HyperMedia pROJECTS

By Beth Scholten and Jordy Whitmer

It is obvious to anyone who has observed students designing and creating hypermedia projects that they are deeply engrossed. Many observers question whether the students are engaged more by the technology itself or by the topics of their projects, and whether the use of hypermedia improves overall student learning. Our initial research findings suggest that, when empowered by the chance to design and create projects using hypermedia technology, students can be engaged in learning about their topics as well as the technology they are using.

A second, more intriguing, observation was that students were more interested in their classmates' work when all of the finished reports were combined into a final hypermedia presentation on a single broad subject. Collaborating with classmates, sharing throughout the authoring process, and designing metastacks made the students more knowledgeable about their own topics and those of their classmates.

Metastacks Increase Content Focus

When students create complex hypermedia or multimedia reports, how do you make sure they are learning as much about their topics as they are about the technology? The key is to encourage students to work together and share their projects with classmates through peer conferences, whole-class discussions, and group collaboration.

The Michigan Theme

We work at Elliott Elementary School, a Professional Development School (PDS). In the PDS environment, teachers and students work collaboratively with Michigan State University faculty and graduate students. During the last three years, we have been involved in a study group called the Computer Technology Project (CTP), which focuses on integrating technology into the curriculum and evaluating its effect on student learning. As a subproject of the CTP, we designed and implemented a hypermedia curriculum for fourth- and fifth-grade students. The idea of creating a Virtual Michigan Museum (see Figure 1) evolved out of this hypermedia curriculum.

Similar to the fourth-grade curriculum in many school districts, our social studies content focuses on our state—its history, characteristics, geography, and cultures. The Michigan theme serves as the focal point integrating social studies, literacy (language arts), and science curricula. For example, when our students learn about Michigan's Native American cultures (our first project area), they read and write legends and historical fiction during their literacy studies. Such opportunities help students develop connected understandings about our state and increase their learning in a variety of academic subjects (see Figure 2.)

Hypermedia projects are an integral part of the curriculum. Within the classroom and lab, students work individually and collaboratively to design stacks about a wide variety of topics related to our state. For example, in one of our recent projects, each student researched and de-

signed at least five hypermedia projects during the school year. At the start of each project we provided a major theme (e.g., Famous Michigan Residents) and allowed students to choose their own report topics within the theme. After the students shared their final projects, the class designed a metastack. Metastacks are single-card stacks that graphically depict the conceptual relationships among the students' topics and serve as a type of home card that connects to each students' stack. The project themes and their related stacks (more than 100 stacks) were connected over the duration of the school year into a master metastack that we called the Virtual Michigan Museum. The introductory card from the museum stack is shown in Figure 1.

Collaboration

The learning environment in both the classroom and the computer lab was similar to that of a writing workshop. Students researched topics, created rough drafts and storyboards, held conferences with peers, and presented their work periodically during whole-class sessions we called Author's Chairs. We sought to help our students view one another as sources of information and advice. We made a rule that students should ask two peers for help before consulting one of the adults in the classroom. We wanted them to appreciate the community of learners around them and share their understandings with one another.

In such an environment, opportunities for collaboration abounded. For example, when students help each other, they begin to view one another as resources, which ensures that collaboration will be built into the environment. Another formal structure, peer conferencing, was required twice during each project. At the start of projects, students critiqued and edited each other's plans. Likewise, they peer-conferenced after drafting their stacks on the computer, commenting on their classmate's choice of content, structure, and mechanics. We provided guidelines and criteria to help students formulate good questions. During peer conferences, peer editors considered such questions as:

- What were the most important things you learned about the topic?
- What parts of the project were confusing?
- Is the stack's organiation easy to follow?
- Do the graphics and sound help you learn?

In addition to the formal collaboration, more informal opportunities often occurred. For example, students shared resources from home, informed each other of information related to one another's topics, taught one another new hypermedia skills, interlinked stacks, and assisted each other in creating sounds, graphics, and animation.

Sharing

Sharing also occurred informally and formally throughout the various hypermedia projects. Within the classroom and lab, students were accustomed to sharing their thinking with one another. They were encouraged to seek and value input and comments from their peers.

After students finished their stacks, they added their name to the Author's Chair list at the chalkboard. During the Author's Chair sessions, students shared their work with the group, displaying their stacks on a large TV monitor. The audience was encouraged to ask questions and offer comments about the content as well as the author's use of the technology. Students usually were very excited to share their work during this time, and they enjoyed being the experts about their areas of study.

Likewise, students viewed the Author's Chair sessions as occasions to learn from one another. Each time a student presented his or her stack, audience members were asked to think of two other stacks related to it. This information was listed on the board, allowing students to see connections between the topics and information shared. Students learned about the content areas their peers had studied and the technology they choose

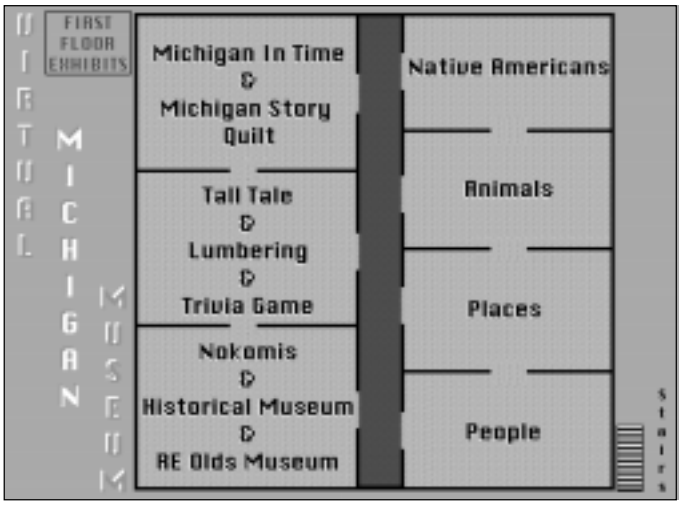

Figure 1. A year-long series of hypermedia projects were organized into a final presentation entitled the Virtual Michigan Museum.

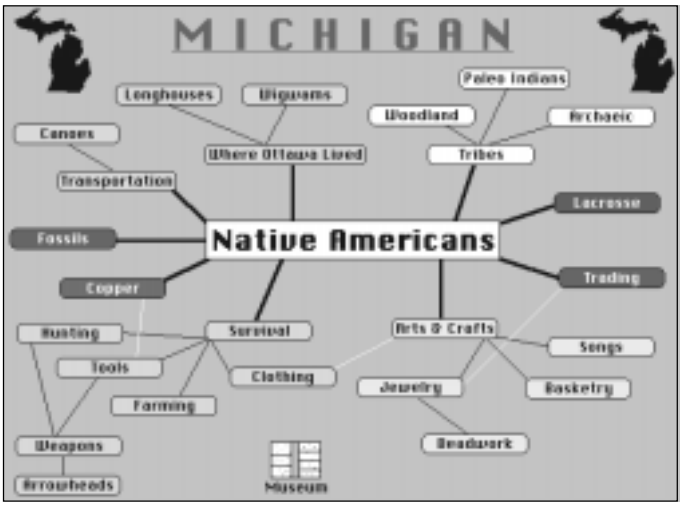

Figure 2. Multiple topics were studied for the Michigan Native Americans metastack.

for their presentations. Similarly, students shared hypermedia projects with their parents at our conferences throughout the year. Some students also videotaped their projects periodically in order to keep a copy for themselves and share their presentations with friends and relatives outside of school. We noticed that while discussing their work with one another, students began considering their audience more often. Comments such as "Why don't you make the text bigger so that others can read it?" "How would someone know that they should click here?" and "Do you think younger readers will know what that word means?" became more frequent. Such a focus was also noticeable during the Author's Chair sessions.

Metastacks

After each student had presented his or her work to one another, we asked the students to think about how all of the topics related to one another as a single work. Because the students were familiar with concept maps (webs that graphically show the relationships among topics) from other classroom learning activities, we decided to build on this idea. Students worked in groups of four to create concept maps that connected their topics. As soon as they had finished, they worked as a class to adapt the ideas from the groups into a metastack that would connect all of the stacks. (Figure 2 shows a card from the Michigan Native American metastack.) Creating the metastack, with its visual representation of relationships among topics, contributed to the students' overall understanding of the project theme. Linking their work pushed the students to view their learning as a cohesive whole, and enabled them to feel ownership and gain understanding of their own and others' learning.

Michigan Native Animals Project

After completing their first project, the students presented their second project, Michigan Animal Stacks, to one another and again discussed the connections among the projects. In thinking about how to organize these stacks into a metastack, we began to consider the scientific classification of animals as a an organizational scheme. Although this seemed to be the most obvious way to link the students' work, we wondered if it would be too confusing and sophisticated for fourth graders. Because of this, we scaffolded the work by providing the beginnings of the concept map and definitions. Students were then asked to raise their hands if they felt the description we provided fit the animal they had researched. We were amazed that the students were able to classify their animal after hearing the scientific characteristics of animals within that order. Students also kept track of the animals their classmates had chosen for their individual projects, and helped each other identify the category in which an animal might belong.

When classifying their animals, the students found that one animal, the vole, seemed to fit characteristics of two orders, rodentia and insectivora. Several students volunteered to do additional research on the issue at home that evening. The next day, students unanimously concluded that the vole belonged to the rodentia order. We were thrilled to see the students solving problems as a group.

After this project was completed, we again created the metastack based on the scientific classification of animals and combined all of the students' stacks into one hypermedia presentation (see Figure 3). Some students suggested adding sound to define the scientific terms included in the metastack and volunteered to carry out this task themselves. We then added the Michigan Animals metastack to the growing Michigan Virtual Museum files.

Other Michigan Projects

During the third project, which focused on Places in Michigan, we noticed that students began thinking about how the metastack would be structured before they had presented their individual projects. This time, the students asked if they could

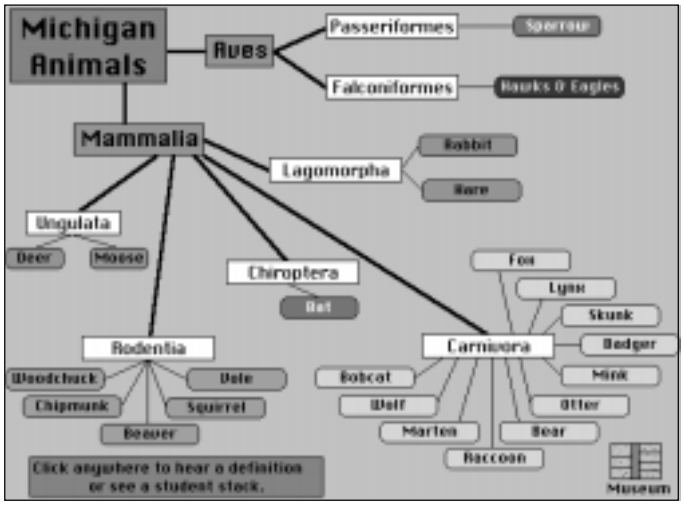

Figure 3. The students based the metastack for the Michigan Animals project on standard scientific classifications: class, order, and species.

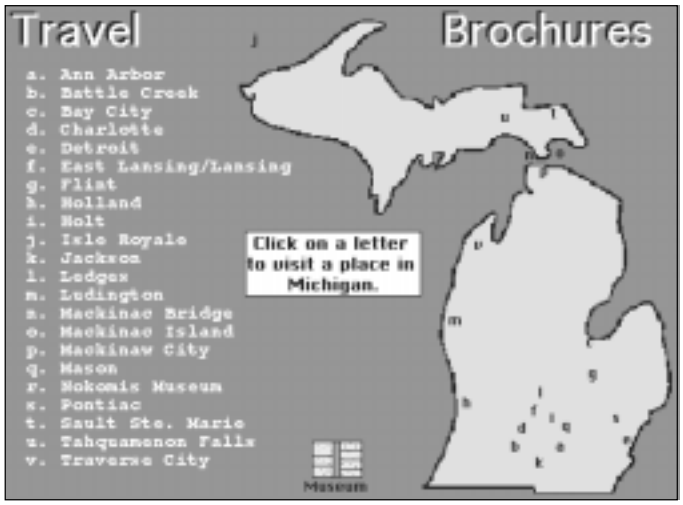

Figure 4. The metastack for the Places in Michigan project contained an alphabetical list of locations as well as an interactive map.

group the stacks into a metastack that was a map of Michigan (see Figure 4). They stuck Post-It notes labeled with their places of study onto a blank map of Michigan, and we used this to organize the metastack. Visitors to the Michigan Virtual Museum could navigate on the metastack either by clicking on a place's name in an alphabetical list or on its location on the map.

During the discussion about how best to organize one of the final projects for the year, Michigan Biographies, the students suggested two distinct representations. One group of students thought that the people should be organized by occupation (see in Figure 5). Others felt that a chronology chart, such as the one shown in Figure 6, might be better. In the end, the students decided that both representations could be created and that the users of the Michigan Virtual Museum could decide which they preferred.

Conclusion

The notion of the connected metastacks combined with the frequent peer collaboration and sharing opportunities enabled students to feel ownership over the entire Michigan Virtual Museum project. Instead of emphasizing the technology or the individual subjects the students were studying, we kept students engaged by stressing how each individual stack fit into the larger project, giving new importance to their work and allowing them to gain knowledge on a wider variety of subjects. ■

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Figure 5. Michigan's Famous People stacks were arranged in one metastack by occupation.

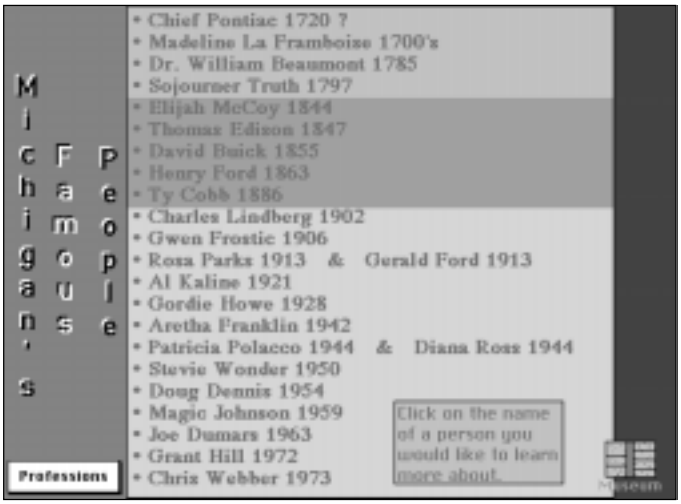

Figure 6. The second Famous People metastack arranged subjects in order by birthdate.