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The Power of Project Learning with ThinkQuest

In **project learning**, students *discover the meaning* of what they learn by working together to solve complex, real-world problems, rather than being taught facts from books. A growing body of evidence indicates that project learning supports the development of critical skills students must have to meet the demands of the 21st century. In response, the Oracle Education Foundation has developed an online learning platform called ThinkQuest to extend the benefits of project learning to classrooms globally. This paper draws on a broad international research base and case studies of actual classroom projects supported by ThinkQuest to illustrate both the theory and practice of 21st century teaching and learning.

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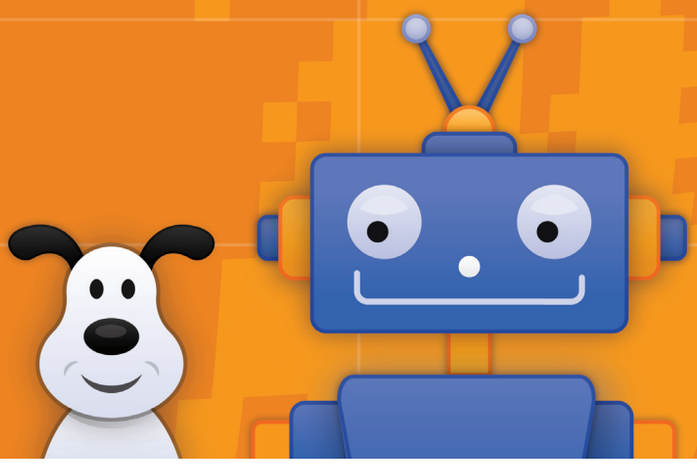


"With a youthful population, we know the importance of a strong and innovative education sector, one that prepares our young people for the 21st century's global marketplace and equips them with a 21st century skillset. By inspiring, engaging, and igniting their imaginations, we're encouraging our children to be life-long learners."[1]

—Queen Rania of Jordan

"Education is at the heart of human progress. Economic and social prosperity in the 21st century depend on the ability of nations to educate all members of their societies to be prepared to thrive in a rapidly changing world. An innovative society prepares its people to embrace change..."[2]

—G8 Summit Statement 2006, St. Petersburg

"I'm calling on our nation's governors and state education chiefs to develop standards and assessments that don't simply measure whether students can fill in a bubble on a test, but whether they possess 21st century skills like problem-solving and critical thinking and entrepreneurship and creativity."[3]

—Barack Obama, President of the United States

"...to be ready for the future, our children need to grow up as independent thinkers, with the habit of questioning and thinking for themselves. They need to be well-rounded in outlook and abilities, have good values, and be robust in the way they approach challenges and obstacles.... They should be culturally-intelligent, able to understand and work well in a global economy..."[4]

—Lui Tuck Yew, Minister of State, Ministry of Education, Singapore

1 http://www.techcrunch.com/2009/05/19/an-interview-with-queen-rania-of-jordan-on-how-twitter-can-help-change-the-world/

2 http://en.g8russia.ru/docs/12.html

3 http://www.whitehouse.gov/the_press_office/Remarks-of-the-President-to-the-United-States-Hispanic-Chamber-of-Commerce/

4 http://www.moe.gov.sg/media/speeches/2008/01/16/speech-by-rearadmiral-ns-lui-t.php

Skills for the 21st Century

Today's students will enter a workforce that is vastly different from that of their parents. Increasingly, they must be able to:

> **work in teams** that are cross-functional and often **global** to **solve complex** and **important problems** that critically affect the world
> while responding creatively to **rapidly changing business landscapes** using **rapidly evolving technologies**.

Most countries are facing a gap between the knowledge and skills needed for future success and the current education system,[5] which is often designed to impart a fixed body of knowledge rather than initiate a lifelong journey of creative thinking and agile learning. Recognizing this challenge, numerous organizations—ranging from governments to private foundations to multinational corporations—are undertaking ambitious initiatives to define the 21st century skills students need[6]; develop visions, standards, and supports to facilitate 21st century teaching and learning[7]; and provide teachers and students with ICT [information and communication technologies] equipment and training.[8]

At the same time, consensus is growing among scholars and educators that **project learning**[9] is one of the most promising vehicles for **promoting 21st century skills in the classroom**.[10] To this end, the Oracle Education Foundation has created a platform called ThinkQuest to promote powerful project learning experiences for students around the world.

This paper:

1. Describes project learning
2. Examines the promising link between project learning and 21st century skills for students
3. Introduces ThinkQuest as a global platform to support project learning
4. Presents four case studies of educators around the world who are using project learning and ThinkQuest to expand students' opportunities for the future

In a recent large-scale international study, teachers reported that students who participated in inquiry projects and group work exhibited greater mastery of 21st century skills.[11]

5 OECD (2000); Sawyer (2006); Conference Board et al. (2006); Commission of the European Communities (2008)

6 For example, APEC [Asia-Pacific Economic Cooperation]'s 21st Century Competencies and Skills, http://www.apec.org/; OECD [Organisation for Economic Co-operation and Development]'s Definition and Selection of Competencies [DeSoCO], http://www.oecd.org/; New Zealand's Key Competencies in 21st Century Schooling, http://nzcurriculum.tki.org.nz/; Partnership for 21st Century Skills, http://www.21stcenturyskills.org/

7 For example, ISTE [International Society for Technology in Education]/NETS [National Educational Technology Standards] for Students and Teachers, http://www.iste.org/; UNESCO ICT Competency Standards for Teachers, http://www.unesco.org/; UK's Next Generation Learning Charter, http://www.becta.org.uk/

8 For example, the Egyptian Education Initiative, supported by the World Economic Forum, http://www.weforum.org/; Intel® Teach, http://www.intel.com/education/; the WorldLinks, http://www.world-links.org/

9 Also commonly known as "project-based learning" and by other names around the world

10 Barron & Darling-Hammond (2008); Hong Kong Curriculum Development Council (2001); Pearlman, (2006); Sawyer (2006)

11 Law, Pelgrum, & Plomp (2008)

1. Project Learning

Project learning is a systematic teaching and learning model that engages students in learning knowledge and skills from a series of complex tasks including: design and planning, problem solving, decision making, product and artifact creation, and the communication of results. —Project Learning Institute, Oracle Education Foundation

Project learning is not a new educational technique; as early as the 16th century, it was an established method for training architectural and engineering students in Europe.[12] But in the 21st century, project learning is at the center of a global shift in education, from the traditional focus on teacher-led instruction to a **new focus on the self-directed *learner*.**[13]

What do learning projects look like?

According to the literature[14] and as illustrated by a project in Professor George Hirata's science class in Brazil, a learning project:

- Starts with an essential question or problem, usually one from the real world
- Is central to the curriculum, so students are learning important concepts tied to standards
- Includes a variety of activities over an extended period of time, all designed to explore answers to the essential question or problem
- Requires collaboration among students, the teacher, and possibly community members
- Asks students to take initiative and work autonomously, while the teacher acts as facilitator and coach
- Often involves uses of technology that extend students' capacity for research, analysis and collaboration
- Culminates in a product or presentation that requires students to communicate their results, often to a real-world audience

Professor Hirata's students explored the question, "Is the sky we see the same as what people saw at other times and in other places?"

The project was part of a curriculum unit on astronomy and tied to Brazilian subject area standards

Students engaged in online discussions, conducted research, and presented their work.

The class was divided into small groups, each of which explored a different theme related to the essential question.

Each group selected a topic and planned its own research, with coaching from Professor Hirata.

The students conducted web research and considered the reliability of the information sources they selected.

The final products were student-developed websites related to the essential question.

12 Knoll (1997)

13 Markham, Mergendooler, Learmer, & Ravitz, (2003); Thomas (2000)

14 Helle, Tynjala & Olkinuora (2006); Krajcik & Blumenfeld (2006); Thomas (2000)

2. Project Learning and 21st Century Skills

A strong base of global research links project learning to the development of an array of important 21st century skills. Some of those studies are highlighted here. The References and Bibliography section of this paper lists the cited studies along with a range of additional readings on project learning.

Critical Thinking

Project learning is not just about memorizing facts. **It's about students applying what they learn to solve a complex problem**. Students engage in *active inquiry*, exploring an issue from multiple perspectives, learning how to ask pertinent questions, gathering relevant information, and synthesizing a solution. Studies show that well-designed learning projects can lead to **deeper subject matter understanding** and to **students who think more like experts in their field of study**.

In a 3-year study, British students in a school that used a project learning curriculum associated math with exploration and thinking, whereas students in a school with a traditional curriculum associated it with memorizing and using rules. Project learning students outperformed the traditional students on both basic and conceptual problems in the National Exam.[15]

Creativity

In project learning, students often work on an authentic, real-world problem that does not have one right answer. Students must be creative in coming up with new ideas, combining knowledge and skills across disciplines, and designing innovative solutions that meet a real need.

A study in Singapore found significant gains in creativity among polytechnic students who participated in a project learning curriculum that required them to explore and develop solutions for real-world problems. These students were better able to discover relationships in complex patterns and became more flexible thinkers than peers in a control group.[16]

An empirical study found that U.S. middle school students who worked on a scientific inquiry project gained significantly more collaboration skills than their peers who did not have such an opportunity. In a performance assessment task, students in projects negotiated more and distributed work better than those in the non-project learning group.[19]

Teamwork

Project learning typically involves teamwork. Well-designed learning projects **help students become effective collaborators, contributors, and leaders**, developing such skills as listening, questioning, and compromising to achieve a common goal. In addition, sharing and discussing their ideas helps students build **deep knowledge**[17] and become members of a "**community of practice**,"[18] in which participants work together to continuously advance their understanding.

15 Boeler (1998, 2002)

16 Seng (2000)

17 Krajcik & Blumenfeld (2006)

18 Lave & Wenger (1991)

19 Kolodner et al. (2003)

Cross-Cultural Understanding

Some project teams bring together participants from different parts of the world or with different backgrounds, **increasing student awareness of cultural differences** and building **respect for different perspectives**. When students work with partners who are different from themselves, they learn how to resolve misunderstandings and overcome cultural and language barriers.

According to a U.S. teacher whose students worked on a project with peers in Bulgaria, "When we started, most of the students had no idea where Bulgaria was located, much less any idea as to its history. In the course of the project, the students learned some basic facts about the country. . . [and they] came to feel a sort of personal connection to the Kosovo situation [in the neighboring country of Yugoslavia] that was a different perspective from most of their friends…. A place on the map became real to the students."[20]

Communication

In project learning, students create products that communicate their ideas and learning to others. They often present their work, sometimes to an **authentic audience** such as the community or a client. Through this process, students learn important skills such as how to display findings and recommendations, how to organize a presentation, and how to capture and maintain audience interest.[21] In addition, presenting their work to a wider audience often motivates students to produce higher quality products.

In the Silicon Valley Challenge 2000 program in the U.S., students worked on multimedia projects and presented their work at regional fairs. In a performance assessment task to develop a brochure about ways to help homeless students, Challenge 2000 students outperformed comparison students on three dimensions: content, sensitivity to audience, and design.[22]

Technology

Through technology-supported projects, students learn how to use ICT tools in context. Technology also supports **deep student learning** by helping them access real-world data, collaborate at a distance, visualize and analyze data, and create multimedia presentations of their results.[23]

In an Israeli high school, students who worked on computerized projects were less dependent on the teacher's guidance, collaborated more frequently with peers, and were more likely to generate new ideas, take risks, and engage in trial and error than peers who did their projects without computer support.[24]

Self-Direction

Project learning puts students in the driver's seat, giving them more control over their learning. In well-designed learning projects, teachers skillfully design and guide—but do not fully direct—students' learning. Students formulate their own problems and goals, plan the steps of the project, seek the resources they need, and design their own products. Research has shown that students learn better and gain more self-confidence when they feel a sense of ownership over their learning process.

U.S. high school students at risk of dropping out of school conducted a project on homelessness. They visited a homeless shelter, researched issues related to homelessness, and gave a multimedia presentation to their peers, teachers, school leaders, and community members. Researchers reported positive effects on the students' academic self-confidence, sense of accomplishment, attendance, and language skills.[25]

20 Gragert (2000)

21 Carver, Lehrer, Connell, & Erickson (1992)

22 Penuel, Means, & Simkins (2000)

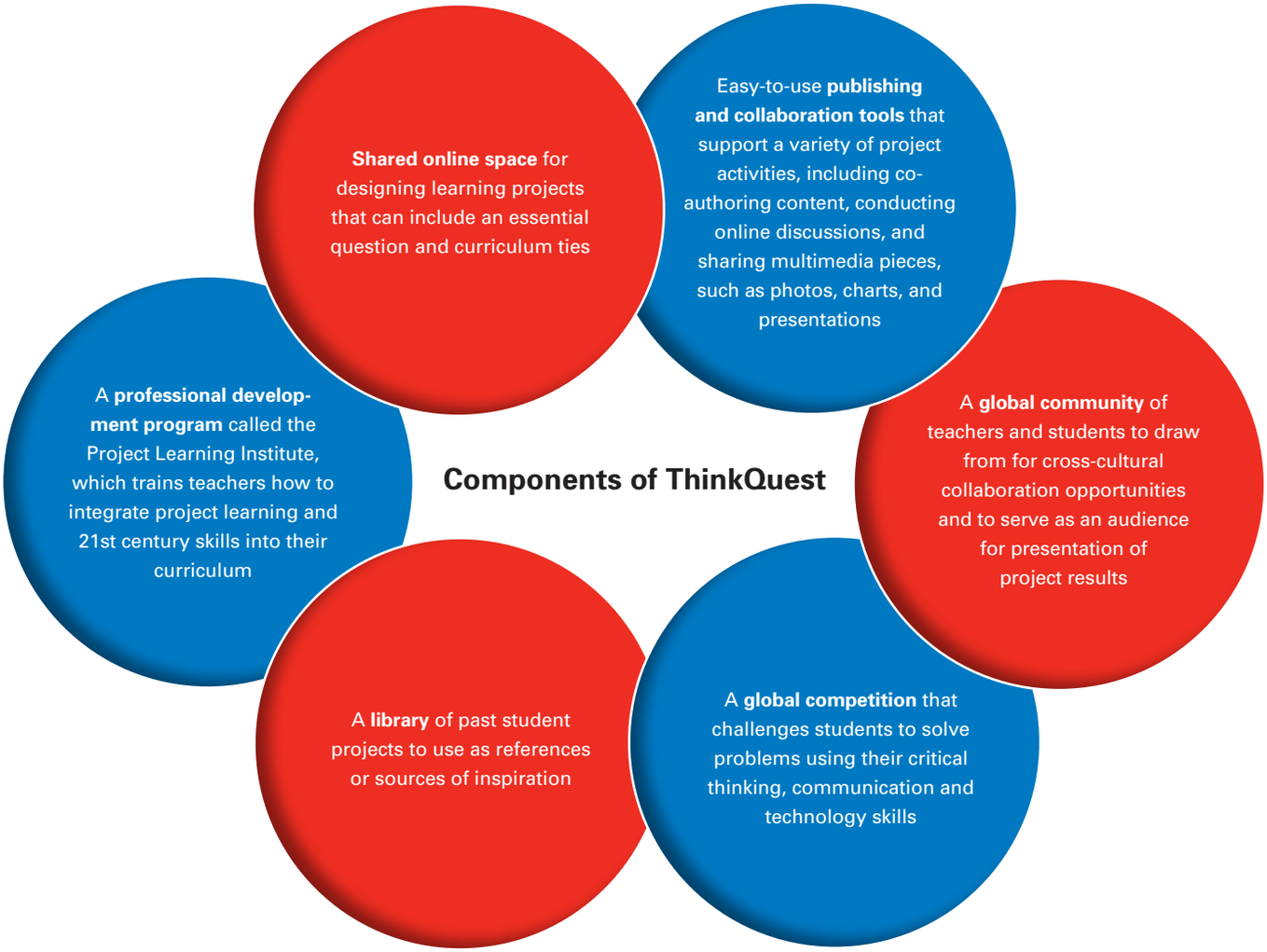
23 Edelson & Reiser (2005), Moursund (2003)

24 Barak (2005)

25 Carr & Jitendra (2000)

3. ThinkQuest

Developed and hosted by the Oracle Education Foundation, ThinkQuest is a protected online environment that enables teachers to design and carry out learning projects within their classrooms or in collaboration with ThinkQuest's global community.



ThinkQuest is designed to make it easy for teachers to set up learning projects within their classrooms or in collaboration with other students and teachers around the world. The environment is flexible so that teachers can design projects to meet their specific teaching and learning goals.

Because student safety is paramount, **ThinkQuest is a protected environment available only to teachers and students at accredited schools**. Having confidence that ThinkQuest is a space for interactions between real teachers and students, schools can comfortably allow their students to communicate openly and globally.

ThinkQuest also enables teachers to control project visibility and membership, so they can decide whether materials and activities are limited to a particular class or open to all ThinkQuest members globally.

ThinkQuest is available free of charge and free of advertising to primary and secondary schools around the world. It currently supports over 622,000 students and teachers in 69 countries.

4. Case Studies

The following case studies illustrate the powerful outcomes that can result when ThinkQuest is used to support well-designed projects that emphasize 21st century skills.

These actual classroom examples represent a range of geographies and a variety of core subject areas:

- Students in **Puerto Rico** used a local lagoon cleanup as the basis for a ThinkQuest project on environmental science and a public information campaign.
- Students in **Greece** took the initiative to develop a ThinkQuest competition entry on a public safety issue that was particularly relevant to their community.
- Students in the **United States** learned civic responsibility through a ThinkQuest project in which they took action to support the elderly in their community.
- A math teacher in **India** used ThinkQuest to connect her students with peers and resources from around the world.

In all these cases, students had opportunities to develop their independence as learners and problem solvers, build skills that can be applied to novel situations, hone strategies for successful collaboration, and expand their range of resources far beyond the walls of the classroom.

In addition, their teachers learned to play an important new role in the classroom, shifting from information source to facilitator and guide. Many of these **teachers also grew as professionals** through collaborations with peers in ThinkQuest's global community.
As a result, the case studies that follow highlight both the 21st century skills that students developed and the professional skills that their teachers gained.

S.O.S. Save our Lagoon: Connecting Students' Lives to Science

By participating in a ThinkQuest project tied to a local lagoon cleanup, students learned to think and act as environmental scientists. They examined real-world concerns that affected their community, while integrating skills and concepts from several academic disciplines.

Teacher: Señor Gonzalez, Puerto Rico
Subject: Science for ages 13–15

Señor Javier Gonzalez teaches science to low-income 13- to 15-year-old children in rural Puerto Rico. His project, *S.O.S. Save our Lagoon*, engaged students in direct investigation of environmental science concepts through a cleanup activity at a nearby lagoon.

Essential question: "What are the main causes of the contamination of the Las Salinas Lagoon, and what can we do to solve this problem?"

The students conducted background research using resources linked from their ThinkQuest project space, including Google Maps and websites about local geography. During the lagoon cleanup, they collected not only garbage but also data on the types of garbage encountered. Back at their classroom, students used mathematical skills to analyze the data and determine patterns, such as which companies' products made up the largest proportion of the trash. The students used this information to send letters to businesses asking for improved consumer education and reduced packaging.

According to Señor Gonzalez, "Think[Quest] opened a lot of doors for myself…and for my students." In addition to learning important science concepts, reported outcomes included:

- **Technology skills**. At the time of the project, Señor Gonzales' school had very limited Internet connectivity and many students had little experience with Internet research. Señor Gonzales used links in the ThinkQuest project space to guide students' exploration of Internet resources.

The online resources enabled students to approach the cleanup with relevant background knowledge.

- **Creativity** and **communication skills**. When the students discovered that the majority of garbage was produced by a small list of local companies, they came up with the idea of the letter-writing campaign. Through this multidisciplinary activity, which linked content from students' science and Spanish classes, students learned how to write persuasively and format business letters properly.

Working on a **real problem** in the community inspires students to think creatively about practical solutions.

Writing for an **authentic audience** motivates students to present their findings and recommendations so as to be as persuasive as possible.

- **Critical thinking** and **self-direction**. The students used their own initiative to decide what action to take based on their analysis of the data and their desire to make a difference. Said Señor Gonzales, "I have seen students doing things because they want to, not because I asked them."

Analyzing information to make decisions is an important part of **critical thinking**.

- **Teacher professional growth**. As a result of this and other learning projects in ThinkQuest, Señor Gonzalez has established ongoing collaborations with educational organizations overseas, received several national awards for excellence in science teaching, and worked as a project learning coach for other teachers in Puerto Rico. "If I hadn't built that first page in Think[Quest]," he said, "the whole roller coaster wouldn't have started!"

Forest Fires: Engaging Students with Real-World Problems

In Greece, two middle school teachers coached a team of students in a ThinkQuest competition. The students were highly motivated to learn about their chosen topic of forest fires and to develop the technology and teamwork skills needed to produce a high-quality project.

Teachers: Mrs. Kentrou and Mrs. Tsombanoudi, Greece
Subject: Science and computer science for ages 13–16

Mrs. Anna Kentrou and Mrs. Despina Tsombanoudi coached a team of students in a global ThinkQuest competition. Motivated by a recent forest fire that had threatened their school, the students chose to focus their project on the topic of fires and fire prevention.

In a highly self-directed effort, the students organized the project into tasks that were delegated to smaller sub-committees. As students worked on their entry, they were motivated by the fact that their work would be seen by a global audience and compared with other high-quality entries. According to Mrs. Kentrou, "They kept looking at the library [of past entries] and saying, 'Look what they did…. We've got to increase here, we've got to do something there.' It was a driving force to keep going and not say that it looks fine now."

Mrs. Kentrou and Mrs. Tsombanoudi cited a number of outcomes from the project learning approach:

- **Critical thinking.** As part of the students' independent research, they decided to survey peers and interview civic leaders. Through this process they learned proper research techniques, including how to avoid leading or revealing questions. This prompted them to begin thinking more critically about other surveys and interviews they had encountered.

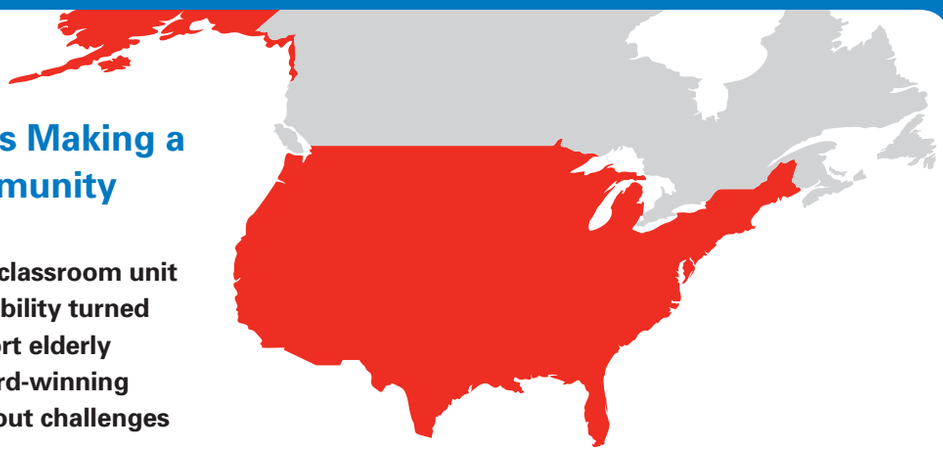
- **Creativity** and **self-direction**. Students had the freedom to select their own real-world topic and make their own design choices. According to Mrs. Kentrou, "It was like they were opening up their wings; they could actually create something…. It started really small and then they started to flourish."

By pursuing their own **interests** and working toward open-ended goals, students develop creative approaches to **real-world** problems.

- **Teamwork** and **communication skills.** According to the coaches, the project helped students learn how to discuss and negotiate goals, resolve disagreements, and divide responsibilities among team members.

- **Technology skills.** Students gained new levels of independence in their use of technology, which the coaches said had not previously been an area of interest. Said one of the coaches, "You would be surprised at how quickly they learned how to use it [ThinkQuest] on their own. They saw that they can achieve it on their own, that they don't need someone else showing [them] things."

By learning how to use technology **independently** on an as-needed basis, students develop flexible skills that can be **applied to new technologies**.



Forget Me Not: Students Making a Difference in Their Community

At a primary school in the U.S., a classroom unit on government and civic responsibility turned into an extended project to support elderly community residents and an award-winning ThinkQuest competition entry about challenges faced by the elderly.

Teacher: Mrs. Lockard, Florida, United States
Subject: Government and citizenship for ages 9–10

Mrs. Mijana Lockard is a teacher at a magnet school in a disadvantaged area. Her ThinkQuest project, *Forget Me Not*, helped bring the topics of government and citizenship alive for her students. "You have a textbook that explains what civic responsibility is," she said, "but they don't truly understand [until they actively engage in it]." The students explored the role of government in a variety of situations and then brainstormed on ways to exercise civic responsibility in their own community.

Essential question: "How can individuals effect positive changes in their communities?"

Some students noticed that many of the houses near the school were in poor condition and learned that the area had a high population of elderly residents with limited mobility. On their own initiative, the students decided to organize a day of service to help the seniors. They contacted local churches and community organizations and used online resources to research the issues that seniors face. Then, they planned the improvements they would make, created a budget, solicited donations of gardening and other supplies from local businesses, and printed flyers and maps for volunteers. Because the students had learned that the elderly are often lonely, they even developed questionnaires that volunteers could use to facilitate conversations across the generations.

Mrs. Lockard reported that the project was easy for teachers to facilitate because the students were so **motivated by their authentic mission**: "We were a little bit overwhelmed by the children's desire."

ThinkQuest was used throughout to conduct online research, draft project materials, and communicate outside of class. The project culminated in the development of a winning ThinkQuest competition entry on the challenges faced by the elderly and how governments, organizations, and children can help.

Mrs. Lockard described a range of 21st century skills that her students developed through this and other ThinkQuest projects:

- **Critical thinking.** The students were asked to think deeply about open-ended situations "in which they would have to consider the context, do the research, and connect the dots to make decisions on their own." For example, students considered a series of dilemmas about the relative roles of government and citizens in providing local support; they then applied this perspective as they designed their project.

This project was **deliberately structured to promote and guide** students' critical thinking.

- **Self-direction.** In contrast to teacher-directed classrooms, "ThinkQuest makes [students] take charge of their own learning," said Mrs. Lockard.

This level of responsibility also raised students' **self-esteem**: "These kids come out of these projects thinking they can do whatever [they want]… It gives them the power."

In her projects, students locate their own resources and set their own deadlines. "To me, those are the most important skills they can take into the 21st century, because the world of work is like that. If we always tell them what to do, when to do it, and how to do it, it is hard for us to expect them to suddenly grow up and be able to do it on their own."

- **Communication skills** and **cross-cultural understanding.** Mrs. Lockard reported that through ThinkQuest, students learned to communicate respectfully with their peers from around the world. The *Forget Me Not* project applied the same skills on a local level, building bridges between students and the elderly.

- **Teamwork**. Many of Mrs. Lockard's academically motivated students were accustomed to working on their own. "What ThinkQuest has taught them," she said, "is how to rely on each other, how to vote if they do not agree, how to respectfully listen to each other's ideas... They realized that 'we cannot finish this project unless we work as a team .'"

Teamwork skills are strengthened when students must work together toward a **common goal or product**.

Exploring Math and Science: Building a Global Learning "Family"

In India, a math and science teacher used ThinkQuest to guide her students' explorations beyond the walls of the traditional classroom. The teacher reported that students took a more active role in the learning process and developed deeper subject matter expertise.

Teacher: Mrs. Rajeshwari, India
Subject: Math and science for ages 11–15

Comparing information from **multiple sources** helps students develop **critical thinking skills**.

Mrs. Rajeshwari, a teacher at a government school in India, uses ThinkQuest to help her students explore important math and science concepts. In one project, students developed reports and presentations about the difference between two- and three-dimensional shapes. The final products were judged by other ThinkQuest teachers from around the world. In another project, students had the opportunity to interact with scientists at the Indian Space Research Organisation. They used a variety of online resources to research black holes and other topics of interest and posed follow-up questions to the scientists.

Students are **motivated** by the freedom to pursue topics of personal interest.

Mrs. Rajeshwari said that ThinkQuest's global community has given both the students and herself access to many more resources

ThinkQuest opens the **learning community** far beyond the classroom.

and ideas than they could ever find in their single classroom: “We [used to be] restricted to our own knowledge and restricted to our own textbook… [Now] we are in one corner but we can see the whole world.”

According to Mrs. Rajeshwari, using ThinkQuest and project learning resulted in a number of outcomes:

- **Critical thinking**. Students in Mrs. Rajeshwari’s school are used to learning from a textbook and are not often invited to question the information they receive. Project learning enabled students to pursue information from multiple sources, helping them understand topics more deeply and consider different points of view. “Instead of learning only the little textbook things, they feel like they are doing a big job and they learn a lot... Confidence level increases, and they are ready to discuss the topic with anybody.”

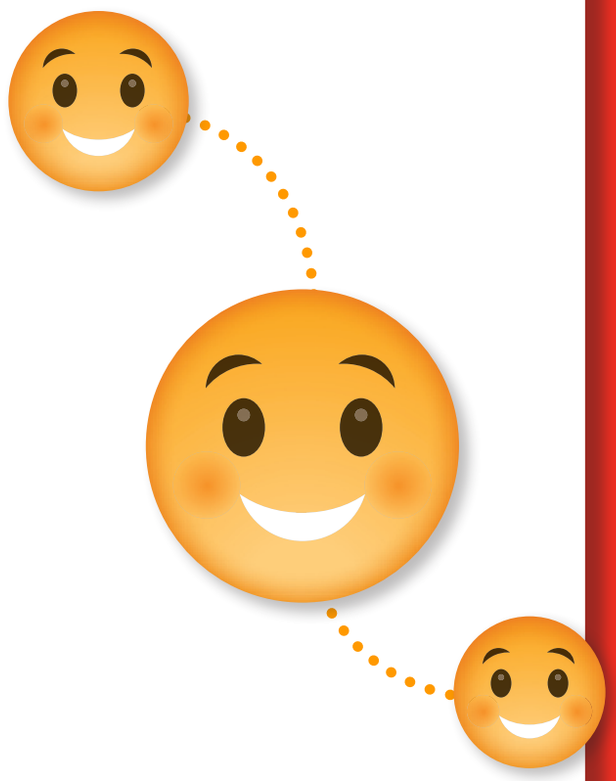
- **Self-direction**. Project learning gave the students freedom and autonomy. They decided how they would approach a problem and often went beyond assigned materials, surprising Mrs. Rajeshwari by bringing in relevant resources and news stories from outside the classroom. “They learned more than they had to learn…. They started learning on their own.”

- **Teacher learning**. As students became increasingly independent, they sometimes encountered topics that were new even for Mrs. Rajeshwari. In addition to developing her knowledge of these topics, she learned to shift her role from primary information source to facilitator of new explorations. “It’s like two-way learning. Because of the students I started learning.”

- **Global teacher community**. Mrs. Rajeshwari has also developed ThinkQuest projects that offer forums for teacher collaboration. For example, she created a project in which teachers from all over the world share math resources. This type of interaction has resulted in strong feelings of connectedness among her fellow teachers. “We have become one community, we feel as though we are one family…. We are very far away, but we don’t feel like that. The teachers are very close to each other.”

- **Understanding of technology as a tool for learning**. Mrs. Rajeshwari reported that ThinkQuest helped students’ families discover that technology could be a valuable learning tool. Parents who did not initially support children’s technology use, fearing that it would be a distraction from studies, are now supporting it as an enabler of learning.

By providing a structured environment and tools, ThinkQuest helps model effective use of technology for learning.



5. Conclusions

The teachers in these case studies have found that ThinkQuest **promotes and amplifies** their ability to use project learning in their curriculum. By conducting projects in ThinkQuest, they are able to transform learning opportunities and outcomes for their students. Not only are students deeply engaged in subject matter learning, they are also developing and exercising a set of skills in high demand in the 21st century—they are learning to **work collaboratively** with people from different backgrounds and **work creatively** to solve new types of problems with help from a wide range of **technology** tools and resources.

By providing a protected environment and active global community, ThinkQuest also empowers teachers and students to extend the reach of their projects:

- **Students** have opportunities to collaborate with peers in other schools or countries.
- **Teachers** can tap the expertise of peers around the world, building close connections with like-minded colleagues they would not otherwise have met.
- **Ministries** and **program developers** can leverage ThinkQuest as a platform for broad regional participation in a common learning program.

These changes to teaching and learning are not small, nor are they easy. Project learning requires a significant investment on the part of teachers to learn how to be effective facilitators. It also requires new skills from students, who may be accustomed to being told exactly what to do. The teachers profiled in this white paper felt that the positive transformation they experienced in their classrooms was well worth the investment. And because the challenges of the 21st century are neither small nor easy, they demand nothing less.

For more information about ThinkQuest, please go to www.thinkquest.org.

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