

**Columbia Center for New Media Teaching and Learning**

**Columbia University**

**The Digital Classroom Project  
Evaluation Report**

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## **Introduction**

During the Fall Semester 2001 CCNMTL in partnership with the School of General Studies and with the cooperation of the Registrar office constructed a digital classroom for faculty and students to explore the uses of technology in teaching and learning. Given the environment design and technological resources, it represents a new kind of electronic classroom at Columbia University. Following the Center's philosophy and perspective regarding new media teaching and learning the Digital Classroom was designed with a focus on pedagogical purposes rather than on technological resources.

This evaluation was conducted with the purpose of understanding different teaching and learning experiences that the features of this classroom setting promote. We have interviewed instructors, observed classes, and consulted students in order to address the different dimensions involved in their teaching practices within this classroom.

The findings and results of this evaluation allow us to understand the way in which the environment plays an important mediational role for allowing educators to re-conceptualize the use of new technological tools in their teaching experiences and envision new educational opportunities.

From these findings it was possible to identify potentially enhanced experiences that become models for future explorations and developments in these kinds of digital classroom environments.

Finally, the study allowed us to think about additional ways in which faculty could be engaged in the future development of the Project.

## **Part I: History, Description and Purposes of the Digital Classroom Project**

### **I.1. History and Background of the Digital Classroom Project**

During the Fall Semester 2001 the Columbia Center for New Media Teaching and Learning, in partnership with the School of General Studies and with the cooperation of the Registrar office has constructed a Digital Classroom located in 308 Lewisohn Hall. This environment was designed to allow CCNMTL and its faculty partners to explore and experiment with uses of technology in the classroom. The main assumption in the construction of this classroom was that in order to accomplish this purpose, easy access to different electronic resources, as well as flexibility in the disposition of the space, have to be central features of the environment. The projection-based schemes of conventional electronic classrooms seemed not to successfully address these criteria.

Conventional technology-enabled classrooms are built based on a projection system model: a computer connected to a ceiling mounted digital projector. The computer is usually set up in a podium at the corner of the classroom. In addition, the system can also include other devices such as VCR, DVD, document cameras, etc. Sometimes all these devices are set up together under a control panel system in order to allow users to easily manipulate each input device. The projection system classroom also allows Internet connection from the central computer, and sometimes from additional computers for students. Some classrooms also allow students to connect their own computers to the Net.

The disposition of the space and the need for the instructor to be at the corner of the class or behind a podium, managing the computer, made the environment rigid and less accessible for people to interact. Technology almost becomes the center of the action, demanding from faculty to master the use of all and each device. Even with more sophisticated control panels for this task, the interface between instructor and technology in these kinds of environments does not seem to provide a familiar and flexible disposition of resources and space. In order to have both the screen and the chalkboard available for the instructor in the class, the projection system has to be placed in a big space. The presence of all the devices in the environment makes difficult for professors to move more spontaneously while displaying materials on the screen.

The projection system scenario seems to be a particularly complex scenario for instructors who are not quite familiar with the use of technology in their teaching practices, making it more difficult for them to become confident in this task. This complexity also increases the demand of technical support for using different media in the classroom.

## Projection Systems Electronic Classroom Samples



[Mississippi State University](#)

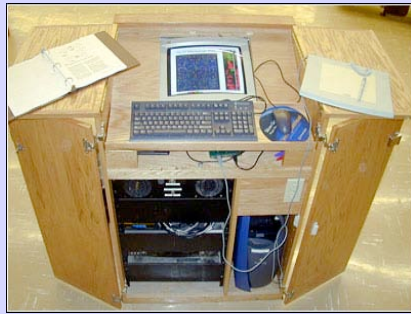


[Florida International University](#)

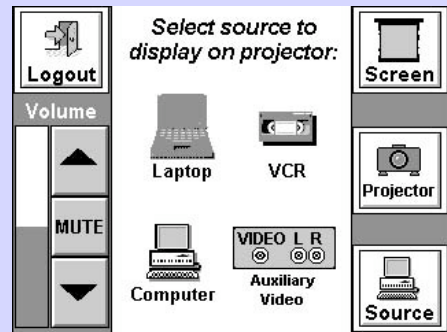


[Montana State University - Billings Library Computer Classroom](#)

## Projection System Podium and Control Panel Samples



[Digital Lectern, University of California at Santa Barbara](#)



[Oregon State University Enhanced Classroom Touch Panel Tutorial](#)

Given the constraints of the projection system scheme of electronic classrooms, CCNMTL decided to create an environment that would overcome these limitations. The purpose was to design the environment in a way that would make possible for faculty and students to focus on their teaching and learning experiences while experimenting with the use of technology as resources and tools in their activities.

Construction of the classroom began during the summer of 2001 and it was almost completed by the third week of the fall semester 2001.

## I.2. Description of the Digital Classroom Project

### *I.2.a- Description of the environment:*

Given the purposes and criteria mentioned in the previous section, the digital classroom was designed to include the features and resources described below.

#### □ **Movable, color-coded furniture and front and rear whiteboards - chalkboards.**

Movable, color-coded furniture enable faculty and students to rearrange the room layout into a variety of configurations at their convenience.



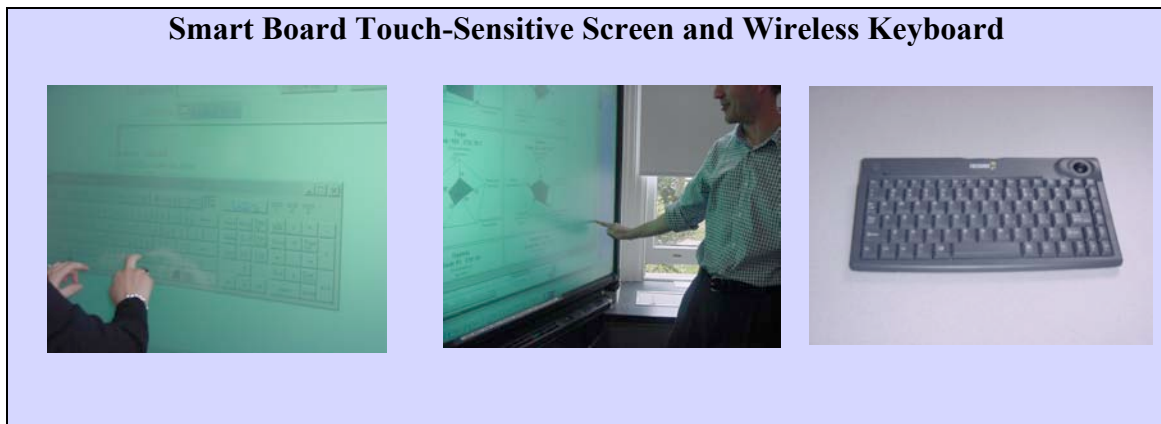
Given the flexible disposition of furniture, and the movable Smart Board [see description below] the classroom has two whiteboard/chalkboard, located in opposite walls, so that students and instructors can easily configure the room according to the activities they are working on.

#### □ **Smart Board 3000i**

Instead of a projection system, the Digital Classroom has a Smart Board, which is a 67" diagonal touch screen housed in a movable cabinet. The unit connected to networked computer that can project images from the computer, a DVD or a VCR.

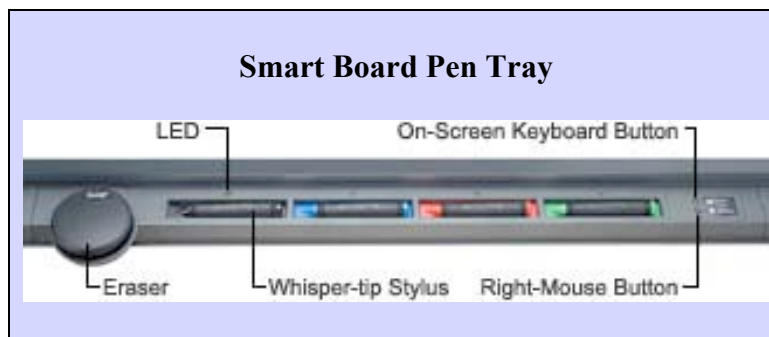


When the computer is turned on, the Smart Board software transforms the screen into a touch-sensitive surface. Instructors and students can control and manipulate the computer by interacting with the touch-sensitive screen or by using a wireless keyboard. They can type either on the screen or using the keyboard. They can also manipulate the computer by using their finger as a mouse.



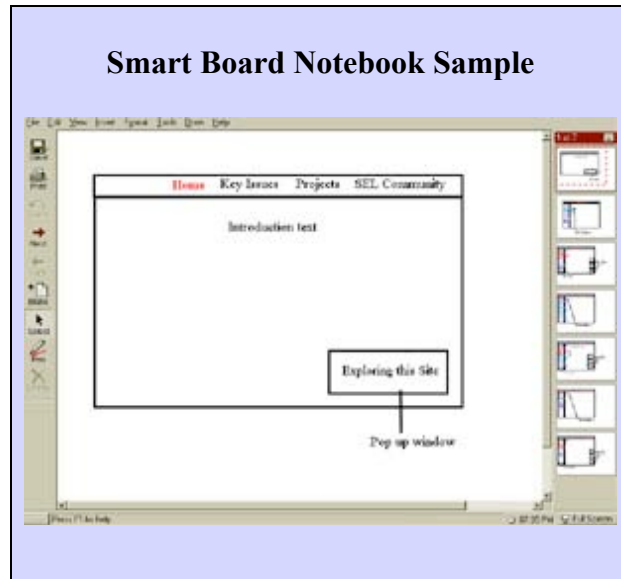
It is important to mention that what instructors and students actually manipulate on the screen is the same desktop interface they have in their personal computers.

When the computer is activated, the Smart Board software automatically allows instructors and students to write, annotate, or highlight the projected image.





These annotations can be saved to the Smart Board Notebook. The annotations can also be saved in HTML format so that they can be easily uploaded to a course website. The Notebook can be retrieved, posted, printed or emailed.



In addition, the Smart Board Notebook software can be installed in faculty and students personal computers, allowing them to either work with annotations made in class, or prepare documents to work in the class using the interactive Smart Board.

The Smart Board Pen Tray also allows instructors and students to switch between projected images (DVD, VCR, computer), by pressing labeled buttons.

□ **Wireless Internet access point, wired Ethernet ports, and Power outlets for laptops**

The classroom is serviced by Columbia University wireless access point, providing networking to any wireless-equipped laptop. In addition, the room has a number of wired Ethernet ports in the front of the room and in three floor boxes installed along the center of the room. The floor boxes also provide electrical outlets.

This networking architecture allows faculty and students to organize and structure the environment according to their needs. They can use individual computers or work collectively with the Smart Board connected to the Internet.

## □ **Environment Design**

New heating and cooling systems, acoustical panels, and new lighting and blackout shades have been included into the classroom to create an appropriate and comfortable environment for faculty and students.

Both the air conditioner and the lighting system work appropriately. The acoustics in the room require additional treatments beyond what has been done.

## □ **Capacity**

The room has capacity for 18 to 24 students.

### *1.2.b- Academic Implementation of the Project:*

The Digital Classroom was inaugurated few weeks after the beginning of the Fall Semester 2001. Nine courses were taught there. Some courses were assigned to the classroom by the Registrar Office. Others courses were selected by the School of General Studies and CCNMTL based on their instructors' projects and experience.

All the instructors were invited to a training session organized by CCNMTL. In that session faculty were able to learn about the overall design of the classroom, and about the Smart Board in particular. All the instructors but one participated in this training session. In addition, electronic tutorials were installed in the Smart Board for faculty to look at.

Each instructor also has an individual folder in the Smart Board Desktop. Faculty can save there all their Smart Notebook documents and other digital materials.

CCNMTL has also created a special web page that addresses the purposes and features of the Digital Classroom Project. This page can be linked from the Center's website.  
<http://www.ccnmtl.columbia.edu/projects/classroom/>

**Fall Semester 2001**  
**Courses being Taught at the Digital Classroom**

- English for International and Public Affairs  
Professor May – Landy  
Course Website: <http://prometheus.intuitivenetworks.com/courses/>
  
- College Composition  
Professor Gill  
Course Website: <http://www.columbia.edu/cu/bulletin/uwb/subj/ENGL/F1102-20013-002/sectionw.html>
  
- Contemporary Civilization  
Professor Gordon  
Course Website: <http://www.college.columbia.edu/core/index.html>
  
- Intermediate French II  
Professor Cornette  
Course Website: <http://www.columbia.edu/itc/french/1202/>
  
- World Literature  
Professor Mackay
  
- Latin-American Culture and Spanish Conversation  
Professor Magadan
  
- Colloquium: Ancient and Classical Traditions  
Professors Meyer and Awn  
Course Website: <http://www.columbia.edu/itc/religion/f2001/index.html>
  
- Intermediate French II  
Professor Aurora  
Course Website: <http://www.columbia.edu/itc/french/1202/>
  
- Topical Seminar: New Media Teaching and Learning  
Professor Moretti  
Course Website: <http://cw.tc.columbia.edu/prometheus>

*1.2.c- Future Developments:*

The Center is already working in the development of some future activities and tools for the Digital Classroom Project.

CCNMTL is planning to incorporate additional resources into the Digital Classroom that will provide faculty and students with new opportunities for interactive experiences in and beyond the classroom: videoconferencing capabilities and digital video and tape

recording. The incorporation of these tools will be accompanied with the training and technical support needed to fully take advantage of these resources

In order to address faculty-training needs, the Center is making the necessary arrangements to have the classroom available during certain time slots so that instructors can go into the environment and experiment with the technology.

In addition, CCNMTL is developing additional tutorials and teaching support information to be included in the Digital Classroom Project web page.

Finally, the Center is currently developing a new strategy to select courses to be taught in the Digital Classroom during the next semester. Since Educational Technologists members of the Center's staff work closely with faculty in the development of projects and experiences with new media, they are in an excellent position to recognize courses that may be better served by the features and purposes of the Digital Classroom environment. They are currently in the process of identifying this courses and consulting faculty about this possibility. This strategy attempts to identify teaching projects and experiences that may promote the development of new explorations around the educational potentials of the environment.

## **Part II: Evaluation Plan**

### II.1- Purposes of the Evaluation

The overall purpose of this evaluation is to understand different teaching and learning experiences that this classroom environment promotes in relation to different uses of technological resources and tools.

This overall purpose relies on two assumptions that also imply two particular objectives to consider.

Firstly, it is our understanding that the integration of technology into teaching practices is an explorative process that takes place in the very use of these resources within an adequate environment. Therefore, this evaluation attempts to capture not only the way in which professors and students currently work within this classroom setting, but also their ideas and perceptions about what they could do while working with the tools and resources available on it in order to enrich their educational experiences. We believe that this will allow us to identify what we call potentially enhanced teaching practices. These are experiences developed within the digital classroom [or practices envisioned by faculty and students] that seem to involve uses of the environment that may enhance or improve the overall teaching and learning experience.

Secondly, we also acknowledge that different kinds of knowledge domains, or topical problems, may require particular ways of addressing the key concepts and notions they involved. In this regard, we are interested in understanding how these different needs in terms of knowledge construction and understanding may be related to different teaching strategies that incorporates and take advantage of the features and tools of this classroom setting.

Finally, this evaluation attempts to provide suggestions and recommendations that may inform CCNMTL its partners in the development of possible strategies for promoting and enhancing teaching and learning experiences within the Digital Classroom.

### II.2. Evaluation Perspective and Methodology

Given the nature and purposes of the Digital Classroom Project a formative evaluation was assumed to be the best approach for this study.

*A “Formative evaluation strengthens or improves the object (program) by examining the delivery of the program or technology, the quality of its implementation and the assessment of the organizational context, personnel procedures and inputs.” (Trochim, 1997)*

From a formative perspective, this evaluation attempts to shed light on the different phenomena and experiences that take place within the Digital Classroom environment and their relation to the purposes of the project. Moreover, since the project is at its early

stages of implementation, this is an appropriate moment to reflect about the practices being developed in the classroom in order to provide information to improve the project and its future development.

From this perspective, this evaluation represents a qualitative study oriented towards the interpretation of singular experiences and their implications for the understanding of the project. In this regard, we believe it is important to reflect on Elliot Eisner's (1998) considerations regarding qualitative inquiry in education as a form of creativity: *"...Qualitative inquiry is not only directed towards those aspects of the world out there, it is also directed to objects and events that we are able to create...Because the selection and organization of qualities demand qualitative judgment, teaching and textbooks, school architecture and classroom layout are all influenced by qualitative considerations. Becoming smart about qualitative matters requires the ability to experience or create qualities worth experiencing. At their best we call such experiences art."* (Eisner, 1998. Pp. 21-22.)

This perspective to conceptualize ways in which to see and perceive educational experiences seems to be particularly relevant for the purposes of this evaluation. We believe that this perspective and its epistemological assumptions can help us in recognizing intersections among education, art, and design as a cross road where new teaching and learning activities take place within the environment we are trying to understand.

In order to address the purposes of this evaluation we have contacted both faculty and students who work in the Digital Classroom and implemented the following evaluation methodology:

- Faculty questionnaires: to address general considerations and impressions of faculty experience in the classroom, particularly the technological resources they use.

Six Faculty members have completed the questionnaire.

- Faculty interviews: to address the description and understanding of faculty experience working in the classroom. It includes the following dimensions:
  - Professors' uses of the classroom environment:
    - Teaching strategies or activities they develop in the Digital Classroom.
  - Changes occasioned in instructors' teaching strategies by the nature and features of the Digital Classroom.
  - Integration of technology into teaching practices promoted by the nature and features of the Digital Classroom.
  - Instructors' opinion and perception of their students' experiences working in this environment.

Eight Faculty members have been interviewed.

- Students Questionnaires: to address general considerations and impressions of students experience in the classroom, especially in relation to their use of the available resources.

Twenty-six students have completed the questionnaires.

- Class observations: to address the understanding of the class configuration [faculty and students activities] in relation to the environment's features and constrains.

Five classes have been observed.

Following is a description of the implementation and development of the evaluation methodology:

- (1) Phase I: Gathering information regarding Digital Classrooms and Developing the Instruments
  - Interviewing CCNMTL's staff responsible for the development of the Digital Classroom Project.
  - Bibliographical review of design guidelines and research on electronic classroom developments. [See Appendix A]
  - Development of evaluation Instruments [See Appendix B]
- (2) Phase II: Interviews and Observation
  - Class Observations
  - Interviews with Faculty
  - Administration of Faculty questionnaire
  - Administration of Student questionnaire
- (3) Phase III: Analysis of the information gathered.
  - Analysis and interpretation of Faculty and students' experiences
  - Identification of "potentially enhanced practice" models.
  - Literature review for identifying particular conceptual notions and dimensions related to the findings of the study.
- (4) Phase IV: Drafting the report and feedback
  - Drafting the report
  - Asking for feedback from faculty and CCNMTL
- (5) Phase V: Writing the final report

### II.3. Scope and Limitations of the Study

Since this study has focused on understanding individual practices and experiences promoted by the Digital Classroom Project, its findings cannot be generalized to other courses. However, they do provide starting points for understanding particular educational experiences related to specific knowledge domains, within the Digital Classroom. In other words, the low generalization power across courses should be considered as a source for further understanding and development of possibilities regarding teaching and learning within this environment and in relation to particular educational purposes.

It is important to mention that one limitation of this evaluation was the impossibility of conducting a comparative study between the projection system and the Digital Classroom Project. Almost all the instructors who worked in the Digital Classroom during the Fall 2001 semester have not had previous experiences teaching in an electronic environment, and an experimental study was not possible to be implemented. Therefore, all the references to comparisons between these two different environments designs should be conceptualized as participants' perceptions and impressions regarding them.

Although all the instructors and students were contacted, not all of them were able to participate in the study. Different reasons have prevented some faculty and students to complete the questionnaires and participate in the interviews. In addition, given the time constrain it was not possible to conduct a longitudinal study over a sustained period of time as to be able to assess and understand the evolving nature of the experimentations that take place in this environment. Although these two limitations do not prevent us in addressing the purposes of this evaluation, we believe that they imply relevant aspects to consider in a second stage of this evaluation process.



## Part III: Review of Literature and Evaluation Criteria

### III.1. Review of Digital Classrooms Research and Projects

We have reviewed other studies conducted in the area of educational experiences within digital classrooms, as well as general literature regarding the design and development of electronic classroom projects. In the following paragraphs we summarize this information.

We were able to identify some studies that assessed educational experiences developed within electronic classrooms. One common feature of these studies is that they are mainly focused on the use of certain technological tools<sup>1</sup> rather than on the overall educational environment.

Mary Ann Bell from Baylor University (1998) assessed teachers' use and perceptions regarding the interactive electronic whiteboard. In her study she found out that interactivity, ability to mark and save notations, size of display of presentations, and ability to manipulate software from the board were the main features of this device praised by teachers. She also pointed out that students were particularly motivated by the use of this electronic board. According to her study, teachers also suggested the need for special training in the use of the board as to be able to better understand its possibilities.

Another study was conducted to evaluate the effects of a SMART Board on concept learning and generation of ideas in a group discussion activity (Howse, Hamilton, & Symons, 2000.) By developing an experimental study, the authors found out that the Smart Board has encouraged a more prolific generation of ideas. However, they were not able to identify higher order thinking processes in the experiences developed with the Smart Board. They attributed these findings to the particularities of the activities that framed the experience (Howse, Hamilton, & Symons, 2000.)

A study conducted by Anna Smith<sup>2</sup> has assessed the ways in which the electronic whiteboard technology was integrated into a numbers of areas in the curriculum. She found out that by using the electronic whiteboard teachers were inspired to integrate more information and communication technology into their lessons, their teaching practices involved more visual strategies, and students were specially motivated by the use of this tool. Finally, given the nature of the technology being assessed teachers mentioned that they had problems moving the board making difficult to develop a more flexible use of the technology.

As mentioned before, these studies focused on assessing the impact of a particular tool, an electronic board, on different teaching and learning experiences. They were not aimed

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<sup>1</sup> A complete list of studies assessing the effects of the Smart Board in different educational experiences can be reached at:

[http://www.smarterkids.org/research/library\\_subject.asp](http://www.smarterkids.org/research/library_subject.asp)

<sup>2</sup> Publication date is not available. The study can be reached at:

<http://www.mirandanet.ac.uk/pubs/smartboard.htm>

to understand the overall educational experiences and purposes that framed these effects, neither did they attempt to understand the explorative experiences of faculty and students working within electronic environments. However, they allow us to identify some general dimensions that seem recurrent among different uses of these tools: they encourage the development of teaching strategies that focus on visual materials, they promote the development of teaching strategies that integrate technology into the educational experience, and they seem to be highly intuitive for faculty to use.

Among the different electronic classroom projects reviewed it was possible to identify certain common guidelines and features. Almost all these projects have followed some design principles that pay special attention to the following areas:

- The technological equipment
- The user interface
- The room layout

It is probably “The Smarter College Classroom Homepage” developed by Dr. Daniel Niemeyer, University of Colorado<sup>3</sup> the one that better summarizes these principles stressing their pedagogical implications.

According to Dr. Niemeyer there are seven main design principles that should be followed while developing an electronic classroom. These are:

- (a) Empower faculty: pedagogy should drive the decisions made for designing the environment, stressing a user friendly approach so that faculty can intuitively develop the necessary skills to manage the environment.
- (b) Emphasize flexibility: the environment should serve multiple users with many different teaching styles. It should also include the possibility for using different projection and writing surfaces simultaneously.
- (c) Encourage interactions: the setting should allow easy access and movements around the room. The lectern for the presentation computer should be small and placed at a corner, so that it wouldn't represent a barrier between presenter and audience.
- (d) Stress simplicity: the technological equipment should allow presenters to be spontaneous and to improvise, as well as the audience to participate in the presentation.
- (e) Expand connectivity: the environment should be provided with a reliable telecommunication infrastructure.
- (f) Contain costs: the overall design must serve the faculty well yet remains affordable.
- (g) Sweat details: it is important to pay special attention to lighting and acoustic systems.

Interestingly, almost all the literature reviewed refers to easy access to technology as an essential feature to facilitate instructors' presentations. This notion of presentation,

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<sup>3</sup> Accessible at <http://classrooms.com/principles.html>

supported by different electronic devices to deliver information and discuss different teaching materials, seems to be conceptualized as a central teaching strategy that those electronic classrooms could enrich and improve.

In addition to the use of multimedia resources to enrich classroom presentations, some projects also refer to the possibility of capturing and retrieving these activities. The E-Class research project<sup>4</sup>, developed by the Future Computer Environments Group at Georgia Institute of Technology, has created a hardware and software architecture for electronic classrooms that mainly explores the uses of electronic interfaces to save and retrieve classroom activities. Faculty is provided with special tools that allow them to capture their annotations, explanations, and discussions during classroom interactions. The activities captured are organized in chronological order and displayed together with other instructors' or students' notes and materials. This project attempts to reduce the need of note taking in classroom encouraging students to concentrate in class presentations, as well as to make classroom experiences accessible for students when they need to review them. Its main focus is the challenge of capturing classroom activities and its implications for enriching educational experiences. In a study conducted to assess this project, researchers at the Georgia Institute of Technology (Abowd; Atkeson; Brotherton; Enqvist; Gulley & LeMon, 1998)<sup>5</sup> have found that *“students have come to depend on captured lecture material and have reduced their in-class note-taking and increased the effort to listen and participate in the classroom experience. With this favorable result, we are encouraged to begin deeper assessment studies of the impact of capture, integration and access on teaching and learning objectives.”* These findings provide interesting starting points for moving forward the understanding of pedagogical experiences that can be developed in this kind of complex technological environments.

All in all, different projects and studies seem to refer to different conceptions and notions of electronic classroom, stressing different dimensions and challenges posed by these settings for teaching and learning experiences. In other words, although with common principles and pedagogical purposes, all the projects and studies reviewed above imply a heterogeneous landscape for defining the very notion of electronic classroom. This heterogeneity is depicted not only through different designs and architectures that support the development of each project, but through the dimensions and aspects stressed in each project in the process of defining what an electronic classroom is.

Looking for definitions we found the following electronic classroom characterizations:

*“A smart classroom is an interactive learning environment where computers and other electronic devices are the primary information delivery systems. Teachers serve as facilitators who personalize and individualize the learning opportunities of students.”* (Blackstock School Smart Classroom Designs<sup>6</sup>)

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<sup>4</sup> Accessible at: <http://www.cc.gatech.edu/fce/eclass/index.html>

<sup>5</sup> Accessible at: <http://www.cc.gatech.edu/fce/eclass/pubs/chi98/full/index.html>

<sup>6</sup> Document accessible at: [http://blackstock.huensd.k12.ca.us/html/rm\\_desi.htm](http://blackstock.huensd.k12.ca.us/html/rm_desi.htm)

*“Electronic classrooms are also called computer classrooms, media equipped classrooms, or media laboratories, and can refer to any number of classroom configurations. Regardless of name or configuration, these are complex environment.”* (Hinchliffe, 1998)

These characterizations seem to stress the *electronic* dimension of these environments. In other words, they seem to define these classrooms by focusing on the technological resources they involve. Note that electronic/digital – smart seem to be interchangeable notions used as synonymous to characterize the environment.

On the other hand, Norman’s definition (1997) attempts to stress the educational processes involved in these environments: *“The narrow view of the electronic classroom is that it is a room with computers and multimedia displays. The broader view is that it is an electronic environment that supports the many processes of classroom education. But to provide such an environment the classroom must have some combination of the following elements: 1. A computer workstation for the instructor; 2. A multimedia system capable of presenting a variety of types of information (e.g., text, graphics, animation, audio, and video); 3. A database of educational materials within the classroom; 4. A computer workstation for each student; 5. A local area network that allows communication among all of the workstations, and the viewing and sharing of screen images; 6. A system that provides storage, sharing, and transfer of documents; and 7. A telecommunications system to link the classroom to external educational resources.”* (Norman, 1997)

Given this landscape of definitions and characterizations, it seems necessary to clarify the meaning of digital classroom and the way in which it is conceptualized and understood within this study. In the following section we will address this definition and its implications for the overall criteria of this evaluation.

### III.2. Evaluation Framework and Criteria

As we mentioned before, the notion of digital classroom envisioned by CCNMTL in the development of this project refers to an understanding of the overall configuration of this space as a place in which different pedagogical activities can be encouraged and supported. In other words, it is the configuration of the classroom as a whole, with all its different resources and features, what seems to place the activity and pedagogical interaction between instructors and students at the center of the project. The concept of *environment*, as it has been defined by R. Pea (1993), may help us understanding this notion of digital classroom.

According to this author, people actions and interactions are not only framed, but also shaped by the very presence of certain environments and activities. In his own words, *“The environments in which humans live are thick with invented artifacts that are in constant use for structuring activity, for saving mental work, or for avoiding error, and they are adapted creatively almost without notice. These ubiquitous mediating structures that both organize and constrain activity include not only designed objects such as tools,*

*control instruments, and symbolic representations like graphs, diagrams, text, plans, and pictures, but people in social relations, as well as features and landmarks in the physical environment.” (Pea, 1993. P.48)*

This notion of environment, as a material and symbolic mediation of people’s activity (Pea, 1993), stresses the central role played by social relationships and tools in understanding knowledge construction and thinking processes. In other words, mediational processes are characterized by Pea as forming part of what he defines as the distributed nature of human intelligence.

As he points out, intelligence is better understood as a distributed phenomenon materialized in human’s actions, rather than a state of being (Pea, 1993). This notion of distributed intelligence is supported by the idea that people act in the world by shaping and re-shaping certain tools, both symbolic and material, *“The social distribution of intelligence comes from its construction in activities such as the guided participation in joint action...The material distribution of intelligence originates in the situated inventions of uses for aspect of the environment or the exploitation of the affordances of designed artifacts, either of which may contribute to supporting the achievement of an activity’s purpose.” (Pea, 1993)*

As Pea (1993) expresses, the notion of activity encapsulates the mediational process of material and symbolic tools that constitute different environments. The notion of activity is one of the central concepts of the cultural-historical psychology framework founded by L. Vygotsky. Activities imply a historical and culturally constructed action that mediates people relationships with their reality through the use and re-creation of tools (Engestrom, Miettinen, & Punamaki, 1999.)

This concept of environment, and the activities it involves, allows us to re-conceptualize the notion of a Digital Classroom. By looking at these classroom settings through the notion of environment introduced above we are able to focus the attention on the complexity of the pedagogical activities that take place within them. By doing that, we attempt to construct a pedagogical notion of environment that may overcome technical-centered definitions of digital classroom. That is to say, the electronic dimension of the classroom is re-conceptualized as tools, which actually are an aspect of the mediational structures that constitute the overall environment. The activities that faculty and students develop in this environment are the main focus of this definition.

From this perspective, we can approach the understanding of teaching and learning experiences as social and collective activities mediated by both material and symbolic tools in a certain environment. Digital Classroom, then, is a concept that attempts to capture a particular kind of environment designed to encourage and promote certain social activities, as well as to allow people to re-shape and re-create these very interactional possibilities.

This conceptualization of Digital Classrooms has important implications for the evaluation criteria of this study. By evaluation criteria we refer to a set of assumptions and parameters that have shaped our way of seeing the phenomenon under consideration.

Following this notion of mediational environments, we have identified four central dimensions for understanding the educational practices developed within the Digital Classroom. We believe that these dimensions depict and materialize the complexity of pedagogical activities that take place within this environment, and the way in which they seem to be mediated and re-shaped by the use of different tools. These dimensions are:

- Educational purposes: goals and objectives defined by instructors for their courses that shape the way in which some tools are being used within the environment.
- Content being addressed: particularities of the knowledge domain addressed in the course that seem to define the nature of the object related to the activities and interactions that take place in the environment.
- Tools: material and symbolic artifacts that mediate instructors and students activities in the process of constructing knowledge.

By looking at these dimensions and their inter-relationships it is possible to identify what we have called potentially enhanced teaching and learning experiences. These experiences seem to encourage the development of certain activities that either enrich the knowledge construction process, or generate innovative ways for addressing it, by constructing new ways of using tools.

Therefore, in conducting this study we have looked at these dimensions and their relationships in order to assess and understand the educational experiences promoted and developed by the Digital Classroom Project.

## Part IV: Summary of Findings

### IV.1- Faculty and Students' activities within the Digital Classroom

#### IV.1.a - *Uses of the environment:*

The following table depicts instructors' uses of the available tools and resources within the Digital Classroom.

Tools		Used by Faculty
A.	Online Resources	7 / 8
B.	Smart Board Writing Capabilities	5 / 8
C.	Smart Board Saving Capabilities	1 / 8
D.	Other Software	5 / 8
E.	Video (VHS/DVD/Internet) - Audio	6 / 8
F.	Whiteboard	8 / 8

A. Online resources: all the instructors but one mentioned having used online resources in their courses. These resources vary from visual material to digital texts, reference sources, the course website, and other web sites. The ways in which these resources are introduced into the class are deeply tied to the purposes and features of each course. These particularities are addressed later on.

B. Smart Board Capabilities: an important number of instructors (5) explained that they have used the writing capabilities of the Smart Board to highlight or annotate texts and images. Just one of them mentioned that students have written in the board using the notebook during class presentations to record class discussions.

C. Smart Board Saving Capabilities: just one instructor has used the saving and retrieval capabilities of the Smart Board. As it is addressed below, instructors seem to need more opportunities to fully understand and practice with this feature in order to envision possible ways of taking advantage of it.

D. Other Software: an important number of instructors (5) explained that they have used various software within their classes. The application most frequently used is Microsoft Word, to read and work with language exercises, and to look at different works done by students. Two instructors have mentioned having used the C.U. Analyzer in their courses.

E. Video / audiovisual material: an important number of instructors (6) explained that they have used video and audio resources in their courses. Most of the audiovisuals used were DVD and VHS, though there are also cases in which instructors used different recording material from the Internet.

F. Whiteboard: all the instructors have used the whiteboards to make annotations during their classes.

Although an important component of the class, digital resources are not the only aspect of this environment. Regarding the overall configuration of the classroom, the flexible design of the space was particularly relevant for courses related to second language (Spanish, English, French). Instructors mentioned that the environment promoted conversation, a relevant purpose of some of these courses. In other cases, the flexible disposition of the environment allowed faculty to create adequate configurations of space for students to work in different tasks simultaneously.

By looking at the particularities and purposes of each course it is possible to identify two different approaches for using the environment and its different resources and features. In other words, we have identified two approaches for developing certain activities within the Digital Classroom.

*Approach A: Courses focused on text analysis*<sup>7</sup>

This approach is related to courses that address the study of different topics through the analysis of texts<sup>8</sup>. As it is depicted in the courses' purposes, reading experiences within these courses assume a singular character in that they allow students and instructors to unfold the meaning of several phenomena by looking at primary and secondary sources:

“The central purpose of *Introduction to contemporary civilization* is to introduce students to a range of issues concerning the kinds of communities—political, social, moral, and religious—that human beings construct for themselves and the values that inform and define such communities; the course is intended to prepare students to become active and informed citizens.... The course asks students to read closely texts in various traditions of argument, with a focus, though not an exclusive one, on European and American traditions developed from biblical and classical sources.” (From Contemporary Civilization Syllabus)

“This course offers a survey of what might be classified as foundational texts of the Western canon. We will examine them within their individual literary and cultural contexts, but we will also consider them as a body of literature that speaks to a series of cultural concerns, among these, the instantiation of morality, the inevitability of injustice, the regulation of familial life. These various considerations will allow us to embark on a practice of literary analysis that employs a number of critical methodologies, and that will in turn inform the process of writing persuasive and artful arguments about the works we study.” (From World Literature Syllabus)

“College Composition II is the second semester of composition required of all General Studies students. The course offers continued instruction in composition through writing about poetry, drama, short fiction, and the essay.” (From College Composition II Syllabus)

Following these purposes, these courses focus the activities developed within the Digital Classroom on two main intentions. The first one is the creation of a contextual frame for addressing the analysis of the texts and topics covered by the courses. It is worth note that almost all these courses have made their reading materials available in a digital format for students over the Internet.

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<sup>7</sup> Among this approach the following courses are included: College Composition, Contemporary Civilization, Ancient and Classical Tradition, World Literature, and New Media Teaching and Learning Seminar.

<sup>8</sup> As it will become clear later on, the notion of text refers to a broad spectrum of discursive material (images, linguistic text, etc.)



“Everything that you are doing in a text class like this is really trying to find a way into the text, so for some people that would be through a statue, for some people that would be an architectural artifact, for some people that would be through politics of the period, and so you have to find as many different ways as you can, and the more support you can find the more interesting is going to be to them.” (Prof. 8)

“This class is about text, you know what we see as a form of media, ...how do you understand something, but the technology allowed us to be a little bit more reflective about that. Because you have all these things available and you can display them rather than bring in 50 books and say “ok, now, listen to this, now listen to this” I mean you can actually outing them up there, and see graphically the differences in these textual renderings.” (Prof. 4)

The second intention is related to the introduction of visual materials that may enhance the understanding of certain topics and phenomena being discussed through the analysis of the texts; or the introduction of visual artifacts that represent central objects in the disciplines or fields under consideration.

“I use the technology mainly to provide supporting materials, usually visual materials to enhance the readings that we are doing. My class is in world literature, which is in fact mainly western literature, we being with the epic of Gilgamesh and working up to Chekhov. So I have done things like I showed them comparative translations, in HTML format, I have used visual imagery representations of Aeneid, Troy, representations of Lot, Sodom and Gomorra. We are discussing canonical literature so I am discussing how this works get disseminated, what is popularly distilled from these works, and then memorialized historically. (Prof. 8)

“I want people to be able to look at artifacts, whether that’s a piece of text...primary documents, I rarely deal with secondary materials, and this kind of technology can help me to have access to primary sources. I mean they are not always the best translations, or the best view of the Acropolis or whatever it is, but you know, you really have in your fingertips an entirely library, and if you know how to search and if you search quickly, it’s there, and you don’t have to say “I’ll bring a picture next time” you can deal with it right there.” (Prof. 4)

Instructors use the available resources in the classroom to present, exemplified, contextualize, discuss, compare, and deconstruct different reading materials.

In addition, they stress the relevance of reference resources to be used on the spot when they are genuinely needed. In this regard, one instructor mentioned:

“Another example, yesterday we were talking about a character in Hamlet named Horatio, and there is a part at the end where we were not really sure what it

means, and someone said well “what the word Horatio means”, we know it is a name, but what is it mean, what is it come from. So you know it is easy, we went to the library web, and right to the Oxford Dictionary, and on the spot look for the etymology.” (Prof. 1)

As it will be analyzed later on in this report, they use the writing capabilities of the Smart Board to manipulate and annotate these resources in the process of discussing and working with them.

“What I do is I pull up an image [she shows an image from a text]...for example one of the images that I use have Lot’s wife staring back, so it’s an image that have a lot of content in there, so what I have them do was trying provide readings of all of these materials, what is central to the image, so in analyzing the image we will come to use the markers and stuff to highlight or isolate what is primary, secondary, tertiary, it was a lot fun actually to being able to manipulate the image, and then we took parts of it and looked at separate expressions.” (Prof. 8)

Within this approach for the use of the environment it was possible to identify what we have called multiliteracy reading experiences as enhanced teaching activities for developing the analytical purposes of these courses.

*Approach B: Courses focused on second language communication skills<sup>9</sup>*

These courses focused on integrating resources that may provide students with genuine opportunities to practice and improve their listening and expressive skills, framed in a genuine communicative experience. The overall disposition of the environment in addition to the use of multimedia tools seem to allow faculty to address this purpose in different ways.

“This course is for developing conversation skills. For that purpose the overall disposition of the classroom, the tables, the smart board, all these resources seem to be flexible enough for us to share them in a more spontaneous way.”(Prof. 3)

Online resources incorporated in these classes are mainly focused on visual images for developing presentations. In this regards, an important purpose of integrating electronic resources in the classroom is to have students using them.

“Well, you know what is interesting when I have student do PowerPoint presentations, since they generally get some other student to help them advance the slides, it has been very much a back to the screen, I think that what the smart board wants to do is to bring the speaker to the screen in a much more immediate way so you don’t have any of that interference of you walk in front of the projector and you block everything is on the screen. But I think that for the future, and once I get my courseware built to the point I want to be I think the next step

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<sup>9</sup> Among this approach the following courses are included: Intermediate French II, English for International and Public Affaires, and Latin-American Culture and Spanish Conversation.

would be put it into the hands of the students, let them have the opportunity to use it themselves, and play with it.” (Prof. 2)

These courses also make especial use of the audiovisual capabilities of the environment in order to work around relevant language learning opportunities.

“ I use DVDs, French movies, and that’s really amazing and students are really excited because typically this really poorly used on a VHS which is of a very mediocre quality, and the sound, even at this point the sound is much better than on a regular VCR, and so it is a good pedagogical tool, you can practice listening and comprehension, and it is also entertaining, and if you select contemporary movies you get them with contemporary cultural issues, so I was used to use movies in the classroom, but with this is even better.” (Prof. 7)

In addition, some instructors have begun to experiment with digitizing recordings of students oral-presentations in order to have them available in the course website for future analysis.

Among these uses of the Digital Classroom for second language courses we have identified what we call flexible language workshop experiences, explained later on in this report.

#### *IV.1.b - Faculty reflections about the experience*

Throughout the interviews instructors manifested an overall satisfaction with the possibility of working within Digital Classroom. They have also mentioned some aspects that appear as particularly challenging for them or that they believe could be improved. In the following paragraphs we introduce these comments and appreciations.

##### *General appreciations regarding the experience of teaching in the Digital Classroom:*

Seven out of eight faculty interviewed expressed a general satisfaction with the experience of teaching within the Digital Classroom. However, it is important to mention that their positive comments vary in terms of the aspects of the experience they have found especially important or relevant for them. We can suggest that these differences in their appreciation of the experience are related to many different variables: their previous experience teaching with technology, their technology literacy skills, and the purposes for the courses they taught within the Digital Classroom.

Some faculty expressed that by working with the resources available in the classroom they were able to organize their lessons in a way that might make better use of their and their students’ time.

“It can just make looking at the different kinds of writing easier because it is all right there. It can actually save the instructor a lot of busy work, photocopying and stuff like that, that’s for sure one thing...There are two uses of this

technology: one is it just makes all what you already do easier, the other one is it gives birth to a new way of teaching. Does it truly do something new, or just makes something handier? For sure in some ways it makes things handier. And I should say that sometimes it could make things so much easier that it is a new form of teaching. That 's possible also.” (Prof. 1)

Other faculty manifested that the environment allowed them to work with certain degree of spontaneity in the use of different resources during their classes, making them more fluid and student centered.

“And I know how to search, so if I need something during class I can go bum, bum, bum, and you know within 4 clicks I am where I want to be, which means that the class is perhaps much more fluid than what it would be normally, in a normal class.... And it is usually generated from a student question or a student response, which means that there is more spontaneity in the classroom, but that doesn't mean that you get off track or anything, it means that you can stay on track relative to students interests and what they feel they need, so this technology in effect makes the classroom more student centered and less instructor directed, I think, it makes this easier.” (Prof. 4)

“...There are so many things out there on the web that are pertinent and useful to what we do. For example, being able to bring up on the spot a dictionary or an encyclopedia, or just to show them, because one part of the course is instruction in research techniques, so much research today is on the web, not all but so much it is, and I can show them examples of how this is done.” (Prof. 1)

When asked about how this “spontaneity” materialized in the classroom, the faculty expressed that the features of the SMART Board allowed them to have a more flexible relationship with electronic resources. In this regard, one instructor mentioned:

“For example, many times while we talk some students want to show something that they found online, or even I want to bring something to the class from the Internet, it could be an audio, or anything else, so we have the keyboard moving around the table all the time. That's a simple example, but still it seems to me important for allowing spontaneity to keep conversations going on.” (Prof. 3)

Faculty also commented that they can perceive an enhancement of the overall teaching and learning experience of their students.

“So no matter what use I am making of, they are learning something new, simply because they work with the technology either in the classroom or over the course website.” [Prof. 1)

“...Comparing our seminar last semester to working in this classroom this semester.... Well it is true that you have a different group, but I have seen better presentation, and ...I think that it is because you can not get away with the Power

Point if you use the Smart Board, you have to be there, you are with the thing whatever it is what you are showing, you are connecting with the objects or the things you are presenting, because you are physically touching them, and I think that philosophically makes some difference, or maybe psychologically, I don't know, but that's make a difference." (Prof. 5)

This notion of "presentation" and its relationship with teaching and learning practices that take place within the Digital Classroom will be addressed later on. For the moment we would like to suggest the hypothesis that the experiences developed within this environment allow us to think about a difference between "presenting", a practice commonly associated with certain uses of technological tools, and "teaching", a practice mainly focused in different aspects of the challenge of explaining and discussing knowledge.

Finally, two other instructors referred to their experiences in the classroom by stressing the purposes they were able to accomplish or envision:

"I've never been able to teach with visual material like this before, and that's one of the reasons that I really like the technology, because I think that it is extremely important to contextualize...I can't give the students historical context on all these materials." (Prof. 8)

"But the bottom line is that in the case of teaching second languages, I do think that used meaningfully, this kind of technology can promote new experiences for students." (Prof. 3)

As these comments suggest faculty were able to identify particular aspects of the environment that seem to encourage new experiences in their teaching practices that might be conducive to enhanced teaching and learning experiences. What seems particularly interesting is the way in which these reflections imply a consideration of educational challenges as a way of experimenting with uses of technology framed in their pedagogical perspective. Next considerations address these issues.

#### *About the experimental use of technology for teaching and learning:*

Faculty came to teach within this environment having different backgrounds regarding the use of technology with educational purposes. For faculty that are recently thinking about the educational use of technology, the course website has played a central role in the way they worked within the Digital Classroom. Given the relevance of this phenomenon we will address it separately later on.

Almost all faculty members, regardless of their technological skills, manifested that the overall environment has made them reflect about technology and education.

“I can’t even compare to before, because it is my reality now. ... So last semester I was teaching with the course page, but without technology in the classroom, that was good, but this is better, now it is all one thing, it is almost like “my class has a desktop”. I go to class and I bring my briefcase, now my briefcase is in the classroom, everyone can look at. I am trying to get a good metaphor, it is not just my toolbox, it is not my toolbox open in the classroom, we share a toolbox. That’s why I said is like a desktop, we all have this tools in front of us.” (Prof. 1)

One instructor has mentioned that the very possibility of working within this environment allowed him to reflect on some aspects of his pedagogical perspective:

“I think that as a teacher I am forced to be more aware of what I am doing, I mean, I always teach intuitively, and I think that when you are using the technology you are more aware of why are you doing something, maybe even how you can present it better, so that imparting knowledge or getting people to think about something creatively becomes more a matter of design rather than anything else, which is a good thing.” (Prof. 4)

From a similar perspective another instructor manifested:

“Well, essentially I am a better teacher so they are learning better because of this. I have more tools that I chose to use and so there are more stuff that I can do, and then I am also giving them this extra education in technology in the classroom, I do more stuff faster and better.” (Prof. 1)

Reflecting about the process of integrating technology into teaching while working within the Digital Classroom, an instructor stated:

“I want to teach in this classroom next semester because a lot of the work I am doing is deeply tied into it. Once you make the investment, having it in mind, then you want to be able to use it.” (Prof. 2)

Finally, while reflecting on the experience of integrating technology into the course one instructor was able to envision future possibilities in order to continue this process:

“I think that if I go on and teach the course again in that classroom, which I hope to do, I think that would be really fine to bring students up and ask them to pick things that they want to add, to create a space in which they put together visual material that is for them the core of the course, and make something of that, which I think is really important...so that’s the possibility for much more interactive work, and even for me I love the fact that I can mark up the image.” (Prof. 8)

All in all, these considerations seem to suggest the idea that the mediation of the environment has encouraged instructors to experiment or envision uses of technology deeply tied in their pedagogical purposes.

### Challenges of training and lesson planning

Among the aspects that faculty member have identified as challenging is the need for developing more confidence in exploring and moving forward the possibilities of the available resources, especially the Smart Board. Although they find it easy and intuitive to use, they also found that they need training to help them develop informed strategies for their lessons.

“I think I am very, very far from all the potential that the smart board has. And part of the problem is that you really need to get used to it, you need to get comfortable, so you need to practice, and since I didn’t have that much extra time to spend doing this... I fell I would have benefited from having more time before the semester started with more advance training, and also having training during the semester as well.” (Prof. 7)

One of the professors mentioned that she doesn’t feel comfortable enough to work with technology in class since she is not a well-versed user of technology. She mentioned that she went to the training session but that wasn’t enough for her to understand the use of the technology (Prof. 6.)

Another instructor mentioned the need for special help in developing some of the ideas this experience allowed to envision:

“Well I found that it needed more planning. I have a lot of ideas about what I could do, but is hard to implement them within the content of the course. I mean I think that it would be intensely useful for graduate students like myself who are about to go out on the market to had the experience of doing this, and I am really looking forward to being able to talk about it, I think that it would be even more useful to required them to take for or five sessions of training on it, just to learn how to do it quickly, and even to learn things like how to put a website together, quite honestly, I should know how to do that, I don’t particularly, I kind of know my way around the computer, but should be able to know how to put a website without tech support, I mean we need tech support, but there are things that we should know how to do. And we also need to learn how to use this technology in the classroom.” (Prof. 8)

In addition to the need for training, faculty also expressed a concern with the time needed for planning their lessons in order to take full advantage of the available resources.

“But I haven’t had enough time to prepare all this, the fact is I am not a tenure track professor here, I teach as much as some tenure professors do and I also have a full time job...so part of this is a matter of time to prepare.” (Prof. 1)

“Saving screens is still very simple as well. I mean, I downloaded the smart software in my laptop and started to play around with it and then I just didn’t have time to do that anymore, I mean, I think that really take advantage of this stuff

you really need a couple of week to become familiar with the technology, and then you can begin to envision a lot of different things you could do with it. The problem is, and I am sure the full time faculty will have this issue as well as I do, I just don't have the time to do that.” (Prof. 4)

All in all, hands-on training, opportunities for practice, and close assistance in implementing ideas and projects seem to be among the challenges faculty identified for moving forward their experiences.

### *Differences perceived between the Digital Classroom and the projection system scheme*

From the eight faculty members interviewed just one had a previous experience working in an electronic classroom. Two other instructors had previous experiences either making presentations or attending classes in electronic classroom based on the projection system scheme. When asked about the differences between these two environments they identified some essential advantages brought about by the Digital Classroom over the projection system scheme.

“I find that there is like a psychological difference, and is that with the projection technology somehow you feel yourself distance from it because it is already a distance mechanism, and never have faith on it. I had one professor that taught a course in a projection classroom and about one out of every two times he simply cannot get to the material he wanted to get to, either one component would be dawn, whereas with the smart board you feel like is all sort of the same thing, and if you can't get the keyboard to work for some reason you can just pull it upon the screen, so you never really stuck. The only way you are stuck is if for some reason there is no online connection. So it feels to me a lot easy to deal with, because it is like dealing with your own home technology, you can pretty much figure out what to do if it is not working immediately.” (Prof. 8)

Interestingly, this professor refers to the very intuitive use of the technology that this environment allows her to develop. From a similar perspective, another instructor stressed the fact that the technological disposition of tools and resources based on the Smart Board implies a more comfortable and easy environment for teaching with technology:

“I prefer the smart board... Using the projector, even though they are more sophisticated than a slide projector or an overhead, using a projector is almost the same, you never know if something is going to come wrong, well this is true for the smart board too, but at least is all one unit, you don't have to plug things in. I mean is a hassle using a projector, I much prefer using the smart board, it brings all these technology together, as opposed to have different pieces of technology that you have to connect up.” (Prof. 4)



Comparing the teaching and learning experiences that could be developed in different electronic classroom environments, the instructor with previous experience teaching in a projection system scheme explained:

“I always hated the big podiums in classrooms that have the computer installed in the podium, because in class you have to stand behind this large unmovable structure and you are not going to be relating to the students as much as you could be. The smart board allows you, this actually what I like about it; my style is to get much closer to the students and to have a more personal interaction, and I think that most of the students in the course did that as well, and there is no way they could have done this if they were behind the podium. You physically can actually get yourself closer to the students and really be right there, and that’s make a difference. I think that may be awkward for some instructors who are used to be behind the table, but to me it is much more...you know, chalkboards...there is something to that, it is not a dumb device, and the smart board is a step in that direction, the smart board is trying to take some of the benefit of this and applying them to the computers capabilities.” (Prof. 5)

Interestingly this comment refers to the flexibility of the environment to develop different teaching styles, which seems more difficult with a projector-based classroom.

#### *Aspects to be improved in the overall architecture of the environment*

Almost all the instructors have identified three main aspects of the overall design of the environment that need to be improved.

- Lighting: according to faculty members it is still difficult to manage lights in the classroom.
- Acoustics: acoustic is still a problem in the environment, according to different instructors.
- Connectivity: faculty member explained the need for help in order to take advantage of this capability.

#### *IV.1.c – The role played by courses’ Web sites in experimenting with technology in the Digital Classroom:*

As mentioned previously, courses’ Web sites played a salient role in promoting the use of the environment as a place in which instructors could experiment with technology, especially for those instructors who had begun to think about technology and teaching.

Faculty found in their course Web site an essential component for planning and organizing their lessons in the digital classroom. The course Web site seems to allow them to envision possible uses of technology in their class, as well as manage the available resources. At the same time, the course Web site itself seems to have a new meaning in the overall teaching experience. In this regard they say:

“...When I walk into the classroom I hit on Netscape explorer and I go to favorites, and under favorites there is a bookmark for my course page, I hit on that, and then I just hit on my syllabus, on my syllabus I have links to the actual texts, so it says “readings for the week of October 25<sup>th</sup>: Walt Whitman ” I just click on that and there are the poems. So it is really handy for me to do that, and I think people to have a course page it is just an extra plus. I could go there without a course page and so stuff too, but I don’t have to search for stuff or anything, it right there, so that is really useful. All the readings are online except Hamlet...” (Prof. 1)

“I don’t have a website for this course, but we have an e-group, a yahoo e-group and what we use the most is the chat feature. We also share files and links...Next semester, I want to have a website for this course. I think I could have there the syllabus and all the readings we do, because I try to find online material from Latin-American writers. I also want to have the website for uploading audio files, we do a lot of things with audio. I also could have all the online references linked from there and use them in the class. And actually that is something that goes beyond the class. I also want the website for them to be able to have online what we did in the class and then came back to it later...” (Prof. 3)

“...If I develop a website in which I save the material we work on for instance, it would had been phenomenally different because of the amount of in-class work you can do on it...” (Prof. 8)

Two professors mentioned that they do not have a Web site for their sections. What they have available is a general website developed by the department in which they teach. Both of them have found difficult to take advantage of the resources available in the classroom. However, when asked to envision possible uses, both referred to the need of having a Web site for their courses (Prof. 7 and Prof. 6.)

One instructor said that one of her goals for the next semester is to be able to construct her own website (Prof. 6.) Since she works with many study guides she said she could have them on her website. She thinks that having this course site will help her to make things faster and easier to her course, and use some additional resources in the classroom. Similarly, another instructor mentioned that:

“...Next semester I want to work on the courseware, I want to construct it properly so starting in September we are on our feet and running, and in that I can think of more ways to integrate the technology.” (Prof. 2)

All in all, these considerations make possible to support the idea that this environment moves forward to a second step the work done by CCNMTL in helping faculty to develop their course websites and special resources for their classes. By providing them with a place in which make use and explore the possibilities of these resources, the environment seems to encourage new ways of looking at the integration of technology into teaching practices.

#### *IV.1.d - Students' reflections about the experience*

Twenty-six students completed the questionnaire. In their responses they have manifested an overall positive appreciation of their experience working within this environment.

Regarding the differences between their experiences studying in the digital classroom and in any regular classroom, students commented that:

- This environment lends itself to more reflection; there is more spontaneous self-evaluation of ideas.
- It is much more enjoyable and complete
- Allows for a more multidimensional experience, especially for language courses.
- Integrated technology into the lesson.
- Helps the class to be more interesting.
- Allows for access to the latest information in real time.
- Allows for the integration of meaningful visual resources that help understanding the content.
- Allows having at hand all the texts and resource of the course.
- Allows accessing the readings materials from the syllabus.

When asked about the enhancement of their learning experience by having worked in this environment, students identified the following aspects as enhancements in their learning experiences:

- A more lively participation in class.
- Possibility to access native speakers' resources.
- Possibility to highlight and annotate online resources
- Possibility to watch high-quality audiovisual material.

All in all, students seem to identify in the mediation of the environment the development of certain activities that enhance their learning experiences. These activities seem to incorporate uses of tools that appear as genuine in terms of the purposes of the courses.

#### IV.2. Potentially enhanced teaching and learning experiences developed and envisioned by faculty

Following the purposes of this evaluation we have identified what we called potentially enhanced teaching and learning experiences among the practices being developed or envisioned by instructors that worked within the Digital Classroom.

In order to identify these experiences we have reflected on the relationship between three dimensions of the activities developed within the environment: educational purposes, particularities of the different knowledge domain being addressed in each course, and tools. Through the observation of classes and conversations with instructors it was possible to recognize some practices that given the configuration of these dimensions

enhance the teaching and learning experience. We believe that these experiences represent interesting pedagogical practices that may require further exploration.

*Multiliteracy experiences: new reading analytical practices*

By multiliteracy experiences we refer to experiences in which the mediation of the environment have allowed faculty and students to engage in certain kinds of close analytical readings in class. As one instructor explained:

“Well, I did with *The Aeneid*, which is a very hard work for them, I started reading the first two lines, which are two very weird lines, and I did a whole lecture on intertextuality with these two lines, so I brought up the first sentence and I related it to a work by Shaw and then I pull up that work, and so forth. If you are doing verse analysis, if you are working on poetry is much better to have the class focusing on it up because you can point them through what they should be looking at. Students don’t know generally how to read poetry very well. The collective activity of reading can help them to develop skills for reading poetry, because they can visualize how I read when I mark through the text whereas if they are looking down to a piece of paper, they are looking at it with the same unfamiliarity that they looked at it last week, but if they watching me mark it, and if they watching me walk through it, and I tend to do punctuation in orange and nouns all in green, or whatever, they get a sense of the practice of reading as is done for someone that is familiar with that, what becomes easier to emulate, otherwise is fairly mystify. How do I make meaning out of a poem? It’s not explained to them, the all they see is the product not the process. Having the work up there makes a huge difference because they can see me in action and they can try it. You can perform the task of annotating images for them, a performance of good readers. It is excellent to be able to perform that for and with them.” (Prof. 8)

This reference to a reading activity in class encapsulates two central ideas. Firstly, the notion of intertextuality as a key point to be addressed while approaching the understanding of textual meaning. Secondly, the idea of expert reading performance, as a way of engaging students in a collective reflection about textual analysis. By performing this analytical activity through the use of certain tools, students and instructor seem to have the opportunity to discuss the particularities of this activity. Interestingly, the environment seem to mediate the reading activity in a way quite innovative regarding the experience of analyzing texts: it makes possible the socialization of certain actions that constitute the expert understanding and performance, while at the same time it allows for certain degree of flexibility as to re-shape this performance according to students level of understanding. As another instructor mentioned:

“...For poetry and analysis of texts, when you are doing a careful, zooming in, and then you blow it up, so everybody can see it, and the immediacy becomes important...” (Prof. 2)

In addition, one student has commented that:

“When we read literature works sometimes we are faced with strange and meaningless words and the electronic sources serve as a clarification of any of them and as a broader understanding of the content”

These close reading analytical experiences seem to be related to a multiliteracy perspective in the sense that they imply various opportunities to reflect about the relationship between different modes of representation. The mediation of certain tools seems to encourage this reflective experience; while at the same time it places the reading activity in a new level of multimodal meaning articulation.

Regarding the notion of multiliteracy Cope and Kalantzis (1999) relate it to *“the increasing multiplicity and integration of significant modes of meaning –making, where the textual is also related to the visual, the audio, the spatial, the behavioral, and so on.”* (P. 5) They go on and relate this notion of multiliteracy to the very presence of new cultural tools: *“This is particularly important in the mass media, multimedia, and in an electronic hypermedia. Meaning is made in ways that are increasingly multimodal – in which written linguistic modes of meaning are part and parcel of visual, audio, and spatial patterns of meaning.”* (P.5) The experiences observed and discussed with faculty seem to be related to this understanding of meaning articulation among different representational modes and its related cultural tools. As one instructor commented:

“...And then if we are doing something around the shield of Achilles in The Iliad, and we could put that representation up there, and the students can actually see what that this shield looks like, and how their understanding of the text is reflective in the image, and then there is a whole cognitive thing that happens there for the students, how did I understand it like this when it is actually like this, or maybe that guy is wrong...I mean it is kind of interesting, so that when you throw a bunch of different media at somebody with something like the shield of Achilles there is that kind of self-reflective process going on about how somebody interpret something.” (Prof. 4)

From this comment it is also possible to recognize the way in which the very notion of text is also reconceptualized. The notion of text seems to refer in this conceptualization to a complex discursive phenomenon that involves more than one linguistic referent (Veron, 1987).

Similarly, referring to the way in which the mediation of certain tools allows for the development of new analytical activities that articulate different modes of representation, another instructor explained:

“Well I could have taken it and say “isolate some expression in the image” and “tell me what its context is”. One of the things I like to do in this class is...you know the criteria for selection of readings for this course is random, of course it has a rationale, but there are a lot of other works that could have been included here, so

there are a lot of ways to organize the materials, so I ask them to think about a course that may add some materials and delete some, or a course that may use the same materials but organized thematically, or according to a different series of axis, and one of the ways to do that would be ask them to create through lines through the visual materials that we have been accumulating. One of the things we found, for instance, is that this notion of purification through fire work through a lot of works that we study, so a student for instance could have notice that and then provide a reading saying this image which is specific to Lot could also be related to that.” (Prof. 8)

As mentioned before, these experiences of moving through different discursive elements in the process of unfolding levels of understanding, is also related to certain uses of tools that appear as new mediations in class activities. We have observed classes in which the interactive smart board was used for highlighting, signaling, and annotating the interpretative process describes above. In this regard one instructor mentioned:

“I write all over the board, and that’s because my own pedagogical method is that students don’t feel that they should be taking notes unless you are writing, so I would never bring something up and leave it there because it’s fine is like you turn on the TV and they become passive recipients, is like the hypnotize by the TV, so I was very clear in saying look I am not bringing up these images because they are pretty images, I am bringing these images because they have some symbolic value, they tell us something about the work. For instance when I have these comparative images from Troy I was making a point and I say look at this image and I mark up the point and that really stayed with my students when it came time for the midterm. So these material does have an effect, I think, and being able to mark it is such a privilege, I mean in art history you don’t get to do that.” (Prof. 8)

This is a very interesting explanation regarding the way in which tools are being conceptualized by faculty while working within this environment. They seem to have allowed them to also envision new activities to be developed in their lessons.

“I can imagine in my course a long talk about how the first page of Hamlet in a very early printed edition is different from the title page of the editions we have now, one says “The tragic history of Hamlet”, and the other says “The tragedy”. I could put this up; we could look at these images closely, compare them, mark them on the screen, make comments, and save these comments for further explorations. It could be very helpful, we could also have short videos of Laurence Olivier, the resources are there, and we could use them in an easier, faster, and more flexible way.” (Prof. 1)

All in all, we believe that these reading activities represent interesting starting points to explore the way in which this environment could promote the development of reflective experiences regarding different modes of representations in knowledge construction processes.

### *Bridges between different communicative experiences*

These are practices that seem to construct bridges between different communicative experiences: communications that take place beyond the classroom setting and activities developed in the classroom. They represent interesting experiences that shed light on new electronic communication tools from a pedagogical perspective.

These experiences are mainly focused on the integration of an asynchronous communication tool, the course Bulletin Board, with different activities developed in class.

Regarding the Bulletin Board, one instructor commented:

“What we’ve done is looking at the Bulletin Board. And what I do is having them post...in general I do, starting around midway in the semester they are doing long papers that require steps of research, an outline, a summary of their sources, and different kinds of stuffs, and they post this in the Bulletin Board, and sometimes I ask them to respond to the Bulletin Board. (Prof. 1)

Other instructors have also mentioned looking at students postings in class, as to be able to integrate different discussions and topics addressed in both spaces (Discussion Board and Class Discussions). By doing this, they say, they are able to construct relationships between different communication experiences that take place in and beyond the classroom. Indeed, this relationships assign new meaning to the very use of electronic tools such as the course website and the Bulletin Board. As one instructor commented:

“And of course I think that the links, and being able to walk them through Prometheus, so that the courseware itself is brought to life, is giving the courseware a presence in the classroom, so that the courseware isn’t some disconnected thing you meet when you go home at night.” (Prof. 2)

We have observed a class in which the instructor has printed students’ posting regarding a particular question and organized them in a way that allows him to bring students comments to the class reflecting on the different levels of analysis involved in their responses. By doing that, students and instructor engaged in a discussion regarding the different understandings and interpretations depicted in the postings. This activity seem to include in the class a new possibility for discussing and reflecting on students’ understanding, as well as to move further their participation in and beyond the class.

A class observed has also involved annotation experiences over students’ posting and on the whiteboard, as to materialize some of the arguments being made in the discussion.

Students have also acknowledged this possibility of re-signifying the use of electronic communicative experiences:

“We have been able to utilize the course bulletin board, which has enabled us to exchange in an orderly fashion in class. Internet access allowed us to look at text together online with great ease.”

“We are able to quickly see and read writings of other students posted on the class bulletin board.”

All in all, these experiences open up the possibility for addressing the complex questions posed by new communication tools from a pedagogical perspective. They seem to imply new ways of relating students’ activities that encourage the development of different process for reflective practices. We believe that these experiences represent important starting points for thinking about the mediation of electronic tools in knowledge construction processes.

#### *Flexible language workshop experiences*

These experiences refer to opportunities to work with genuine communicative experiences, as well as with relevant resources for performing and improving expression skills. They have been envisioned by instructors as activities that may enhance students’ opportunities in second language learning. As one instructor mentioned:

“Well there are many things I can imagine for this course, like using multimedia resources in different ways, but I really think this classroom could be an incredible opportunity for my course next semester. That is a Grammar and Composition course. I can imagine having students working in their own computers in the classroom, each in his/her own level. We could all use a software that I have for collaborative writing, and because they can be connected to the Internet, they could take advantage of the resources I selected for them. Then, they could post their work in the Bulletin Board, and we could review each work together, collectively, on the smart board screen. We could mark them, and save the annotations. That’s one possibility, I am sure I could think of others.”  
(Prof. 3)

It is worth noting that this example focuses on the mediation of certain tools that may allow the instructor to develop activities for addressing both individual students’ needs and collective experiences in a flexible way.

Two instructors (Prof. 2 and Prof. 3) also referred to the use of recording tools in combination with the course website as an opportunity to allow students to reflect on their own performances. They envisioned ways of making students performances available on line through digital recording media as a way of keeping track of their learning processes.

We have also observed a second language class in which students working in small groups used the environment to create presentations, record them, and discuss their performances, using different annotations on the board to keep track of their comments.



These are incipient ideas regarding second language learning that imply the configuration of the environment in new ways as to re-shape its possibilities in the process of creating a rich communicative space.

### *Socialization of Technology Literacy Skills*

These experiences refer to interesting interchanges between students and instructors around technological skills.

Regarding the way in which students relate to the environment, one instructor commented:

“They help me.... many students are much more familiar with some of the different things, like the searching function in the Oxford English Dictionary, I don’t know if you are familiar with it, but if you type the word in there (refers to the upper section of the screen) you are searching in a totally different way than if you type it in there (refers to the lower part of the screen)...And I was doing it wrong and then they were saying “no, no, no, do it over there...” (Prof. 1)

Another instructor (Prof. 2) has also mentioned that teaching in this environment had helped her to introduce some basic and fundamental technological information into her class, such as the features and functions of the course web management system in which she has her course web site and some online research skills, among others.

Similarly, another instructor also referred to the way in which the environment has allowed her to introduce some technological skills to her students:

“I show them how to use the online resources of our library, which they just don’t know how to do in a very profound way. And there are certain databases that I use, certain full text resources like the “American Memory Project”, that are fantastic. These are things that GS students don’t know about, and it was really fun to be able to show that in that classroom. I have students that ask me about word origins, especially when we were looking at ancient texts. And I say, well I could answer this question but why don’t we just go through the process of looking it up. So I would take them through that process and it was quite enlightening, on the spot.” (Prof. 8)

What seems interesting from these considerations is the extent to which some experiences with technology, that are commonly private, such as the tips one uses to get to the information needed, or the strategies one has developed for using different computer applications, begin to be socialized, allowing people to interchange and make use of many new possibilities. We stress the fact that this socialization goes beyond the experience of explaining how to search the Internet, for example. It is more related to a byproduct of the integration of technological resources in an environment in which activities are mainly done collectively. In other words, technology literacy skills seem to

be integrated into genuine opportunities in which they are needed, and developed collectively, allowing for a more flexible interchange between students and instructors. We believe that it is the mediation of the environment what re-shapes the possibility of introducing these opportunities.

Finally, we would like to stress the fact that these opportunities are not only interesting learning experiences for students, but relevant activities for faculty in the process of reflecting on the role played by new cultural tools (such as new electronic communications means) in their professional performances as educators.

## **Part V: Discussion and Suggestions**

### V.1. About teaching and learning in the Digital Classroom

As introduced in the previous section, it seems possible to support the idea that the mediation of this environment allowed instructors to experiment with uses of technology in such a way as to encourage the development of new teaching experiences. In other words, by working within this environment faculty were able to identify what we can call new teaching designs. There are two central notions that may help us in understanding this process: the idea of design and the process of shaping mediational activities.

According to Perkins (1986) design is a process by which certain structure is adapted to a purpose (Perkins, 1986.P.2). Design, then, is a process by which certain understanding and actions are configured in such a way as to make sense out of them according to any particular set of intentions. It can be understood as an epistemological perspective in which knowledge acquire meaning in relation to the purposes and intentions that frame its production and re-production.

From this perspective it is possible to recognize teaching practices that, given the particularities of different knowledge domains, attempt to develop activities in which students are able to understand and recognize how knowledge is constructed and signified in these very domains. Or to say it differently, activities in which students are able to recognize the way in which knowledge is designed in certain disciplines. For example, these are activities in which the introduction of interpretative resources and contextual frames allow students to unfold the meaning of different sources and artifacts in the process of constructing knowledge in the discipline under consideration.

However, this is not the only way in which design is materialized in teaching practices within the Digital Classroom. Indeed, when we think about new teaching designs, we are also thinking about the way in which the mediation of the environment allows faculty to reflect on their own knowledge about teaching. That is to say, by working within the Digital Classroom faculty were able to re-shape this very mediational environment in such a way as to reflect on their own teaching experiences, envisioning new possible activities. This process is related to the way in which tools are conceptualized within this kind of educational settings. Moreover, we would like to suggest that this re-conceptualization of tools is actually encouraged by the very design of this particular environment.

As the comments quoted in the previous section manifest, instructors have found in the environment several opportunities to reflect on the way in which different tools can be used to address the purposes of their courses. The way in which they have shaped these possible uses depict different teaching designs attuned with each course singularity. In this process faculty seem to re-conceptualize the role played by technology in their teaching experiences, and in education in general. This is what can be identified as the process of experimenting with technology; or to say it differently, the process of re-shaping the meaning of tools.

Regarding this process of re-conceptualizing and re-shaping the mediation of tools Pea (1993) explains: *“We exploit intelligence from objects when we use them instrumentally in activities. And we often need to decouple intelligence from such objects to reuse them in novel ways. Once such intelligence is designed into affordance properties of artifacts, it both guides and constrains the likely contributions of that artifact to distributed intelligence in activity.”* (Pea, 1993. P.70.)

Examples of this possible re-configuration of tools in the overall mediation of the environment could be found in the way in which instructors integrated different communication experiences into their classes, or in the way in which they have worked with different digital resources for developing analytical reading experiences. These examples depict the way in which educational purposes and knowledge domain interact with the mediation of the environment, generating new educational experiences.

Indeed, there is an interesting phenomenon that we have observed regarding the conceptualization of tools by instructors within the Digital Classroom. This phenomenon is related to the notion of presentation as an activity commonly associated with electronic classrooms. We would like to suggest the idea that this environment promotes what we can call teaching performances as opposed to presentation experiences, which are mainly related to “projection” systems.

By presentation activities we refer to a particular conceptualization of electronic classroom environments in which tools are understood as means for delivering or organizing information. This notion is usually associated with certain software specially designed for these activities, such as Power Point. Although presentations are, and should be, valuable teaching activities, they do not represent the complexity of experiences involved in teaching practices. Teaching is more than organizing information. As some instructors mentioned, teaching seem to be related to the very possibility of performing certain activities that might create opportunities for reflection and knowledge construction. The organization of information could be part of this performance, but it is not all what teaching is.

In our observations of teaching and learning experiences within the Digital Classroom we have recognized that the overall mediation of the environment seems to promote what we call teaching performances rather than presentation activities. It is as if the overall design of the classroom, and the integration of computer capabilities and chalkboard strategies, encourages the construction of new teaching performances. Instructors seem to focus on developing activities through the mediation of different tools that may encourage students’ participation in analytical or interpretative experiences, rather than on presenting information.

Moreover, we believe that this re-consideration of tools and activities within the Digital Classroom has also an impact on instructors’ and students’ technology literacy skills. We would like to suggest that the experiences observed and envisioned in this study might imply interesting cases of new literacies regarding technology and knowledge, both in the teaching expertise domain, and in the particular disciplines of each course.

All these considerations suggest that this environment could move a step forward some of the projects CCNMTL is developing with its faculty partners. That is to say, the Digital Classroom can serve as a catalyst mediational space for allowing faculty to reflect on the formative use of technology in teaching and learning.

## V.2. Suggestions for future developments of the Digital Classroom Project

Following the findings and discussion explained above, we would like to introduce here some suggestions that might contribute to the development the Digital Classroom project. These suggestions are mainly related to opportunities for instructors' professional training regarding the environment. It is important to mention that the new way in which courses to be taught in the Digital Classroom are being selected for the next semester already implies a difference in many of the experiences that may take place within the environment. In any case, we believe that the following suggestions could imply interesting strategies for faculty and the Center in the advancement of their joint purposes.

### *Partnerships for experimentation*

CCNMTL's philosophy of working in partnership with faculty members in the development of formative educational projects with new media represents a substantive starting point for thinking about training opportunities for instructors. Just as professors work together with educational technologists in the development of their own course websites, this development could represent the beginning of an explorative experience with the tools and resources of the Digital Classroom. In addition, within this partnership it would be possible to carry on an ongoing conversation in which new teaching design could be envisioned and implemented during the academic year. Educational technologists could also suggest additional resources (i.e. C.U. Analyzer<sup>10</sup>) that might represent genuine opportunities given the purposes of each course.

### *Documentation of experiences*

This is actually a second step of the process suggested above. We believe that in the process of working with faculty it could be interesting to document the experiences developed within the Digital Classroom. This documentation may provide a valuable resource for the collective construction of possible activities and experiences within the environment. It is also an opportunity for moving forward the experimental dimension of the environment in the sense that by documenting the experiences it is possible to recognize new aspects and possibilities to be developed and improved.

### *Training sessions and online resources*

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<sup>10</sup> This actually occurred when talking with one of the instructors regarding activities in which she wanted to de-construct images with her students. I explained to her how the C.U. Analyzer could be a valuable tool for her purposes.

As it was mentioned before, faculty manifested the need for hand-on training sessions. It seems necessary to provide instructors with opportunities to experiment with the available tools, as well as to envision possible designs for using them in their courses. It might be interesting to have training sessions organized by knowledge areas according to the courses that will be taught within the environment. It might also be interesting to provide instructors with continuing training sessions over the semester reflecting on the difficulties and challenges they face in their daily work.

One special topic that should be covered in these sessions is the one related to the use of the Smart Notebook. Instructors may need some individual assistance for downloading the software and developing strategies for using it in their classes. It might be also interesting to help students in this process as well.

Finally, online resources can be developed for addressing instructors' training needs. Although the electronic tutorials included in the Smart Board are a starting point in this direction, it may be relevant to develop a more customized tutorial for faculty in which the overall purpose of the Digital Classroom Project is addressed. This tutorial could include documented practices that may help instructors to envision their own teaching designs.

## Conclusions

*“But prosthetic technology is not the point, even if it is crucial to what a culture is about. What is the point is the procedure of inquiry, of mind using, which is central to the maintenance of an interpretative community and a democratic culture.”*  
Jerome Bruner, 1998.

This study has allowed us to recognize the mediational role played by the Digital Classroom Project in promoting transformative teaching experiences with new media.

These experiences depict the intersection of pedagogy and design as a new way of conceptualizing educational environments. This intersection has a twofold meaning. Firstly it refers to an architectural structure that supports certain educational epistemologies for envisioning transformative uses of cultural tools in knowledge construction processes. Secondly it refers to the mediational process in which instructors and students engage in re-interpreting the meaning of tools and resources in their joint activities.

The introduction of multiliteracy learning experiences, the development of new educational communication practices, and the socialization of formative technological skills within this environment are examples of the way in which instructors were able to experiment with uses of technology to accomplish their pedagogical purposes. Through this experimental process students were able to identify an improvement in their learning opportunities.

We believe that the Digital Classroom Project represents the starting point for designing environments that may serve as catalyst for new conversations among educators regarding new media teaching and learning.

## APPENDIX A: BIBLIOGRAPHICAL REFERENCES AND RESOURCES

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### **Electronic Classroom Projects and Resources**

Computer Classroom Design. Workspace Resources

<http://www.workspace-resources.com/work/education/cicdesi1.htm>

E-Class Project, Future Computer Environments Group. Georgia Institute of technology.

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Smart Classroom Resources

<http://www.clarion.edu/admin/computing/classrooms/resources.htm>

The Technology Rich Learning Environment. Building the 21<sup>st</sup> Century School.

[http://archive.ncsa.uiuc.edu/IDT/html/Technology/classroom\\_tech.html](http://archive.ncsa.uiuc.edu/IDT/html/Technology/classroom_tech.html)

## APPENDIX B: EVALUATION INSTRUMENTS

### Smart Classroom Evaluation - Questionnaire for Faculty

1. The following is a list of the tools available in the Smart Classroom. Please, select the ones that you use:

- a. Internet access
- b. Smart Board Capabilities: Writing in Smart Board  
Saving screens in Smart Board Notebook
- c. Other software
- d. Video (VHS/DVD)
- e. Whiteboard.

Others/Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. What kinds of activities do you use them for?

- |  |  |
|--|--|
| A) Presentation of Topics/Lessons                                    | E) Exemplification of Topics/Lessons   |
| B) Searching Information with students in the classroom              | F) Working with the Class Web Site.    |
| C) Working with graphical and visual representations of information. | G) Working with audiovisual materials. |
| D) Working with online resources.                                    |  |

Others: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Do you think that this environment has impacted the way you teach this course?

Very much					Not at all
1	2	3	4	5	

4. Given the features of this classroom, could you think of any topic or lesson plan in your course that would be better addressed teaching in this environment?

5. Do your students use these tools in classroom?

YES

NO



## Smart Classroom Evaluation - Guideline for Interviewing Faculty

### PART I

1. How would you describe this classroom setting and your experience teaching within it?
2. What features of the classroom setting do you use the most? (Technology, disposition of the space, etc.)
3. When do you use the available technology? Why do you don't use it?
4. Have you ever taught in an electronic classroom before?  
If yes, do you find any difference between this classroom and other electronic classrooms you have taught in?

### PART II

5. What are the key concepts you desire to communicate in this course?
6. What methods do you normally use to convey the key concepts?
7. Is there any particular aspect of the teaching experience that seems to be changed because of this environment? Have you introduced new activities in your lessons because of the available tools? Has your presentation of the course been altered because of teaching in this classroom?
8. Do you remember any particular occasion in which teaching in this environment helped you to explain/demonstrate/introduce a lesson or a topic? If not, can you envision such a situation?
9. Is there any purpose of your course that seems to be particularly benefited from this environment? Or is there any particular purpose of your course that might be benefited from this environment?
10. Do you think about the available tools while preparing your lessons?
11. Would you like to continue teaching in this classroom? Why? Do you have any project or idea that you would like to develop teaching in this classroom?
12. Have you found any difficulty teaching in this environment? (Any difficulty particularly related to teaching management)
13. In your opinion, which pedagogical strategies/purposes could be better developed teaching in this environment?

### PART III

14. Did you use to work with technology tools in this course before teaching in this classroom?
15. a- Does the environment help you to integrate technology into your teaching practices? How?  
b- Does the environment help you to think of new tools to use, or new ways to use them?
16. Do you have a web site for this course? What do you use it for?

### PART IV

17. Given the features of this setting, do you notice any change in students' participation or in the class organization?
18. Do you think that this environment could enhance students' learning experiences? If yes, why or in what sense?

**FINAL QUESTION**

Do you have any suggestion for improving this environment or any additional comment?

**Smart Classroom Evaluation - Questionnaire for Students**

**Course:**

**Date:**

**1. How would you explain the differences between studying in this environment and studying in a regular classroom?**

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**2. Have you ever taken a course in an electronic classroom before?**

YES  NO

**If yes, do you find any difference between this classroom and other electronic classrooms you have studied in?**

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**3. The following is a list of the tools available in the Smart Classroom. Please, select the ones that are used in your course:**

- a. Internet access
- b. Smart Board Capabilities: Writing in Smart Board  
Saving screens in Smart Board Notebook
- c. Other software
- d. Video (VHS/DVD)
- e. Whiteboard.

**4. Have you used one of these tools?**

YES

NO

If YES please indicate which ones:

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**5. Do you bring your own computer to the classroom?**

YES

NO

If YES please indicate the purposes of using your computer in this classroom:

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**6. Do you think that this environment has enhanced the learning experience of any particular topic in this course?**

YES  NO

If **YES** please indicate why:

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## **Smart Classroom Evaluation - Guidelines for Classroom Observation**

- Disposition of the classroom (physical arrangement of the environment and the use of it.)
- Which tools are being used?
- Who use them, when and why?
- How these tools are related to one another in the lesson?
- How professors integrate different aspects of the environment: smart board, white board, disposition of the space, etc.?
- Do the tools present any problem during the lesson?