THE GLOBE PROJECT: AN ANALYSIS

INTRODUCTION

Team 3 chose to analyze the Internet Project called The Globe Program. The URL of this project is: http://www.globe.gov/globe_flash.html. This project is intended for students in grades K to 12. Globe is “a worldwide, hands-on primary and secondary school-based education and science program” according to their introductory page. It is a cooperative effort led in the United States by a federal inter-agency program supported by NASA, NSF, EPA and the U.S. State Department in partnership with universities, state and local school systems and involving 100 other countries.

Protocols in the Globe Program include atmosphere/climate, soil, hydrology, land cover/biology, and phenology which is the study of recurring biological cycles and their connection to climate (such as annual bird migrations, insect outbreaks, salmon spawning, etc.) At least one teacher from each participating school must attend a Teacher Training Workshop to be trained in the GLOBE science measurement protocols. This requirement is due to the fact that students, teachers, scientists and government agencies around the world use the data gathered and submitted by students. The Missouri Partners that aid new classes joining the program are the Francis Howell School District in St. Charles, MO and the Missouri Botanical Gardens in St. Louis, MO.

Team 3 has reviewed and evaluated the Globe program through the seven dimensions of the model proposed by Callahan and Switzer in their article Technology as Facilitator of Quality Education: A model available at http://www.intime.uni.edu/model/modelarticle.html.

DIMENSION 1: Students are at the center of their own learning

The first major dimension of the article “Technology as Facilitator of Quality Education: A model” is students at the center of their own learning. Our team feels that this program is an excellent example of this first dimension. The students are involved from the very beginning, which would mean they help decide which area of science from which to gather data. They decide how and where the data will be gathered, with guidance from the teacher who has been trained in the scientific methods that must be used. They go out into the environment, usually with their class but sometimes in small groups or with their parents. The data they are gathering is authentic, right from the source and meaningful. They will gather the data for varying periods of time, such as one school year and succeeding classes will continue up to 5 years or even 10 years to spot trends. The students do not just report their findings and end the thinking processes they have been involved with. They are encouraged to use the site to plot graphs, construct worldwide maps or maps on a smaller scale. They then use their data and data gathered from other classes to attempt to answer real-world problems. They are encouraged to come up with solutions and correspond with the many scientists who are involved with the program.
Throughout the entire program, the students are the ones involved with learning – the teacher is a guide and resource only.

DIMENSION 2: Principles of good learning

The second major dimension of this model concerns 8 principles of good learning. Principle #1 is active involvement and this Internet Project gets an excellent score on this. These students do not merely recite or recall – they are actively engaged in science and are adding to the world’s stock of new knowledge. Principle #2, patterns and connections, is also exemplified by this project. They are not taking data for just one time or one day – their collection is ongoing for long periods of time and they will form new patterns and new mental connections as the data emerges. Principle #3, informal learning, is strong in this program, because the students and teacher are not in one setting but are out in the world exposed to different situations, different people, and different opportunities. Principle #4, direct experience, is one of the strongest points of this project. The data that is submitted is not found in a classroom. It has to be obtained and recorded and employed in the real world. The experiences of the students are authentic and relevant.

Principle #5, a compelling problem, may or may not be present for each individual student engaged in this project since what people find compelling varies from person to person. However this section of the reading also addresses the ability to solve the problem and if the problem is perceived as too challenging, the brain simply “turns itself off”. It may occur to some students that massive, complex problems such as global warming or species extinction may not be able to be solved. Principle #6, reflection, would be encouraged by this project since the longer time frame and consistent gathering of data in the same manner might produce considerable alpha-level activity in the brain. The Globe program encourages principle #7, frequent feedback. The scientific method and the use of the Student Investigative Format encourage frequent feedback. Each investigation consists of a formal statement about the project beginning with an abstract, research question/hypothesis, research method, data summary, analysis, conclusions, discussion and bibliography. The last major dimension of the model, #8, enjoyable setting, is variable depending on the project the class undertakes. Gathering weekly data in a scenic valley wading in a cool clear stream will generally be more enjoyable than going to a sewage treatment plant or a trash dump. On the other hand, all data is gathered out in the environment, which is a big plus for most students.

Contributed by Maxine Olmstadt

DIMENSION 3: Aspects of information processing

The third step deals with Aspects of Information Processing. Aspects of Information Processing include seven dimensions of processing information. The first dimension deals with appreciation which is the first stage of information processing. Our group feels that this particular website does give the students the firsthand experience or through various media. The media that is included in The Global Program is printed material, experiments, things that will
strike the students interest in this program. The program includes a news and event section. The second dimension is **presearch**, in this stage the learners make a connection between what they want to know and what they already know. The Global Program has the students search through exploration of different subtopics which all relate to the main topic. The third dimension is **search**, during this stage the students search different websites that are available to the topic at hand, are able to perform experiments. Each experiment has a purpose, overview and a student outcome. The fourth dimension is **interpretation**. At this point students are able to take their experiments create maps and graphs, report the data they have collected and collaborate with other Global students and scientist. The fifth dimension is **communication** where students learn to organize and present their findings. This particular dimension goes hand and hand with interpretation. Students can create graphs and communicated with others and they can actually submit a report. The sixth and last dimension is **evaluation**. This is where students can evaluate and revise techniques. Students have this availability in this program.

**DIMENSION 4: Standards from content disciplines**

Dimension number four deals with **Standards from Content Disciplines**. This particular program is developed for primary through secondary education. The program meets the needs of the achievement in science, math and in computer and networking technology. This program will help students and teachers achieve state and local education goals and standards.

*Contributed by Janet Land*

**DIMENSION 5: Tenets of effective citizenship in a democratic society**

Callahan and Switzer believe that technology is a facilitating agent of quality education and that developments in information technology enhance student achievements in important areas of our democratic society. For this reason, they propose five tenets of effective citizenship that can also be applied to technology-enhanced educational settings. Let us take these five tenets in turn and see if the Globe Program supports them.

The first tenet is **tolerance**, defined as “the capacity for recognizing and respecting the beliefs of others” (Callahan and Switzer). The Globe Project links students, teachers and researchers from all over the world. Students conduct a program of real environmental measurements. Then they transmit their data to a central processing facility via the Internet. In doing so they collaborate with scientists and other GLOBE members worldwide. Besides, GLOBE creates a forum for students to communicate with their peers around the world, thus fostering understanding and tolerance of other cultures and their sense of global community.

The second tenet is **critical thinking**. Critical thinking is at the basis of intelligent judgment required by citizens in a democracy. It is also at the basis of sound scientific research. The Globe project encourages students to use inquiry skills such as observation, analysis of data, description, comparison, making hypotheses, drawing conclusions and reporting results. By publishing their investigation reports on the GLOBE website, students are sharing their findings
with the rest of the world. In addition, students can experience the full intellectual process that is science, from curiosity through investigation to conclusion and communication.

The Globe project also requires decision-making skills. “**Decision making** in a democracy is a process of reaching agreement in group situations through dialogue, discussion, debate, and analysis” (Callahan and Switzer). In the Globe project “once a proposed project is chosen, each team reviews all data submitted for their protocols for accuracy and consistency.” This involves a lot of analysis and discussion.

The third tenet discussed by Callahan and Switzer is **thinking together** and **making meaning**. In a democratic society responsible citizens are faced with complex problems and choices. They need to be able to analyze the problem collaboratively and find viable solutions through discussion. Similarly, Globe schools collaborate with each other on a variety of topics. Students are encouraged to ask questions about how the environment around them works, to make hypotheses and find answers. Sharing ideas is essential in this process as is a scientific differentiation between the problem and the possible solutions. For example, in the Gulf Coastal Erosion in Louisiana project students have thought of a series of solutions to a serious environmental problem after they identified it. As truly responsible citizens they also convinced local authorities to take action against the erosion. This is an extremely good example of how an Internet project can support the personal and social development of young people.

On a more international level, the Globe project is being implemented through bilateral agreements between the U.S. government and governments of partner nations. Thus international cooperation and mutual understanding among countries are strongly supported.

The fourth tenet Callahan and Switzer propose is **power sharing** and **empowerment**. They believe that education should “provide young people with the understanding, abilities, and commitments with which they can identify and act upon their interests.” Empowered citizens are people who have an increased awareness, understanding and ability to deal with the complexities of the world surrounding them. This seems to be also the goal of the Globe project. Students not only learn how to carry out scientifically rigorous observations, but also learn to use their findings to better understand the environment, its problems and how to face them. Because the Globe project is based on a network of world-class scientists and experts, students are supported in their work by people who act as tutors within a critical framework. For example, in the ongoing project called White River Hydrology Study, students monitor hydrologic protocols of water quality along the White River in Missouri and Arkansas. Thanks to their findings they will be able to evaluate the effects of urbanization and development within this watershed and eventually analyze the environmental consequences and propose some course of action. The Environmental Study of the New River in NC, VA and WV and the River Rhine Project presumably have the same goals.

The last tenet is **individual responsibility** and **civil involvement with others**. Individual responsibility is a key feature of a democratic society. Being responsible for one’s actions is also very important for the success of the scientifically rigorous GLOBE observations. Students are members of a world-class scientific community and soon realize that their work is appreciated
and valued. Therefore, their sense of responsibility towards all other participants is highly enhanced. Through their involvement with and observation of environmental phenomena, students become more sensitive to the problems and needs of the communities they live in. For example, in the Gulf Coastal Erosion in Louisiana activity the students are described as “…caring enough about their state to make a difference in the environment and in” their “city’s budget.” In other words, the students have developed such a high level of civil responsibility that in one case they succeeded in convincing their city’s authorities to take action to prevent the coastal erosion of Louisiana. This is a very good example of how the Globe Project can stimulate good civil responsibility in young people.

As we have seen, the five tenets that Callahan and Switzer place at the center of a good democratic society also play an important role within the Globe project. Tolerance, critical thinking and decision making, thinking together and making meaning, power sharing and empowerment and individual responsibility and civil involvement with others are assets of the Globe project. By engaging in rigorous scientific observations students all over the world are given the opportunity to become not only more knowledgeable about the environment and its problems, but also more responsible and active citizens.

**Contributed by Vito Brondolo**

**DIMENSION 6: Teacher Knowledge and Behavior**

**Student characteristics**

As far as the student characteristics are concerned, the globe program supports all five main factors of Dunn and Griggs Learning style model.

1. “Their immediate environment (sound, light, temperature and furniture/setting design)”. In using the globe program, students are encouraged to develop data and analyze it within their immediate environment.
2. “Their own emotionality (motivation, persistence, responsibility, or the opportunity to do their things in their own way)”

   Even though certain guidelines are given for students to submit reports, students still will have plenty of opportunities to include their own emotionality. For instance, students have the opportunity to submit reports in different formats. Through the acceptance of these different formats, the Globe program offers students to be creative in several ways (such as document design, website design, etc.)

3. “Their sociological preferences (Learning alone or in different-sized groups)”

   Globe gives its students the opportunity to work in different-sized groups. While it is recommended that reports be submitted as a class, the door is kept open for smaller-sized groups.
4. “Their physiological preferences (perceptual strengths represented by auditory visual, actual, kinesthetic and sequenced characteristics)”

Since Globe does give access to reports from other schools and students, this factor may also be addressed. Different schools may show different physiological preferences as a result of their research.

5. “Their processing inclination (global/analytical, right/left, impulsive/reflective)”

The same applies as in the physiological preferences factor.

**Pedagogy and Classroom management**

In reality, not every teacher is well rounded and has the in depth knowledge needed to conduct surveys and research in a satisfying manner. Globe is helping both ends of the spectrum. The teacher who is starting out will find teacher guide protocols helpful. Links are provided to topics which can be used in the classroom environment. Each topic has several subjects and, if needed, lesson plans and guidelines are available in detail.

For the more experienced teacher, the educator’s corner is a nice touch. Here, teachers can meet with other teachers and share their input.

As far as classroom management is concerned, Globe offers a variety of possibilities. Research projects can be organized very loosely or structured. Globe offers a variety of ways to get the information needed.

**DIMENSION 7: Technology**

Globe offers a huge amount of information. Thanks to partnerships with NASA, NSF, EPA and the U.S. department of state, the globe program goes beyond just a compilation and organization of scientific data.

To those teachers not coming from the science field, the Globe program may seem a little bit overwhelming at first. However, the data is well structured for someone who knows what he or she is looking for.

Professionals and educators in the field will appreciate this program very much. Why? Because it saves a lot of time. For example, a science teacher may not have the time to conduct a research project on monthly rainfall in a certain area. But, he/she can let his/her students research the Globe program to find a case study or student data that is very useful. And herein lies the genius of this program. By making data public and accessible, it saves instructors lab time that may not be available or too expensive.
The only foreseeable downside is that, due to the vast amount of information available, younger students may get lost very easily. For this reason, the program seems more suitable for Junior High School age or older students.

To sum up, it can be said that Globe is not for the novice user, but it will be a great resource for intermediate to advanced users.

Contributed by Stefan Frank

In conclusion, Team 3 believes that the Globe project is a good example of how technology can not only facilitate quality education for the 21st century but also enhance student achievement in core areas important in a democratic society. After analyzing the project using the seven dimensions of the model proposed by Callahan and Switzer, Team 3 is convinced of its educational value.