

Teaching and Learning with Technology

Beyond Constructivism

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11 The Virtual Harlem Experiments

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VIRTUAL HARLEM

Virtual Harlem is a virtual reality cityscape of Harlem, New York, in the 1930s. It was designed by Bryan Carter at the University of Missouri to accompany his courses on the literary works produced during the Harlem Renaissance, an important period of African American cultural history.¹ Carter's idea was that students would more fully understand the literature of the Harlem Renaissance if they were able to experience the cultural setting in which its writers lived. In the 1920s and 30s Harlem was a cultural center that attracted musicians, painters, novelists, poets, and intellectuals who constituted the New Negro movement, more familiarly known as the Harlem Renaissance. The New York City neighborhood was bordered on the west by St. Nicholas Avenue and stretched east to the Harlem River. It was bordered on the south by 114th street and stretched north to 156th street. Within these two square miles, numerous cafes, theatres, clubs, bookstores, churches, stores, and bars were located amid residences. Virtual Harlem, on the other hand, has only ten blocks but features the more famous buildings, in many instances sometimes locating them out of their historical places (Figure 11.1).

Bryan Carter described a tour of the cityscape in "Virtual Harlem in the Beginning":²

As the journey begins, a passing trolley car full of people must be avoided, as well as other Model-T's parked in the street. Straight ahead, the Lafayette Theater . . . with an all black cast playing in the version of *Macbeth* produced by Orson Welles. . . . [You] can stop and hear a portion of Macbeth's infamous monologue. . . . [You] pass street vendors selling their wares, and as you approach one, he will start to call out his jingle, "the meat pie man is a mighty fine man." . . . [You] might happen upon two men playing checkers or telling "hoodoo" stories, . . . [What] most people want to experience is the Harlem's famous Cotton Club, where African-Americans are not

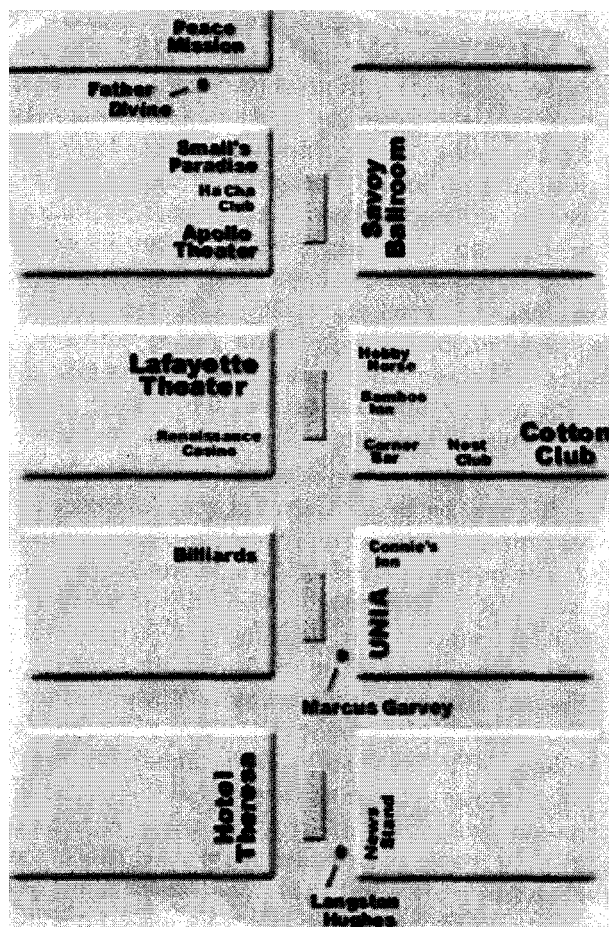


Figure 11.1 The Virtual Harlem Experiments. Created by James J. Sosnoski.

allowed. The gold and wood-crafted doors of this Mafia-controlled club are unmistakable, and as they open, you have a sense of entering a world of wealth, exoticism, sensuality, and illusion. Designed to be reminiscent of old plantation life, the interior strikes you as a combination of the Old South and an exotic island jungle. There are palm trees everywhere, and the room is filled with laughing guests in evening gowns and tuxedos. If you stay long enough, the curtains will part, and actual footage of a filmed performance of the Duke Ellington Band will play on stage as dancers tap in the foreground as an introduction to singer Freddie Washington. (Sosnoski & Carter, 2001, pp. 34-36)

As Virtual Harlem was being constructed at the Advanced Technology Center, Carter's students gathered information, photographs, and recordings from the Harlem Renaissance period that graphic designers and programmers at the Advanced Technology Center built into the virtual reality scenario. For example, the exterior and interior of the Cotton Club were simulated from 30s photographs. Similarly, recordings of Paul Robeson and Duke Ellington were inserted into Virtual Harlem. Using a text about voodoo spells from the period, Carter recorded his students performing a scripted conversation about them. This recording is included in Virtual Harlem as a sound clip which is triggered when visitors approach the two men playing checkers in an alleyway. Carter himself appears as a waiter in the Cotton Club.

Because of the immense amount of code required to produce the virtual reality images, the "persons" in Virtual Harlem are not rendered fully in 3D and appear to be cardboard figures. The shows that appear inside the Cotton Club are films of performances inserted within the frame of a stage. Though most of the photographs and films used to construct Virtual

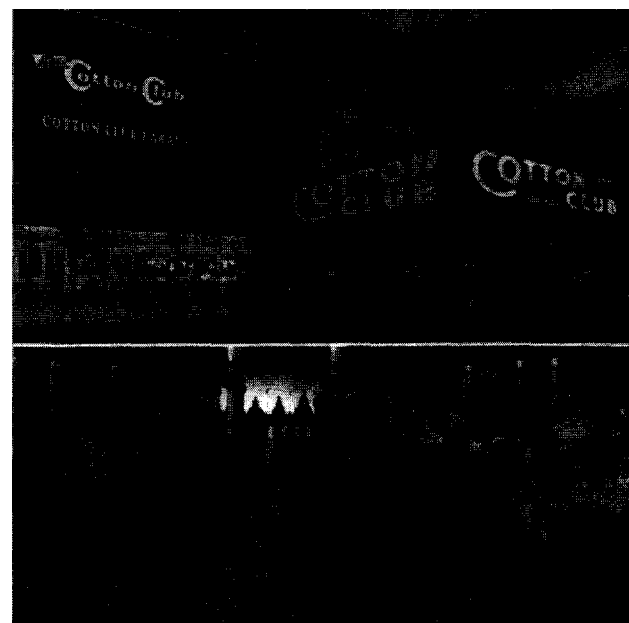


Figure 11.2 Visitors to Virtual Harlem can walk inside the famous Cotton Club.

Figure 11.2 The Virtual Harlem Experiments. Created by James J. Sosnoski.

Harlem are in black and white, the buildings and figures in it are in color, except in the case of the films shown on the Cotton Club stage.

In the summer of 1999, I visited Virtual Harlem at the Advanced Technology Center with three colleagues. That fall, I arranged for Bryan Carter and William Plummer to meet with Andrew Johnson and Jason Leigh from the Electronic Visualization Lab³ at the University of Illinois—Chicago (UIC) directed by Tom DeFanti and Dan Sandin. As a result of this meeting they agreed to collaborate in the construction of Virtual Harlem (Johnson, Leigh, Sosnoski, Carter, & Jones, 2002). This collaboration led to the Virtual Harlem experiments that I coordinated.

THE VIRTUAL HARLEM EXPERIMENTS

During the academic years 2000-2002 the Virtual Harlem project team⁴ experimented with two networked courses in the Harlem Renaissance featuring Virtual Harlem. Using the first course as a trial run, we then did two studies of student reactions during the second. We also showed Virtual Harlem to several high school groups, to the participants in a MOBE (Marketing Opportunities for Black Entrepreneurs) conference, and to visitors to our exhibit at the iGrid 2000 exhibit, INET '2000 held in Yokohama, Japan.⁶ From these groups, we received substantial informal feedback. Finally, we experimented with interactive dramatizations designed for Virtual Harlem.

The Hall/Carter Harlem Renaissance Course

The first experiment was a trial run of a learning network with Virtual Harlem as the centerpiece. James Hall, a professor in the African American studies department at UIC, agreed to teach a course in the Harlem Renaissance in conjunction with Bryan Carter's course at Central Missouri State (CMSU). Carter and Hall planned their courses together so that students could be studying the same texts at the same time.

Early in the semester, when Carter was giving a presentation at the Sorbonne in Paris, students from Chicago and Missouri had "chats" with the students in Paris about the Harlem Renaissance. During the semester, both classes visited Virtual Harlem in the same week. The students in Missouri experienced Virtual Harlem in a theatre-like classroom with a curved screen. Carter, as the instructor, gave the seated students a tour of the cityscape as he "walked" around in it using a joystick to control his movements and their view of the scenarios. The students wore 3D glasses and the effect was much like watching a 3D movie. The students in Chicago visited the Electronic Visualization Lab's CAVE (Computer Assisted Virtual Experience), a 10 x 10 room with screens in front, to the left and right.



Figure 11.3 Students visiting Virtual Harlem in UIC's CAVE wearing 3D glasses. (Note: the buildings seem blurred because they are in 3D.) Created by James J. Sosnoski.

Students were immersed in the scene. Because the CAVE admits only 6 to 8 persons at a time, students had to wait their turn outside. Carter appeared in the CAVE and gave the UIC students a guided tour of Virtual Harlem synchronously with the tour he gave his students in Missouri.

The following week, both groups held a class meeting in video conferencing rooms. Each group could see the other on a large screen and themselves on a second, smaller screen. Voice-activated cameras zoomed in on the person speaking and zoomed out when no one in the room was speaking. The teachers did most of the talking. Most students were hesitant to join in.

Though all the students were invited to contribute to Virtual Harlem, only a few students from UIC did so. Several students from CMSU contributed materials. However, because the only lab constructing the cityscape at this time was UIC's Electronic Visualization Lab, the materials from CMSU were not available to the lead programmer in Chicago, Tim Portlock, and were not included in Virtual Harlem. The project team had not yet developed a system of exchange and the modeling aspect of the project was not realized. (See "Learning by Modeling" in the next section.)

The Brody/Carter Harlem Renaissance Course

A second experiment was conducted at UIC in the fall semester of 2000. We organized the courses on the basis of the trial run the previous

semester. Jennifer Brody from the African American Studies department at UIC agreed to use the same syllabus and follow the same timetable as Carter at CMSU. The classes were scheduled to visit Virtual Harlem in the same week and video conference the following week. To encourage exchanges between the classes, Carter signed up the UIC students to his CourseInfo site. Students were not asked to contribute materials to the model in this course.

Kyoung Park, a PhD candidate in computer science working at the Electronic Visualization Lab under Andrew Johnson's direction, designed a study to examine student reactions to the increasing complexity of the technologies used in the courses associated with Virtual Harlem in Chicago and Missouri. Park also designed a recording software, which she termed "annotations," and programmed it into the model. Using it, students from one class could leave messages for students in the other class. She also designed a tracking software to follow the paths students took as they toured Virtual Harlem. The results of her study were published both in the *Proceedings of the Seventh International Conference on Virtual Systems and Multimedia* and in *Works and Days* (Park, Leigh, & Johnson, 2001b; Park, Leigh, Johnson, Carter, Brody, & Sosnoski, 2001). The conclusion she reached in her study is quoted in "Comments on the Classes" in the next section.

Richard Besel, a graduate student in communication, investigated how student reactions to technology manifest themselves in a learning environment that depends upon technology. He gathered data from the student responses on the CourseInfo site. He then used NUD*IST to analyze their attitudes. The results of his study were also published in *Works and Days* (Besel, 2001). His conclusions are quoted in "Comments on the Classes" in the next section.

Virtual Harlem vs. "The Thing Growing"

We were well aware that Virtual Harlem lacked interactivity. It was basically a tour of Harlem in the 30s. As it happened, at the time of the experiments, Josephine Anstey, a graduate student pursuing an MFA in digital art at the Electronic Visualization Lab, developed a virtual reality short story called "The Thing Growing" in which visitors to the CAVE were required to interact with virtual reality characters in the story.' Her story provided us with a model for introducing interactive dramas into Virtual Harlem.

"The Thing Growing" begins with a stark landscape in which a box is visible. Soon, the audience hears repeated cries of "Let me out!" With instructions from the "voice" to use the remote control in the hands of their "leader," the audience frees her.' She jumps out and exudes joy, praising the audience. After a few moments, villainous figures appear in the landscape and the voice begs the audience to save her. Again, following the voice's instructions, the audience, using their remote device, shoots the villains,

who disappear as they are hit. Again the voice expresses delight, suggesting that she and the audience dance. She gives instructions by waving her arms up and down. If the group leader does not move his remote in the manner she suggested, she complains loudly.' Depending on whether the leader "dances" or not, the voice becomes increasingly domineering and emotionally ruthless. After a time, the audience finds itself desperate to get out of the situation. Finally, again depending on the tactics of the leader, the voice is either killed with the remote control, or after a lengthy period, she dissolves.

On Wednesday, April 26, 2000, I brought my graduate seminar over to the CAVE to see a demo both of Virtual Harlem and of "The Thing Growing." Anstey showed both virtual reality scenarios to groups of four. While one group saw the demo, the other group talked to Anstey about her work. Afterward, I took my class to a nearby computer lab and asked them to respond to their experiences of the two virtual reality scenarios in e-mail messages to me. They unanimously preferred "The Thing Growing" because it was interactive and had a story line. They found Anstey's story engrossing if disturbing and, by comparison, found Virtual Harlem rather placid.

During the winter semester of 2001, Tim Portlock, the lead programmer of Virtual Harlem at UIC, took an independent studies course from me on "narrative." We worked together exploring how an interactive virtual reality scenario dramatizing events of the Harlem Renaissance might be constructed. We studied various computer games to research possible methods. Our study, "A Design for Multiple Interactive Narratives in VIRTUAL REALITY Scenarios," was published in *Work and Days* (Sosnoski & Portlock, 2001). On the basis of this design, two graduate students, who were interested in Virtual Harlem, wrote dramas in an independent studies course I directed in the spring semester of 2001. Their dramas were also published in *Works and Days* (Lively, 2001; Tappan, 2001).

The Virtual Harlem project team wrote a grant proposal to produce these dramas. We had hoped to engage drama students from a nearby art center to act in the plays, film their performances, and transfer the recorded performances to virtual reality scenarios. Unfortunately, the proposal was unsuccessful.

The Virtual Harlem Collaborative Learning Network

On Friday, April 7, 2000, we did a trial run of a hookup between the UIC's two CAVEs and the virtual reality installation at UM. The staff at the Electronic Visualization Lab had considerable experience in designing collaborations between persons in networked CAVEs at great distances from one another." Bryan Carter was in the Advanced Technology Center in Missouri, Jason Leigh was in one of the CAVEs at UIC, and I was in the

other. Suddenly, an avatar popped up in my CAVE and I heard Carter's voice. Seconds later another figure popped up representing Leigh. Carter then invited us to take a tour of Virtual Harlem and proceeded toward the Lafayette Theater. Leigh and I followed him in our separate CAVEs. I experienced following two avatars "walking" down the street in Virtual Harlem. We were able to converse with each other. Though at a distance, Carter's presence was immediate and vibrant.

A more formal experiment in networked CAVEs was conducted on July 19, 2000. A hookup between the CAVE in Chicago and a CAVE at the iGrid 2000 exhibit (INET 2000) held in Yokohama was engineered by the Electronic Visualization Lab's technical staff. When the time for the experiment arrived, high school students who were enrolled in Jim Hall's summer course responded to questions about the Harlem Renaissance and Virtual Harlem asked by visitors to Virtual Harlem in Yokohama. Hall's students offered explanations to Japanese visitors to Virtual Harlem synchronously. This experiment demonstrated to the project team the potential of a collaborative learning network.

During the academic year 2001-2002, I was a fellow at UIC's Great Cities Institute. I received the fellowship to develop a collaborative learning network based on the Virtual Harlem project. Working from the experiences of the networked classes in the Harlem Renaissance, I developed the Arts and Science Collaborative Exchange Network Development (ASCEND). The network linked groups at various universities (UIC, CMSU, U Arizona, Sorbonne, Paris, and Vaxjo, Sweden) to study the Harlem Renaissance by modeling Virtual Harlem. Through this network we conducted a number of experiments using Web cams to video conference with faculty and students at the five sites in the network. Discussions of these experiments are available in *Configuring History*.

"Teaching the Harlem Renaissance through Virtual reality Cityscapes" (Sosnoski, Harkin, & Carter, 2006).

WHAT WE LEARNED ABOUT LEARNING THROUGH VIRTUAL REALITY APPLICATIONS

In my view, the most important lessons we learned from the Virtual Harlem experiments are:

1. Unless Virtual Harlem is a historically accurate representation, it clashes with the materials being studied in courses in the Harlem Renaissance.
2. Figures rather than buildings stir students' interest.
3. Unless students from one site collaborate with students from another site, communicating with students from other universities does not contribute to the learning experience.

4. Unless students are able to interact with the virtual environment, the virtual reality scenario is more a spectacle than a learning environment.

Following are summaries of the main comments of the project team on the Virtual Harlem Experiments.

Comments on the Classes

In her study of the course, Kyoung Park concluded that:

In the post-course survey, students gave positive responses to this exercise. Students said it was a unique opportunity for them to meet classes elsewhere, which extended the traditional classroom boundary. Students said they could share each other's perspectives about some topics they learned in their respective classes. Technology in general helped in bringing the classrooms closer than ever before.

However, students also responded that they wanted more collaboration between two classes. Some UIC students suggested more frequent and casual chats with CMSU students for the future distance-learning classroom. Students suggested that the future distance-learning classroom should have more opportunities to work with remotely located students. It seemed we did not give an attractive reason to draw students naturally into collaboration over technology. Instead, it seemed we just forced them to use technologies; posting messages on the discussion board was just one example of such failures. Thus, it is important to have a believable reason that students between classrooms will benefit from collaborating. (Park et. al., 2001, p. 93)

In his study of the course, Richard Besel concluded thatil

most postings . . . reflected positive value assessments, most students concluded that "technology was very helpful" or that "it was extremely beneficial to communicate." When students went beyond these very vague statements, two general claims surfaced. One the one hand, students appreciated being given the ability to see what it was they were learning about. This visualization does not apply to VIRTUAL REALITY alone either. One student commented, "Through technology we were able to read other student's responses, instead of just hearing them." On the other hand, students also felt that communication with another class in a different state somehow made what they were studying more important and salient. As one student claimed, "It [the communication through technology] made me feel like the subject we were discussing [*sic*] was more important because it was being exmainen [*sic*] by these other people too." The students in these classes felt that technology in general was a good thing and something of value. (Besel, 2001, p. 111)

SUMMARIES OF THE RESPONSES THE VIRTUAL HARLEM PROJECT STAFF OFFERED IN E-MAIL EXCHANGES

The participating members of UIC's African American Studies Department, though appreciative of its aims, were critical of Virtual Harlem on scholarly grounds. They found it frustrating that buildings were not in their historical locations and that the persons in the model could not have been in Harlem at the same time—Paul Robeson's performances of *Macbeth* did not coincide with Ellington's performances at the Cotton Club. One staff member was especially unhappy that so few women were represented in Virtual Harlem. She felt that the Dark Tower, a famous salon hosted by A'Lelia in her Harlem mansion, should have been in the scenario. Though the African American Studies faculty was impressed by the technology in general, they seemed to regard Virtual Harlem as a kind of gimmick that took their students away from what they should be learning. Carter, not surprisingly, felt that Virtual Harlem gave students a virtual experience of history. Hall agreed, pointing out that Virtual Harlem gave students an embodied sense of the Harlem Renaissance. All the teachers agreed that Virtual Harlem needed to include many more figures of the Harlem Renaissance than it does.

The technological staff from UIC's Electronic Visualization Lab thought that the experiment went rather well. They were generally pleased that the technology did not break down during the showings. They did find that the virtual reality application was far too slow in generating images during the tour. They also noticed that the differences in the virtual reality installations at the two universities interfered with Carter's ability to give a tour of Virtual Harlem to UIC students.

They thought that the students in the class seemed interested, although a little shy at first. Leigh noted that:

There were a few "hey! that's Connie's" or "that's the Apollo!" So they were definitely making the connections. On a number of occasions they asked "what street are we on?" We might consider adding the names of streets to the environment (once we place everything in their correct geographical locations) since the street names seemed to serve as mental as well as physical landmarks.

Though the students enjoyed seeing the buildings they had earlier read about, Johnson noted that the figures in the scene motivated more conversation. He also noted that the students in the CAVE in which the teacher of the course was present asked far more questions than the students in the second CAVE.

The technical staff also noticed that a few students experienced eye-strain and some dizziness. In addition, they noted that the students outside the CAVEs had little to do and simply waited in line until the students in the CAVE relinquished their places.

Having done many demos of virtual reality applications over the years, they noted that the planning of the visit needed to be improved. There was considerable confusion among the students about what they were supposed to do and where they were supposed to stand, etc.

Comments on the Chats

As Besel notes, students often experienced technical difficulties in the CourseInfo chat rooms. In addition, not enough chat times were scheduled. The few scheduled exchanges could not develop into relationships; consequently, we suspect that students used the communication technologies only to the extent they were required to do so.

Comments on the Video Conferences

Generally the Virtual Harlem project team agreed that the video conferences with both classes in one room looking at the other class on a large screen did not stimulate dialogue between the two groups of students. Instead, the teachers did most of the talking. As in more conventional lecture settings, the speakers (teachers) asked for questions from the audience. Only a few students volunteered.

We agreed that collaboration among students from different universities needs to be built into the course requirements. We believe that webcam chat sessions might encourage collaboration because they simulate face-to-face exchanges.

Comments on the Contrast Between Virtual Harlem and "The Thing Growing"

One of the most important lessons of the Virtual Harlem experiments was the need for interactivity. Once students had seen Virtual Harlem, they had little desire to return to the virtual reality scenario. The students enjoyed experiencing Virtual Harlem but most felt that one visit was sufficient. The learning environment needs to be more interactive and students need to experience alternative ways of experiencing Virtual Harlem that might motivate return visits.

Observations about the Virtual Harlem Experiments as Experiments in Instructional Technology

As the coordinator of the Virtual Harlem experiments, I have a number of observations to make about their implications for the use of virtual reality scenarios in curricula involving the study of cultural history.

1. Learning Pathways: The impact of UIC's Electronic Visualization Lab on the Virtual Harlem project was considerable. Not only did it give

the project a technological base from which to work, but it also provided an exemplary learning environment. So much did it dominate my perspective on the Virtual Harlem experiments that I was continuously aware of the conventional classroom's limitations.

The Electronic Visualization Lab is a technological laboratory offering advanced degrees in computer science or digital art. Students who experience it as a learning environment roam purposefully around a room full of persons at computer terminals all networked. Usually they work on a project under the direction of a staff member. The pattern of learning is one of exchanging ideas about programming while problem solving. More experienced students are often consulted by less experienced students. In addition to visits to the computer lab, the instructional staff usually meets with the students working on particular projects around a conference table in the main office. Advice is sought from other labs all over the world via videoconferencing. It is a highly energetic and charged atmosphere largely because each student is committed to a project and involved in solving the problems it presents. At the motivational core of the lab is an understanding on the part of the students that their work in it requires a solution to a programming problem no one has yet solved.

The contrast to the conventional literature classroom is sharp. In literature classes, students are not required to do original research at the undergraduate level. Moreover, the subject matter they learn is transferred to them as information. They are accustomed to being relatively passive recipients of accepted "knowledge" in the field. They arrive at a set time in a classroom, sit in audience fashion, and listen to their professors talk, occasionally answering questions directed at them.

In the Virtual Harlem experiments these two learning environments clashed. Whereas the students who were programming were motivated by the idea of designing effects that were not previously programmed, the undergraduate students had no similar personal projects. The papers they wrote did not necessarily have any connection to Virtual Harlem. By contrast, Carter's students at CMSU were placed in a position similar to the students at the Electronic Visualization Lab and asked to undertake personal projects.

New to learning by computer modeling, the teachers from UIC's African American Studies department had no mechanism to judge whether a particular student's project was completed with sufficient historical accuracy to be included in Virtual Harlem. Though a Harlem Renaissance scholar in his own right, like the engineers, Carter was more flexible in his approach because he also was deeply involved in the technical side of the project.

This clash of teaching and learning styles proved to be an obstacle to the project. I believe that if a CLN focused on building a model of Virtual Harlem is to succeed, a lab is a far more suitable educational framework than a classroom. Rather than using the classroom as the model learning environment for such projects, we need to adapt a learning pathways model.

One of the issues Johnson, a computer scientist at EVL, raised during the experiments was: is taking class time to see Virtual Harlem worth it? He understood the need to build a learning environment capable of attracting students to it. Virtual Harlem is not attractive to literature students in this sense for whom it is more of an exhibit than a "workshop."

At the Electronic Visualization Lab, art students work on their digital art projects. Students like Josephine Anstey, a fine arts major at UIC, are not confined to a classroom as the major learning environment. She took classes in the fine arts building and in the engineering building but read fiction on her own and brought all of these learning experiences together in the lab. I think of this pattern as a "learning pathway." "Your project sends you along many paths to acquire what you need for it. In my view, it is difficult to take students for whom the conventional classroom is their major learning environment and "throw" them into a situation that requires project-oriented learning pathways. Such a sink-or-swim approach proved unsuccessful.

2. Collaborative Learning Networks Require Shifting Roles: As we envision it, a collaborative learning network—because of its complex structure—requires persons in the network to be both teachers and learners. The technical staff has to learn about the Harlem Renaissance from the non-technical staff. Similarly, the non-technical staff has to learn about the technologies of networking from the technical staff. Within this framework, everyone in the network is both teacher and learner at some level and with respect to some area of study. The unusual combination of disciplines in our project—African American culture, literary, historical, urban, gender, social, anthropological, artistic, graphic, and dramatic studies, communication, psychology, engineering, computer science, and visualization—mandates that no one person in the network can master all perspectives. At the same time, the diversity of perspectives allows each person in the network to view the subject matter and the technology from a previously unfamiliar point of view. Moreover, since the project is based on virtual reality scenarios at the higher end of the technological spectrum, a certain excitement is continuously generated, especially when persons enter the network and view the work that has been completed.

Again, the "classroom" framework is an obstacle. It does not readily admit such shifting roles and perspectives. This is especially problematic in subjects like literature or history where relationships between teachers and students have the character of masters instructing apprentices.

3. Learning by Modeling: Hypothetically, Virtual Harlem is a "dynamic system of relations." It comprises many elements: buildings, people, cars, events, communications, markets, and other phenomena. These elements can be understood as a "neighborhood," a dynamic system of relations. People live in buildings, pay rent, buy goods, make decisions, respond to injunctions, talk, sing, dance, drive, and involve themselves in multifarious relations with the other elements in the immediate environment. Computer

models allow for a variety of possible systematic relations and provide a way of understanding the historical period.

Another obstacle in developing the Virtual Harlem project as a collaborative learning network was that learning by computer modeling is unfamiliar to humanities scholars. In addition, the concept of a system, as in "system dynamics," is suspect in the humanities as a consequence of the post-structuralist movement in the 60s and 70s.

4. Learning History through Virtual Experiences, a New Form of Historiography: Persons associated with the Virtual Harlem experiments agreed that the virtual reality model of Harlem provided an "experience" of history. Its capacity to put visitors in the past where they could "walk" down a city space, turn around, and look back to where they had been, turn corners into side streets and watch buildings they could not see earlier come into view went beyond what printed textbooks about history could provide. Even so, the experience Virtual Harlem provided was a tour of a historical setting. History, on the other hand, is a story. We were very much aware of the limitations of Virtual Harlem as a mode of history telling.

Virtual Harlem is being redesigned as a dramatic presentation of the history of the Harlem Renaissance. Scripts of everyday life will be built into the presentation to dramatize the historical events. In time, students will interact with figures that "live" in Virtual Harlem whose character and behavior are as historically accurate as we can make them. If the virtual reality scenario is not historically accurate, the virtual experience is not an experience of history but of fiction. The line between these two genres is often blurred and it becomes difficult to know when the narrative is historically accurate and when it isn't." The circumstance that some scenes have been invented will trigger complaints that they are historical fictions. In my view this is an important part of the learning experience. Historians' interpretations are often controversial. Studying history entails sorting out the competing claims of historians. Controversies are regularly included in conventional courses—for example, questions about dating the "beginning" and "ending" of the Harlem Renaissance have been answered differently by historians. If dramatic presentations in Virtual Harlem are challenged, the emerging controversies should enliven learning history.

Virtual reality history telling is a new and unfamiliar mode of historiography. Until this new mode achieves legitimacy, it will generate arguments. But intellectual ferment is needed to interest students in solving historical problems.

IF I WERE TO DO ANOTHER VIRTUAL HARLEM EXPERIMENT

Financial issues: We were fortunate that Tom DeFanti and Dan Sandin were willing to share EVL's resources and staff the Virtual Harlem experiments.

Though all of the Electronic Visualization Lab's projects are funded by grants, Virtual Harlem fit well enough into existing projects in 1999 to be supported. If I were to coordinate a second set of Virtual Harlem experiments, a reconstituted project team would probably have to apply for grant money to develop the Virtual Harlem collaborative learning network. If none was forthcoming, no experiments could be conducted.

Technological issues: In 2002-2003, I conducted some experiments in Chicago based on the Virtual Harlem experiments. We were invited to create a Virtual Bronzeville by a group in that neighborhood who had seen Virtual Harlem. The Electronic Visualization Lab staff was moving away from CAVE technology because it was prohibitively expensive. A one-walled 3D platform (a GeoWall) that cost only a fraction of the immersive CAVE but still provided a virtual reality experience has been developed at the Electronic Visualization Lab.

That same year I was invited by Tom DeFanti to participate in an National Science Foundation grant to fund research on high-speed delivery of images and other types of data. As a result, I decided to experiment with graphical information software (GIS) into which 3D applications could be placed. Kheir Al-Kodmany in the Data Visualization Lab at UIC's College of Urban Planning and Policy had developed a technique he called "smart maps" that allowed for GIS maps to be Web based and include various QT videos of the areas in the map.¹⁴ I wanted to adopt his technique to the design of Virtual Bronzeville. Using a Geowall2 installation," it would be possible to present viewers with a map of Bronzeville and to include 3D graphical representations of specific buildings that could be accessed with a mouse click. An additional advantage is that the GIS database system could provide instant demographic, economic, and cultural information about the sites on the map. Creating Virtual Bronzeville as a smart map also allows access to it from home computers and would make student collaboration much easier.



Figure 11.4 Visitors to the Aurora Small Science Museum GeoWall. Created by James J. Sosnoski.

We ran the Virtual Bronzeville experiment for a year. Chris White was the lead programmer under Andrew Johnson's direction. Two exchange students from Vaxjo University in Sweden worked in the Electronic Visualization Lab under my direction assisting White. We built two Bronzeville sites. However, complex negotiations with the Bronzeville group that had invited us slowed our progress to a standstill by the end of the year. Nonetheless, if another Virtual Harlem experiment were to be conducted, it should include smart map representations mounted on a Geowall2 as well as CAVE applications.

Network Issues

One of the lessons of the Virtual Harlem experiments was that involving students from other universities, and it was a very attractive aspect of the learning environment both to students and to administrators.

During the Virtual Harlem experiments we learned that student collaborations were difficult for students because of the limits of their training. As a result I would include classes from more than one department in the collaborative learning network, e.g., a African American studies class, a virtual reality computer science class, a digital fine arts class, a history class. It would be important to have at least one class in some related technological field.

We also learned that the large video conference rooms are best suited for presentations. Students there listen to researchers from other parts of the world who are developing applications that could apply to the work they are doing or at a minimum acquaint them with cutting-edge research.

Our experiments in the ASCEND network with webcam video conferencing convinced us that student interactions would be best suited to webcam conferences. This would also enable students at one university to partner with students at a distance and would encourage collaboration among the different classes.

Student Issues

I believe it was a mistake to take a regularly scheduled conventional class and bring its members into an educational experiment as complicated as the Virtual Harlem collaborative learning network model. Instead, I would introduce a prerequisite course requirement on communication technologies. Once students completed the prerequisite, they would be eligible to sign up for a course in modeling Virtual Harlem. Groups of students might then form project teams. To participate in the project they would sign up for independent course credit in their degree department. Rather than ask faculty from an African American studies department to link their coursed to a technology lab and courses at other universities, it probably would be more effective to ask them to sponsor independent study students. Of course, the staff of the experiment would need to include a Harlem Renaissance

scholar whom the sponsoring teachers respected. Similar arrangements would pertain for students in computer science, engineering, literature, fine art, history, and so on. Such an arrangement would avoid the "classroom problem" I mentioned earlier and allow the students to take a project orientation. In this context, it would be much easier to require students to collaborate, particularly if the student teams could include students whose expertise was needed for the projects undertaken. If students from departments that relied heavily on technology were on a project team, they could set up the technology for everyone on the team. This would facilitate the use of webcam conferences and computer modeling to encourage student interactivity. It would also allow rather sophisticated collaboration software to be utilized (e.g., Marratech conferencing software which includes white boards and other modes of communication).

Teacher Issues

As I have already mentioned, in future experiments I would not link existing classes. Funding from a grant source is critical in this matter because university administrators do not ordinarily support the kind of team teaching that would be required by a collaborative learning network, nor are they usually willing to give degree credit to students working with teachers from other universities. In addition, the problem of full time equivalent students would likely be a serious obstacle unless the financial aspects of participation in the collaborative learning network were taken care of with grant money. Here's a team-teaching schematic that would suit a collaborative learning network:

Each Virtual Harlem project group A, B, C, D would have a student from one of the four university independent studies courses. (See Figure 11.5. The oval symbolizes a virtual lab featuring four modeling projects; the squares symbolize sites at different locations.)

CONCLUSION

The key element that was missing in the early Virtual Harlem experiments was a "transportive scenario." For a virtual experience to be effective, the scenario through which the experience is expressed must be capable of transporting its audiences into a virtual world much as moviegoers lose consciousness of sitting in a theatre and are transported into the world of the film. Since the learning involved in the Virtual Harlem experiments can be described as counter-stereotyping, it entails changes in people's belief systems. Such transformative learning experiences depend upon correlative motivation; thus the virtual experiences must have a strong emotional impact. Stereotypes are difficult to change but historically "counter-stereotyping" (displacing a stereotype with a more representative figure) has been successful.

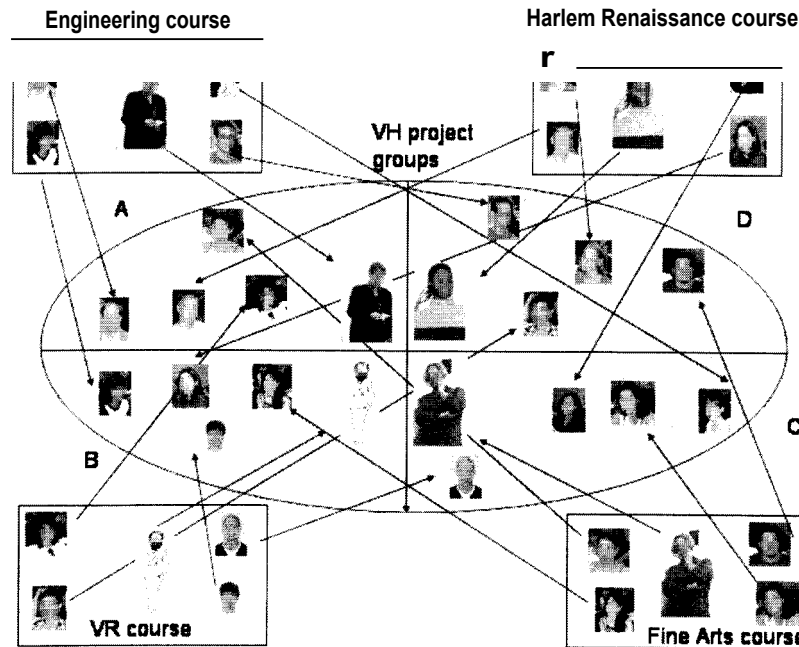


Figure 11.5 Diagram of a Virtual Harlem Collaborative Learning Network Project Group. Created by James J. Sosnoski.

In *Narrative Impact: Social and Cognitive Foundations*, the editors state that the subject of their book is "the impact of narratives in the public sphere" (Green, Strange, & Brock, 2002, p. 7). Several contributors refer to studies that show the widespread social impact of narratives such as the Bible or *Uncle Tom's Cabin*. Their remarks are often based on previous research that demonstrates the role narratives have played in social change." Green and Brock conducted a series of experiments involving "imagery-rich narratives." These experiments demonstrate that imagery-rich narratives that confirm or threaten their audiences' worldviews can change prior beliefs

Studies of the phenomenon of "psychological transportation," which is defined "as a state in which a reader becomes absorbed in the narrative world, leaving the real world, at least momentarily, behind" (Green, & Brock, 2000; Green et al., 2002, p. 317), indicate that readers' propensity to experience transportation is dependent upon mental imagery evoked by the narrative." "A mental image is a representation of a particular stimulus that is formed by activation of a sensory system and, thus, is experienced by the organism as having similar qualities to the actual perception of the stimulus" (Green et al., 2002, p. 321). Such sequences of mental images

contextualized by a narrative provide the sensations that accompany actual experiences. Instead of seeing activity in their physical surroundings, transported readers see the action of the story unfolding before them (Green et al., 2002, p. 317). Such virtual experiences, which are usually "seen in the mind's eye," can be remembered. When recalled, they can be applied to analogous situations in an experience transfer. Virtual reality narratives are likely to have similar outcomes.

Green and Brock's "Transportation-Imagery Model" consists of the following five postulates.

- Postulate I. Narrative persuasion is limited to story texts (scripts) (a) which are in fact narratives, (b) in which images are evoked, and (c) in which readers' (viewers) beliefs are implicated.
- Postulate II. Narrative persuasion (belief change) occurs, other things being equal, to the extent that the evoked images are activated by psychological transportation, defined (following) as a state in which a reader becomes absorbed in the narrative world, leaving the real world, at least momentarily, behind.
- Postulate III. Propensity for transportation by exposure to a given narrative account is affected by attributes of the recipient (for example, imagery skill).
- Postulate IV. Propensity for transportation by exposure to a given narrative account is affected by attributes of the text (script). Among these moderating attributes are the level of artistic craftsmanship and the extent of adherence to narrative format. Another conceivable moderator, whether the text is labeled as fact or fiction (as true or not necessarily true), does not limit transportation.
- Postulate V. Propensity for transportation by exposure to a given narrative account is affected by attributes of the context (medium). Among these moderating attributes may be aspects of the context or medium that limit opportunity for imaginative investment and participatory responses. (Green et al., 2002, pp. 316-317.)

Since persons can learn from virtual experiences how to conduct themselves in situations they have not yet encountered, it can be expected that "null experiences" (impossible actual experiences, e.g., a white person cannot experience what black persons typically do) can also be transferred virtually. Teaching history through virtual experiences of the past allows students to experience history virtually what they cannot experience actually. Null experiences, such as past events, can be transferred into our memories through virtual experiences. The transfer process in witnessing actual and virtual events is quite similar. Persons typically use "scripts" (patterns of routine behavior) garnered from past experience to guide them in specific situations (Harkin, 2006). "Null experience transfers" produce a configuration of past experiences together with an empathetic effect that "bridges"

gaps in experience. In the process of configuring, a "bridge" (trans-script) is constructed through which other persons can be perceived as possessed of an inner life analogous to the interpreter's. However, until dramatic scenarios are built into Virtual Harlem, experience transfers via transportation will not often take place for visitors to it. Yet, when Virtual Harlem is displayed in a CAVE (a four-walled virtual reality setup), visitors are immersed in the setting which surrounds them and feel as if they are walking down the streets of Harlem although they are actually standing still. Because of the "immersive" quality of the Electronic Visualization Lab's CAVE, visitors to Virtual Harlem feel that they have experienced history even though it is not possible to do so. In effect they learn about experiences that they cannot have. This suggests that virtual reality scenarios have the potential for transformative learning and calls for further experimentation involving null experience transfers.

NOTES

1. The Virtual Harlem model was built in UM's Advanced Technology Center (ATC) under the direction of William Plummer between 1996 and 1999. The lead programmer was Thaddeus Parkinson.
2. Carter's essay appears in a special issue of *Works and Days*, "Virtual experiences of the Harlem Renaissance," dedicated to the Virtual Harlem Project (Sosnoski & Carter, 2001). See <http://www.evl.uic.edu/cavern/harlem/> for additional information about the project.
3. For an overview of the projects undertaken at the Electronic Visualization Lab at UIC, see Sosnoski, 2005b and visit their Web site at <http://www.evl.uic.edu>.
4. The Virtual Harlem Project team was composed of Bryan Carter (director, English), James J. Sosnoski (coordinator, English/communication), Andrew Johnson (EVL, computer science), Jason Leigh (EVL, researcher), Kyoung Park (EVL, programmer), Tim Portlock (EVL, fine arts, programmer), James Hall (African American studies, teacher), and Jennifer Brody (African American studies, teacher).
5. See <http://www.evLuic.edu/core.php?mod=4&type=4&indi=49>.
6. See <http://www.startap.nedgrid2000/cultHeritVR00.html>.
7. For a brief description of "The Thing Growing," see <http://www.evl.uic.edu/core.php?mod=4&type=1&indi=28>. A more detailed account is available at <http://www.ccr.buffalo.edu/anstey/VDRAMA/THING/index.html>.
8. The remote control device used to navigate the scene when pointed toward the box on the screen becomes a "key" that unlocks it.
9. The person who has the remote control device is, in effect, the leader of the group. Cameras track the movements of the remote.
10. 07[7] See <http://www.evLuic.edu/core.php?mod=2&type=3&cat=34>.
11. The quoted remarks in Besel's paragraph are from student responses and contain various errors.
12. 08[8] For a more detailed account of learning pathways, see Sosnoski, 2001, pp. 127-129.
13. 09[9] Though such experiences are fictive by definition, the dramatizations are governed by an effort to interpret what it felt like to live in Harlem during the 1930s and to encounter the many great artists who worked there. While

admittedly an unconventional form of history telling, whose historiography has yet to be developed, every effort is being made to give students an experience of the past that matches scholars' interpretation of it. The governing genre in this endeavor is history, not fiction, not even historical fiction. The fictive elements arise from the absence of video or audio documentation. Whereas it is possible to write sentences such as "residents of Harlem could purchase the *Crisis*" at a local newsstand, a dramatization of that event requires a specific figure to approach the newsstand and ask for a copy of the *Crisis* (see Tappan). Since we do not have photographs of that event or recordings of what was said, that figure in Virtual Harlem cannot represent an actual person who lived in Harlem at the time. Yet, to dramatize the historical generalization (residents purchased the *Crisis* at local newsstands) does not entail the genre of fiction. The stories told in Virtual Harlem are governed by historical constraints.

14. See the Pilsen project for an example of a "smart map" (<http://www.uic.edu/cuppa/udv/pilsen.htm>).
15. See <http://www.evLuic.edu/core.php?mod=4&type=1&indi=288> for an explanation of this technology.
16. [16] In the Introduction to the volume, Green, Strange, and Brock note that "the impact of public narratives on beliefs and behavior has received substantial scholarly investigation in disciplines such as sociology, communications, humanities, and political science" (p. 2).
17. In the research on knowledge transfers or sequential extrapolations, the general view is that persons resort to a variety of transfer strategies when encountering a problem-solving situation (Nokes, 2001). My research concerns the choice of an "experience transfer" in interpersonal situations in which the trigger is a narration of an experience that the other person has not yet had or cannot have. The narrative dimension is one of the conditions for the empathetic effect.

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