Students Learning, Students Leading with GIS

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GIS (Geographic Information Systems) is computer software system that blends mapping, data manipulation and spatial analysis. This technology has great potential for interdisciplinary projects in K-12 classrooms. Students using this software technology manipulate databases and analyze the spatial representations of that data. This paper will investigate issues surrounding student learning using GIS and students as the leaders in teaching GIS.

GIS is dependent on known locations in the world. This location analysis can be tied to diverse curriculum issues across subject areas. Science educators can use GIS with their students to explore relationships in environmental issues; social studies teachers and students can explore demographics, economics, and change over time; health and physical education classes can explore the spread of disease; and language arts classes can use GIS to map literature and authors lives (Alibrandi, 2003). There are many more examples of GIS integration in the K-12 curriculum. "GIS provides a capacity to view complex patterns and understand better the world that we live in through exploration" (Mackaness, 1994). This technology allows teachers to meet curriculum and technology standards while introducing higher level thinking skills to students.

Students at Martin Middle School in Raleigh, North Carolina are introduced to GIS through classroom use, guest speakers, GIS events and elective courses. Student learning begins with the basic skill sets needed to understand and utilize the software. As the term progresses students develop spatial/location-based research projects and must find, create, and display data to share with their classmates. These projects are born out of student interest, community needs, and data availability. The students must often reach out into their community to gather data. A number of classroom settings have established and utilized community partners to aid in student understanding of their role in the community (Alibrandi, 2003; Merrick, 2001). The students in the second level GIS course at Martin Middle School in the fall of 2003 undertook a project investigating juvenile crime in their community. They gathered and created data and analyzed the relationships of crimes, age of the criminal with respect to the locations such as schools, malls, clubs and organizations. Through their work the students created a unique and innovative GIS project that could be of benefit to the community, law enforcement officials, and intervention programs and organizations.

In our observations of the students and teachers using GIS we have found that the students are often the technology leaders in the classroom. Many of the middle school students are experts in technology whereas their teachers are novices. We suggest that students should be able to excel in this role as the leaders of technology and allow the teachers to better focus on the content area and subject matter. The students of the GIS courses have been given the role in several situations as the technology assistants and technology teachers. While this shift might alarm some teachers we have found that the student enthusiasm, skills, and knowledge can be motivational to teachers learning new technologies, such as GIS.

Implications for teacher-student roles in technology-enabled classrooms has implications for adult learning and in power and empowerment issues regarding

technology integration. Investigating how students learn and teach technology to their peers and their teachers may benefit research in adult learning of technologies. Shifting student and teacher roles in traditional classrooms with the use of technology may empower students in their own learning.

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