Bringing the Web to Life:
A Learning Game for Children with Diverse Learning Needs

Janet Mannheimer Zydney
Post-doctoral fellow
University of Kentucky
229 Taylor Education Building
Lexington, KY 40506
jzydney@uky.edu

How does the World Wide Web work? Many children are familiar with many educational and entertainment Web sites, but do they have an understanding of how they work? The question of how things work is becoming more and more important. "As the world becomes increasingly scientific and technological, our future grows more dependent on how wisely humans use science and technology." (Nelson, 1999, p. 14). In order to prepare our students to be technologically literate, it is critical to help them understand how technological systems work, as recognized by both the National Education Science Standards (National Academy of Sciences, 1995) as well as the National Technology Standards (International Society for Technology in Education, 2000-2004).

The Beginnings

The question of how the Web works was the problem that Evelyn *(pseudo name),* a special education teacher in New York City, and her students had just begun pondering when I was introduced to them in May 2000. We met through my work as a technology and media education consultant for Media Workshop, a professional development organization specializing in instructional technology in the New York City public schools. In this role, I worked with teachers and their students to help them integrate media and technology into their curriculum in meaningful ways. Evelyn's students often used the search engine *Ask Jeeves for Kids* to research information for class projects, but it remained a mystery to them how it found the answers to their questions. Evelyn recognized this as an opportunity to engage students in an inquiry question that was of interest to them. They began to do Internet research on this question, but the information they found was complicated and difficult to understand. Evelyn explained to me that her students had difficulty visualizing what they read. She wanted to find a way to help them see and touch what was happening behind their computer screens.

After these initial conversations, along with observing her children in the classroom, I designed an activity in which the students would role-play how the Web works. Some students became classroom computers, some became search engines (i.e. a Web site that searches for Web pages based on key words), and others took on the roles of Web servers (i.e. a computer

that delivers information to the Web). We traced how search engines find information on the Web by playing a matching game with questions and answers. Then, we had the students work on the computers to search for the answers to these same questions on the Web.

Since that time, I have repeated the activity in many K - 3 classrooms around New York and New Jersey. Although this game was originally designed for students with learning disabilities, I have found that it works well in classrooms of diverse learners. Given the increasing number of special education students placed in regular education classrooms (U.S. Department of Education, 2002), it is important to develop activities that assist children with a wide range of learning needs. Most recently, I facilitated the Web game in a kindergarten classroom at Constance P. Nichols School (PS 42) in Jersey City, NJ. The class consisted of 14 children of varying developmental levels, taught by a teacher with the assistance of a teacher's aide.

Game Preparation

The week before we played the game, the teacher, Anita Garodnick, and I met to plan out the activity. Anita and her children were studying animals at the time, so she came up with 10 content review questions whose answer could be found though *Ask Jeeves for Kids* (*http://www.ajkids.com/*). We took 10 pieces of colored construction paper (one color for each question) and folded them in half. On one half, we wrote the question (e.g. Where does milk come from?), and on the other half, we wrote the answer (e.g. Cows). On the back of the answer, we wrote the Web address (*http://www.moomilk.com/*) of the Web site where the answer came from. Then, we cut the paper along the fold to create matching colored questions and answers. This color-coding technique proved to be very helpful for non-readers. Then, we created signs for the children to wear around their necks, indicating what role they would play. One sign was labeled "Student" with a stick figure of a child, another sign was labeled "Classroom Computer" with a picture of a laptop, and the rest of the signs were labeled "Web Server" with a picture of a big computer. We also scavenged around her classroom and found a

ball of yarn and a funny hat, which looked like the kind that Jeeves wears when you scroll over his head on the home page of the site. All the materials were put aside in a box for the big day.

Playing the Game

When I arrived on the day of the game, the children were dancing and singing songs with their music teacher. They looked up excitedly to see the visitor who would be teaching them about how the World Wide Web works. To begin the game, we gave the students signs to wear indicating their roles in the game. All the students who played the role of Servers made a big circle. The teacher began to connect all the Servers together with yarn (See Figure 1). Note: It is important to connect the children on opposite ends of the circle together in order to make the yarn look like a web.

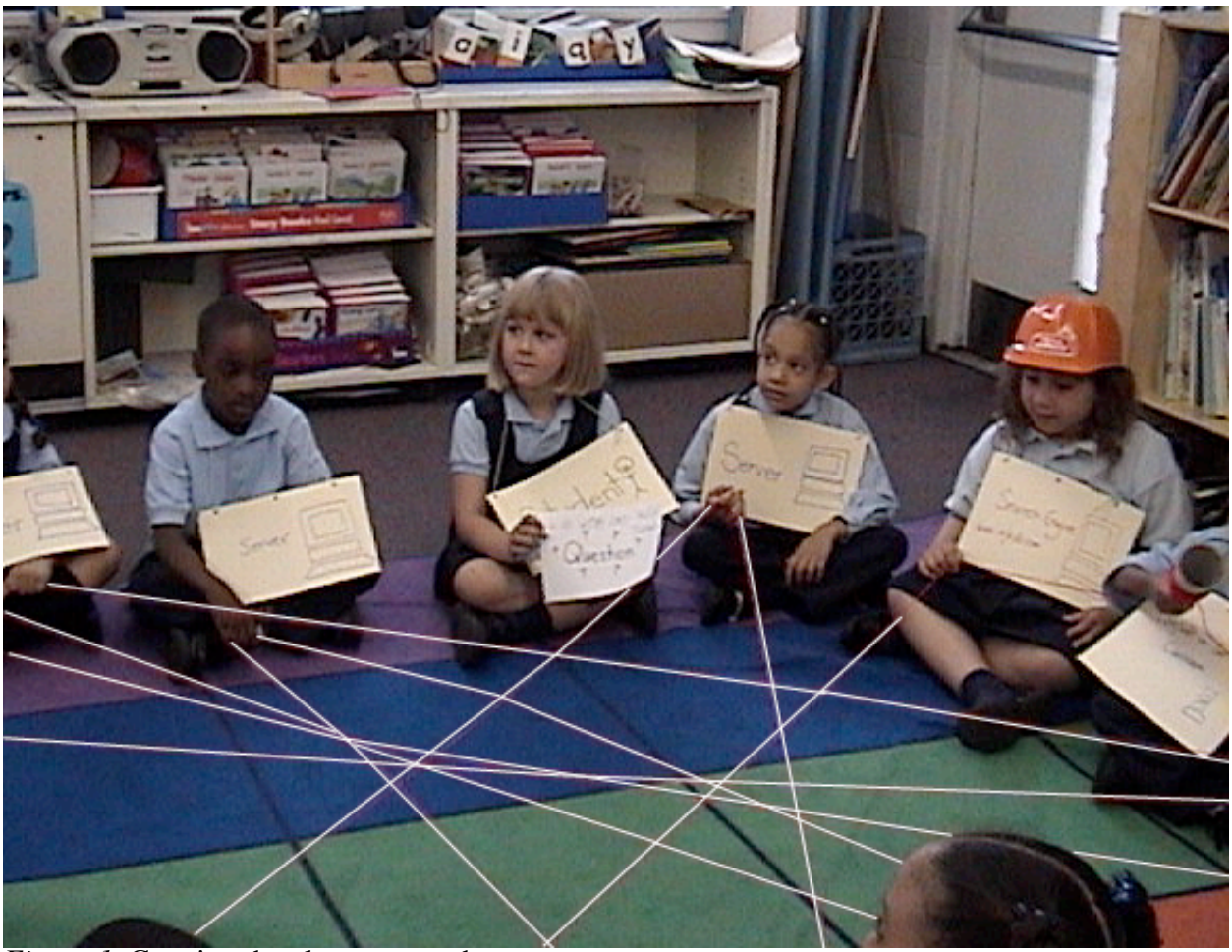

Figure 1. Creating the classroom web

After the game was set up, I asked the students what the yarn looked like. Some children said a star, but many thought it looked like a spider web. After discussing how many points a star had, we all agreed that ours had more points than a star and looked more like a spider web. Then, I asked them to look at their signs and tell me what the picture on it was. Hands shot up in the air. I called on a little boy across from me, who answered, "It looks like a computer." Then, pointing to a map in the room, I responded:

> Great! Now, let's pretend that we are computers all over the world. One computer is in Europe, another could be in Australia and Africa, and, of course, others are here in the United States as well. Let's also pretend that the yarn (which looks like a spider web) is really wires or cables that connect these computer all over the world. Can anyone guess what this represents?

In kindergarten, you may not get a response right away, but in older grades, the children generally will make the connection that the class has recreated the World Wide Web. Then, I asked the students if they have ever used the World Wide Web and what Web sites they have used before. After sharing many of their favorite sites, we discussed that each of these sites has a Web address that begins with www (which stands for World Wide Web). We discussed the concept of an address. Many of the students knew their own address and that it is how the postal carrier delivers mail to them. I explained that this is similar to the Web and that all computers connected to the Web have an address, so that we can find information on them. After this discussion, we explained to the children that we were going to give each a Web address, and then we handed out the answer cards to each of the Servers with the Web addresses facing out. I explained that the name of the Web address relates to the content of the Web site. Then we went around the room and read all the Web addresses and discussed what type of information might be stored there.

After discussing the Web addresses, I gave them more details about the signs that they were wearing:

> One student is wearing a picture of a student, but everyone else has pictures of computers on their signs. However, these computers are not all the same. There are different types of computers which do different things. We have regular computers that we use in the classroom and at home. The fancy name for these computers are clients. The clients are connected by a phone line or cable to another type of computer called servers, and these computers can deliver information into the Web. In our pretend Web, this information is

on the colored cards we gave out. I am going to ask you to hide these cards behind your backs, so that we can't see them anymore. There is also a special program which runs on a server and can search for information on the Web, and this is called a search engine. You may have used search engines before, like *Yahooligans* or *Google*. Today, we are going to use a search engine called *Ask Jeeves for Kids*. Jeeves wears this funny hat. We are going to select one child to be Jeeves. We will pick someone who is behaving extremely well and who can show us that he or she can take on this important role.

Figure 2. Child playing the role of Jeeves

The children got very quiet, waiting to be picked. After selecting Jeeves (see Figure 2), we asked the Classroom Computer and Student to stand near the Search Engine. Then, I explained the rules of the game. We gave the first question card to the Student, who read the question aloud. Then, the Student passed the question to the Classroom Computer, who passed the question to the Search Engine. The Search Engine then guessed which Server contained the answer to the question. Once the Search Engine found the correct Server (i.e. the child who was holding the answer card with the same color), the Server passed the answer card to the Search Engine, who passed it to the Classroom Computer, and then back to the Student. The Student then read the answer aloud to the class.

The game continued until all the questions had been answered. To give more children the chance to play the Search Engine and the Student (the two most desirable roles), we had the children take turns.

Making Connections

After completing the role-playing activity, the students then had the opportunity to see how the activity translates to the computer (See Figure 3). We gave the students the same list of questions and had them find the answers using the *Ask Jeeves for Kids* Web site. At this point, we walked around the room to see if the students were making the connections to the game we had just played. In response to the computer taking a while to find the answer, one girl asked, "Is that because the search engine is looking for the answer in another country?" Although probably not the only cause of the problem, you can tell that she had applied what she had learned to what she was currently experiencing. In addition to learning about how a technological system works, the students also reviewed the science content that they were studying in their curriculum. Moreover, they had the opportunity to practice their reading skills.

Figure 3. Searching the World Wide Web

This activity has worked well in both special education as well as heterogeneous classes with children of diverse learning abilities. The game enabled students to touch and see a complex concept that would otherwise be inaccessible to them. Role-playing how the Web works turned out to be an engaging activity that not only reinforced the academic skills and content from their curriculum, but also enabled the children to discover how the Web works -- a technological wonder that baffles most adults.

References

International Society for Technology in Education (2000-2004). *Curriculum and content area standards: NETS for students*. Retrieved August 30, 2004, from http://cnets.iste.org/currstands/cstands-netss.html.

National Academy of Sciences (1995). *National education science standards: Chapter 6 science content standards: K-4*. Retrieved August 30, 2004, from http://books.nap.edu/html/nses/6c.html#csek4.

Nelson, G. (1999). Science literacy for all in the 21st Century. *Educational Leadership*. 57*(2)*, 14-17.

U.S. Department of Education (2002). *Twenty-fourth annual report to Congress on the implementation of the Individuals with Disabilities Education Act*. Washington, DC: Author.