieve their intended purpose of conversation.

Appropriate use of the "Discussion Board" options can help ensure the ability to view the reply and its originating message on one page. This allows students to access the original posting, thereby facilitating navigation between messages, and ensuring relevant organization of the "Discussion Board". This explanation can also specify the ways in which instructors set the discussion board so that students may initiate their own discussion threads. Understanding these differences can help all users maximize the use of the available options in the "Discussion Board" and convey their ideas to their classmates.
III.2 – Facilitation / Enhancement of collaboration

The design of the learning experience envisioned facilitating collaboration by creating small group project spaces to enable students to carry out conversations and exchange documents. However, observations revealed that such spaces were seldom created or used. Students engaged in conversation and exchanged files in face-to-face encounters or by other means of communication. Consequently, CourseWorks instructor documentation guidelines can be revised so as to minimize the explanations for setting up group spaces. Or, they can also be eliminated altogether, and be provided upon request. Thus, the documentation will reflect the real needs of the users in the course.

These group spaces can be created with several options to grant access to their contents to different members of the learning community. Although some users will not be granted permission to access the files, the group space will be available for view to all members of the learning community. One feature that the system can incorporate, as indicated by observations, is the ability to provide feedback to users who can view these spaces. Currently, when the user attempts to enter inaccessible folders, the system will not respond with any kind of indicating action or message. An explanation for the inability to access such spaces can help the student understand the system rather than assume that it is not operating properly.

III.2.a – The class files section

The "Class Files" area provided most of the space for collaboration among students. Instructor interviews revealed the need for more in-depth understanding of its tree structure to support the collaborative endeavors. CourseWorks documentation can integrate additional explanations of the tree structure of this area, as well as for the functions of the plus and minus signs. This can help students understand the importance of consistency by ensuring postings to the appropriate folders.

This investigation’s findings also addressed the structure of folders for uploading the files to be exchanged as part of the final project. These findings point to suggestions for the improvement of the project design, project documentation and CourseWorks documentation.

The CourseWorks documentation specified a “Final Project” as a top hierarchy folder to contain all previously created folders. Findings suggested that the folder was avoided because of the extra layer of access to files that was required. In most cases, the other folders in the structure sufficed to maintain an organized area. Instances of lack of organization may be attributed to other aspects previously discussed. Therefore, given the system speed to display the “Class Files” area, the design specification can omit this extra folder to facilitate navigation. Various instructors were already experimenting with different ways to simplify the "Class Files" area.
A collaborative redesign of the project by instructors can combine the first two steps (bibliographies) into one. The “Presentations” folder was seldom utilized. Moreover, its utilization showed inconsistent purposes across sections. Therefore, the “Presentations” vs. “Sources to share” folders may be reassessed in order to redesign the file structure accordingly. This issue can alternatively be resolved by explicit specification of the purpose and potential use of this section in the actual project documentation.

The “Writing Plan” was another folder that groups used to support various purposes. This suggests that the writing plan should be posted to the class files section to ensure consistency of display of all the steps of the project, and to allow access to each other’s plans for feedback. Alternatively, writing plans in the form of individual tasks should not be uploaded since they will not benefit from other students’ critique. Therefore, the file structure should be modified accordingly.

The “Final Draft” was another folder that was not widely utilized across sections. It is important to identify whether this was due to lack of time, or whether there is simply no need to post final drafts to CourseWorks. Therefore, instructors should determine whether to continue to include the folder within the structure for consistency or instructor access purposes.

The designers of the learning experience envisioned a naming protocol for files that would be uploaded to the folder structure to ensure adequate organization of the digital environment. However, the use of such protocol to support file exchange should be reassessed. If its use is viewed as necessary to the success of the organization, then it should be specified in the project documentation. The naming protocol was provided in the project documentation for only the first three kinds of postings (files to be uploaded to the first three folders). If the instructors consider those protocols as beneficial for the organization of the folder structure, then the project documentation should specify protocols for uploading files to all sections. CourseWorks documentation can also include a distinction between naming the file and providing a title in the “file post” screen of the system given that the actual file name does not contribute to the alphabetical order within the folder structure.

In addition, the layout of the elements in the “Post File” screen also presented a significant obstacle to posting files. The CourseWorks system can be improved with a new layout that places the pull-down folder menu above the submit button. This can help students identify the selection step and alert them to alternative options below. Otherwise the organization structure impedes the collaboration process.

Lack of feedback regarding the successful completion of the posting process was another issue revealed by our observations. An intermediary and / or final confirmation message indicating the location of the posting (and other information entered by the student) with the ability for editing can also ensure collaboration and system support.

Furthermore, the inability to move the files that had been posted into incorrect locations posed another obstacle to collaboration. CourseWorks system improvements can help
guarantee the flow of collaboration by allowing a clearly organized and accessible exchange of files. One feature of CourseWorks automatically creates a repository of multiple versions of the same files, as students can never overwrite them with newer versions. This allows students to chronicle their knowledge construction across extended periods of time. However, it can also cause confusion between the various versions of documents, so that students may download and study outdated versions of the shared documents. This may be addressed by allowing students to delete or overwrite previous versions of files that had been posted incorrectly. Thus, files that constitute building blocks for the learning experience can remain on the system while incorrect files can be eliminated, thereby enabling a more efficient exchange of documents to support research, presentation, writing and feedback.

Observations also illustrated a lack of student understanding of where to post the files related to various stages of the collaborative critical research project. The project documentation can be revised to further improve student understanding of the specific areas in which to post the files for the different steps, rather than the current “post to CourseWorks”.

The findings indicate a number of problems in posting files, but they can be directly addressed in the CourseWorks documentation guides. The documentation can specify particular considerations for printing from CourseWorks from within and out of university computer labs. This can anticipate potential difficulties that may hamper students’ collaborative efforts. At times, students entered the entire contents of their files by using the notes section of the files that had been posted. Needless to say, this impeded faster display of the presentation and hampered navigation as well. Explicit specification of the “Class Files” area to post documents as files, along with a brief explanation of their content can facilitate their CourseWorks experience.

In addition, some issues related to the compatibility of files also emerged, which may be addressed by improving the documentation. For example, instructors and students’ guidelines can contain explicit information on the benefits of an .rtf document format (compatible across platforms, virus safety) for the efficient exchange of documents to support collaboration within the context of the project. It can also caution students to use the word processing’s program capability of indicating formatting changes that might be lost as a result of translation to the .rtf, which ensures document integrity. Finally, explicit specification of recommended limits on file size for users with a low-speed Internet connection can guide both instructors and students to make better use of the system to support collaboration.

Instructors also commented on their use of other sections of CourseWorks and recommended additional areas for improvement of the system and its documentation. For example, calculation of regular and final grades did not seem to be based on consistent methods. A verification of the grading system (to display final grades in a consistent format, that is, percentage vs. grade point average) should also be considered.
An initial consideration for implementing the new version of Logic and Rhetoric was the scope of activities that demanded the acquisition of different types of knowledge systems, such as CourseWorks. Instructors were concerned with guiding students through all the relevant tools for their academic year in just one course. Moreover, most students participating in the pilot version of the course did not receive any kind of prior training on CourseWorks. Such training may be provided by incorporating it within the student responses to the readings. For example, instructors can lead an orientation session to CourseWorks that is anchored in the content of the project (students reply to a posted question related to the week’s reading, followed by a reply to a posting about issues of posting and replying). In this way, students acquire familiarity with the system but still fulfill the regular learning requirements of the class session.

Finally, the availability of timely technical support was cited as an issue that would contribute to effective collaboration and complex knowledge construction. For example, CCNMTL’s role as the provider of CourseWorks support for instructors should be explicitly promoted, since some instructors sought support in the Academic Computing department. In addition, adequate technical support should also be available to provide CourseWorks assistance by e-mail or telephone so that problems with the system do not severely impede fulfillment of project requirements.

### III.3 – The CourseWorks documentation

Recommendations based on our findings can further improve the documentation so that students can benefit from its specifications to support and facilitate the collaborative learning experience. Some of these recommendations consist of:

- **Suggestions for both instructor and students documentation guidelines**
  - Explicit explanation of the organization of postings in the "Discussion Board" and the "Class Files" area.
  - Explanation of the hierarchy structure of postings.
  - Explicit explanation of the purposes of creating new threads or categories vs. replies to messages.
  - Specification of issues related to printing documents from within CourseWorks.
  - Specification of the purposes of the “Notes” section in the "Class Files" area.
  - Explicit recommendation to utilize the the .rtf format for sharing text documents (or whatever other format is selected for compatibility).
  - Suggestions related to file size and its implication for slow Internet connection.
  - System should address compatibility issues by indicating whether files can be uploaded on specific computer systems.

- **Suggestions for instructor documentation guidelines**
  - Explicit explanation regarding the suggested uses of the various CourseWorks sections.
Removal of the explanations for setting up group spaces (as these were not used and this space can be used for other guidelines that the investigation determined as critical)
Elimination of the “Final Project” folder in the “Class Files” area.

Together with the improvement of documentation guidelines, workshop training sessions (rather than demonstrations) can be implemented to lead instructors through the steps of creating their websites. These training sessions can include members of the CCNMTL support team to allow one person to leads the workshop while others assist individual instructors as they face particular problems.

As noted earlier, the incorporation of CourseWorks training for students in the context of a Logic and Rhetoric session can meet the dual goals of discussing class topics while learning to navigate the CourseWorks interface.

A CourseWorks interactive help feature can be built into the system, such as a ‘mouse over’ or ‘tips’, that may be accessed by clicking the icons next to important input boxes on the system. This can minimize the need for CourseWorks documentation, provide help on demand, address specific features, and provide assistance in the absence of documentation.

Documentation and training are crucial to the implementation of the support that CourseWorks provides for the collaborative learning experience in this course. This can lead to a consistent and successful implementation across the multiple numbers of sections that comprise this core curriculum course each semester.

**Conclusions**

The design of the technology to support the educational endeavors of the new version of Logic and Rhetoric was intended to address three main problems:

1. The complexity of the learning experience that requires the implementation of research and writing skills
2. The requirements of effective collaboration in terms of the production / digitalization, distribution, organization, and access to relevant documents.
3. The importance of training users in utilizing the technology tools that will facilitate the experience.

In order to address these problems, we suggested the use of CourseWorks as the hub for communication and collaboration in the course. We recommended the use of the “Discussion Board” as a central location for the exchange of ideas related to course readings and the negotiation for the topic of the project. We designed and implemented a structure within the “Class Files” area to host the different documents for exchange during the different stages of the collaborative project. In addition, we developed customized documentation to support these activities.
Our assessment of this design revealed the instructors’ endorsement for the use of CourseWorks in support of the complex collaborative learning experience introduced by the Logic and Rhetoric course. Nevertheless, there was limited recognition by the students of this system’s benefits for their learning efforts.

Observations, interviews and survey responses identified a number of factors that may account for such evaluations. These factors can be summarized by the need for improvements in the technology of the CourseWorks system and in the structure that was designed for the exchange of documents and communication, as well as further specification of critical issues in the instructor and student documentation. We believe that the instructor and student experience will be significantly improved by addressing these issues in the next iteration of the design efforts.

Finally, CNMTL’s efforts to assess the support capability of this CourseWorks management system in the development of a contextualized learning experience through Logic and Rhetoric, has augmented our understanding of the approaches that can be taken to conduct this kind of study. Hence, redirecting the purpose of the research enterprise to specific and well defined uses of technology in the context of learning frames the findings of the study in a way that not only speaks to the details of the technology support but also helps to suggest ways in which CourseWorks can be utilized to promote meaningful learning.

References


