Project-Based Learning: Changing the Face of Traditional Education

Terry Smith

Learning Technologies Doctoral Student

Pepperdine University

Terry.K.Smith@pepperdine.edu

Abstract

Project-based learning in a technology rich environment can be effective in K-12 classrooms allowing students to negotiate understanding and construct knowledge in social situations. Benefits include connecting students in communities in and outside of their cultures, and meeting learning goals in non-institutional fashion, while educators share practices and resources using technology tools. When projects endure over time, characteristics of communities of practice begin to emerge in which shared content grows and is amended by participants, generating historical artifacts. Once instantiated, the project philosophy provides an ongoing basis for immersive learning, using wikis, blogs, and other social networking applications. A project-based classroom philosophy sets an engaging, attractive environment for students by meeting their needs to be socially involved, as opposed to being passive receivers. An example long term Internet learning event called the Monster Project is examined in this paper. Widespread use of project-based learning has been curtailed by a strong focus on traditional instruction to meet testing goals. Research shows that active participation in project-based education results in students being more intrinsically motivated, more likely to show conceptual understanding, and more well adjusted than students in traditional education modes. These characteristics are those of a community of practice, where members are informally connected by their accomplishments and by what they learn together. The range of academic content that can be integrated into project-based learning as the main approach in a classroom is bounded only by a teacher's energy and creativity.

Keywords: situated learning, project-based learning, community of practice

1 Introduction

An increasing body of research indicates educational benefits when students actively participate in their own culture, as opposed to students being passive receivers of static knowledge (Barab & Duffy, 2000; Brown, Collins & Duguid, 1989; Joseph & Nacu, 2003; Lave & Wenger, 1991). Some educators today are offering nontraditional methods based on socialized participation in project-based learning. Jenkins (2006) refers to this as a *participatory culture* involving informal mentorship where information is passed on to newcomers, members are free with their artistic expression, and participants believe that their contributions really matter. This paper examines project-based learning using a long term Internet collaborative event called the *Monster Project*. Also shown are additional project learning sources implemented throughout a school year. The benefits of project-based learning are explored as the characteristics of a community of practice begin to evolve among participants.

1.1 Project-Based Learning

Traditional elementary classrooms are typically configured in rows with a teacher's desk placed at a vantage point for watching students, and ensuring compliance with rules. Subjects such as reading, science, and math are predominately taught in isolated time segments. Tomlinson and Edison (2003) write that this planning approach accommodates a whole class mode for delivering lessons, but does not address how to *differentiate* or focus on individual student needs and concerns (p.11-12). If teachers mix students in a more relaxed, flexible environment, something different can happen. When students collaborate in mixed ability groups and are challenged to work on projects together, using tools, a new dynamic in learning can occur. Brown and Duguid (1989) phrased this idea as follows: "Collaboration … leads to articulation of strategies, which can then be discussed and reflected on. This, in turn, fosters generalizing, grounded in the students' situated understanding. From here, students can use their fledgling conceptual knowledge in activity, seeing that activity in a new light, which in turn leads to the further development of the conceptual knowledge" (p. 39).

In project-based learning, students use real world concepts, tools, experiences, and technologies to engage in new roles (and identities) as they pursue questions and share their combined knowledge in social situations. A *project* is sometimes a specifically defined activity leading toward a goal, but even more importantly, it is a philosophy, a way of interacting within the classroom. Students approach class time with the idea that activities and communication with each other, and with the world, will be the norm. Joseph and Nacu (2003) call this an "alignment of learning activities with interest-based activities" (p. 91). Students engaged in project-based learning can be observed doing the following:

1. Considering a motivating question about a real-world problem or situation.
2. Investigating concepts, manipulating knowledge or thinking in a variety of ways.
3. Using tools to shape their thinking: paint, scissors, paper, audio, video, computers, etc.
4. Negotiating, collaborating, evaluating, socializing in a project context.

1.2 Projects All Year Long

Throughout the school year, learning centers, projects, and field trips are the foundation of my elementary classroom approach as shown in Figure 1.
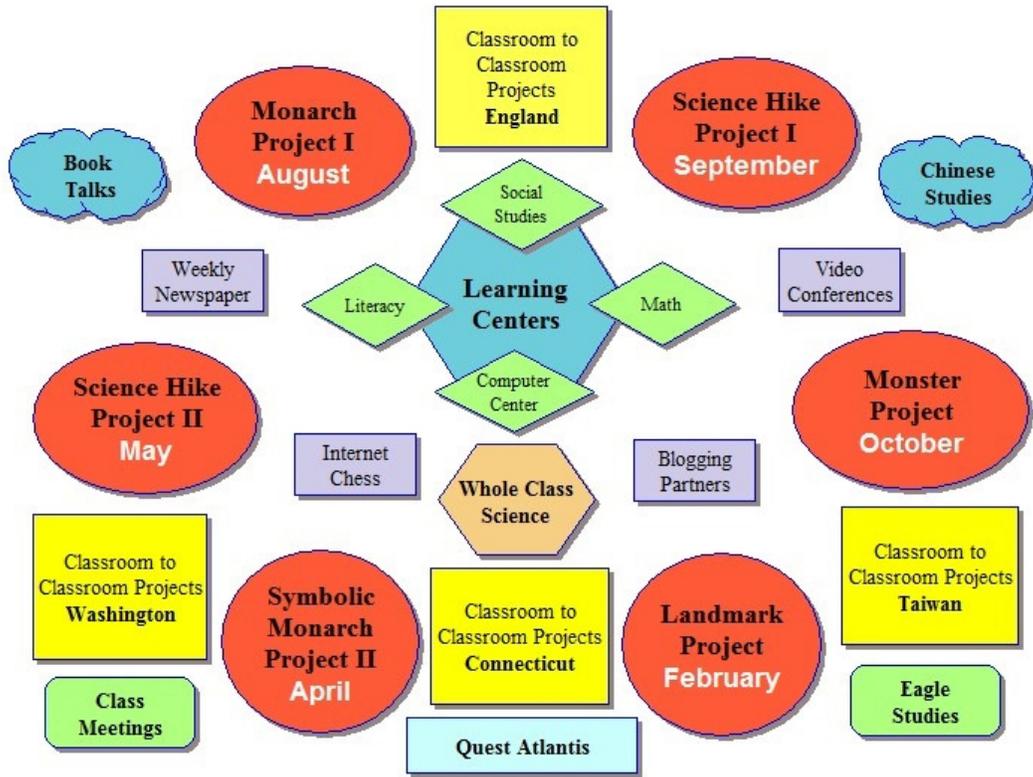
Figure 1: A Yearlong Integration Map of Projects and Skills in a Classroom.

Direct instruction in literacy, writing, book talks, whole class math, social studies, and science are braided into this project scheme. Table 1 describes major and minor projects done in my classroom. Major projects include the Journey North Monarch Migration in August, a science hike in September, the Monster Project in October, the Landmark Project in February, a follow up science hike in April, and the conclusion of the Journey North Project in May. Interspersed among these major projects are a weekly student-led classroom newspaper, and small-group learning centers four days per week. Students also engage in classroom-to-classroom projects using email, video conferencing, DVD exchanges, cards, food, blogging, podcasting, Internet chess, and wikis. Taiwan, Russia, Australia, New Zealand, and England are among our regular classroom contacts. Some of these associations are deeper than others. For example, in one case, our relationship with Taiwanese partners, Kang Chaio Bilingual School, resulted in my students traveling to two international summer camps in Taipei in 2004 and 2007 , the ultimate project: teaching my class in a foreign country, and an unforgettable global experience for my students.

Table 1. Global, Classroom-to-classroom, and In-class Project Examples

SmithClass.Org -- Projects and Duration
Science Hike -- September and April
Planning, using maps, nutrition, ecosystems, water quality, geology, sketching landforms, fossils, estimating, soil samples, measuring, writing hike reports, strenuous exercise.
Journey North: Monarch Migration – August and April
Multi-school project with Canadian and US schools, Raising caterpillars, gathering growth data, graphing, tracking migration data on project web site, project share with Taiwan and other schools, making paper tagged butterflies to send in Symbolic Monarch Project with Mexico, using Spanish, end of year paper Symbolic Monarchs. Study life in rural Angangueo, Mexico.
Monster Project -- About 45 days
Multi-school collaborative global project - poetry, writing, reading, podcasting, video making, map study, team work, compromising, negotiating, measuring, evaluating, graphing, teacher sharing on wiki.
Kidlink Landmark Project -- About 30 days
Multi-school global project – two levels of play (primary and challenge), teams write clues for finding a landmark somewhere in the world. Internet searching, descriptive writing, tracking data, deciphering clues, using e-mail for questions to other players, map skills, sharing cultures, using Skype for video conferences. Seventy-two teams participated. *Most Challenging Academic Game on the Internet*.
Classroom Newspaper – Ongoing
Student teams write news stories for weekly for publication on web, *Fourth Grade Times*. Student editors manage student writers, class evaluations. Content comes from class academics, projects, school events, sports, local and world news. Stories are real aloud and critiqued each week.
Taiwan Coral Reef Project – About 30 days - wikispace
Classroom-to-classroom project with Taiwan, investigating ecosystem and animals of the coral reef, research, drawing, intellectual property lesson, oral reports, DVD from Taiwan with oral reports, blogging feedback. FlashMeeting video conferences, Teacher collaboration and sharing. Other Taiwan Projects: World Problems – Food Project – Audio Greetings
Internet Chess -- Ongoing
Classroom-to-classroom interactions, England, Taiwan, California. Students manage an Internet chess board web site, simultaneous games underway, moves via e-mail and text messages.
Pakistan Plant Project -- About 30 days
Classroom-to-classroom global project with Karachi, Pakistan, researching and investigating plants around the world, studying cells, energy, biodiversity, drawing, oral report, podcasting, published on Voicethread.com; culminated in salad party in Pakistan and USA.
Quest Atlantis -- Ongoing
International learning and teaching project that uses a 3D multi-user environment for elementary students managed by Indiana University. Research project of Dr. Sasha Barab. Publications
Classblogmeister Site and Wiki Site -- Ongoing
Sites for displaying student writing projects (**1001 Tales to the Alien King**) and podcasts; links to partner blogs and webs around the world. Students engaged at school and at home.
Video Conferences -- Ongoing
US and other countries: England, Wales, Washington, Connecticut, Oklahoma, New Hampshire, Oregon, New York, and California. Scheduled and impromptu sessions, Students involved with planning, speaking, microphones and camera, music, math, science, storytelling, current events, sign language, Spanish, Chinese, and magic. Teachers share information and ideas. Examples: Elmira, NY Mark Twain meeting, Mark Twain impersonators at each end. Met online with Spanish teacher in Los Angeles for help Spanish-speaking student. Project planning with Derbyshire and Reading, England.

2 The Monster Project: A Long Term Project Example

The Monster Project joins multiple schools in collaboration on a group-designed product. Teachers join the project and choose a single part of the monster: tail, head, arms, horns, nose, ears, legs, eyes, mouth, hair, and so forth, with the number of parts matching the number of participating classrooms. Each classroom *owns* their chosen body part. Students brainstorm words describing their body part, and submit the description to the project moderator. Classes follow a timeline in which the monster is completed by October 31, Halloween, associating the project to a United States cultural celebration, but also celebrated in many other countries. Once the monsters are built, teachers submit photographs so students can compare and contrast the range of monster creations.

2.1 Growth of the Project

I became the project's leader in 1999 and modified it from an e-mail based project into a web based project. Where members had previously only shared photos in email, the web site provided a permanent *place* for their combined work. Members submitted digital photographs of schools, classrooms, and playgrounds in addition to monster pictures. The web site was both a showcase and an archive; artifacts could endure beyond the life of a single project year, and could be available to all members for historical reference and teaching purposes.

The move from an e-mail list to a project web site spawned other changes. Teachers suggested additional open-ended writing activities: poetry, short stories, monster biographies, and newspaper ads, additions which required expansion of the project site. Then members began experimenting with audio files. One veteran participant, a pre-school teacher from New Jersey, shared a free software program for converting *wav* files to *mp3* files, and sparked interest among other participants as they learned that their computers had capabilities they had never used. An early audio contribution came from Kwazulu Natal, Africa. A young student, speaking in English (not his native language), recorded an apology for his class being late with their monster due to of a lack of orange paint. His principal had journeyed to the city to buy more paint. American students reacted to the African audio message and made their own mp3 files, greetings to other classes. Seeing the need for more communication, we added a wiki for members to contribute directly to community knowledge. Teachers could learn to use a wiki and edit the space independently.

The project currently attracts participants from the United States, England, Canada, Taiwan, Turkey, Kenya, South Africa, Pakistan, and Japan.   Figure 2 shows examples of monsters created by participants in 2008.

Figure 2. Example Monsters from 2008.

Monsters from England and Pakistan.

Monsters from North Carolina and Alaska

2.2 Language and Negotiation

A language of monster terminology began to develop as illustrated in this example of the monster's hands from students in Burneside, England: "multi-coloured veins, scarred, lumpy, hairy and bony, with one eye and a mouth on the palm of each hand." It is a language of adjectives and images, particularly those that younger students find attractive and fun to use. Student descriptions are direct references from their cultures in shapes, textures, and proportions. They specified inches, meters, ovals, circles, heart-shapes, pig-shapes, triangles, rectangles, spheres, eyes, tumbleweeds, rainbows, pompoms, flags, rings, jewels, warts, webs, killer bees, scorpions, maggots, volcanoes, boils, insects, saddles, bat wings, tarantulas and disco balls. Visual clues are in being rusty, dirty, striped, polka dotted, braided, rocky, spidery, hairy,

decomposing, bloodshot, gigantic, dangly, sparkly, rocky, carnivorous, and spidery. Table 2 shows the complete descriptions for the 2008 Monster project.

By discussing and negotiating details, students transform the adjectives and images into concrete form. Typically, the parts are distributed among students by choice or lottery. One student might be responsible for making the body, another for arms, another for legs, and so on. The head is a good cooperation example. Different students create the nose, the eyes, the mouth, the ears, and the hair, yet all of these parts must come together on a single monster head. As facilitator, the teacher allows a non-traditional format of chaos to foster the experimentation, the conversations, the disagreements, the clashes, and some off-task socializing. Students quickly adapt to the freedom of the project, working in trusting *peer-to-peer* relationships outside of the usual teacher-to-student dynamic (Topping, 2005, p. 637). Peer learning happens naturally in conversations and problem solving as students clarify objectives and negotiate details (Sluijsmans et al., 1999). Leaders emerge, impromptu teams form. Students move freely about the work area helping, sharing supplies, and generally enjoying learning and playing. These engaging social activities connect planning, designing, and constructing and later evolve naturally into comparing monsters, communicating with other project members, podcasting, making videos, and writing in student blogs. Overall, building the monster takes several days, a time in which the teacher can conduct whole class debriefing sessions and have students give project updates, further bonding the group into a community.

Table 2. Descriptions from Participating Classes.

Descriptions Brainstormed by Students	
1. **ARMS** – 3rd grade – Oklahoma City, OK: length -1 meter blue with polka dots, colorful spikes around wrist, flag of country	2. **HANDS** 4th Grade, Burneside, England: multi-coloured veins, scarred, lumpy, hairy and bony, with one eye and a mouth on the palm of each hand
3. **Right EYE**- 5th grade – Laingsburg, MI: Ten inch dangling, bloodshot with maggots crawling out and spikes around it	4. **Left EYE** – 3rd grade –Bridgeport, CT: yellow eyeball, blood shot, black iris with blue pupil, spiky eyelashes and eyebrow
5. **FEET –** Pre-school – Paramus, NJ: 2 feet – one red one black, rainbows on both, squishy, 1 ft. wide by 6 in. tall	6. **TAIL –** 1st grade – Moose Jaw, SK, Canada: Green fur, purple dots, brown tip, one metre long, super big spikes
7. **HEAD –** grades 3-4, Malatya, Turkey: black hexagon head with sparkling purple and green dots all over it	8. **EARS –** 4th grade – Indian Wells, CA: 2 tan 8- inch-diameter tumbleweed spheres; red, green, black, blue, yellow killer bees, tarantulas, scorpions, cockroaches, spiders
9. **NOSE -** 3rd grade – Hannibal, MO: 3D, 2 feet long, rainbow dots, spidery, boils, pig-shaped nostrils, crooked	10. **FINGERS** – 4th grade – Australia: 4 each hand, bony, purple, hairy, warts, yellow nails, 3 red claws
11. **LEGS –** 4th grade – Hannibal, MO: 4-feet-	12. **TEETH** – 1st grade – Cupertino, CA: so-sharp-they-

long (3 legs) 1st: human, hairy; 2nd: decomposing, flies, scales; 3rd: skeleton	can-cut-you-if-you-look-at-them, dirty-brown, purple, translucent-green, 10 rectangular on-the-top, 20,on-the-bottom, triangular with triangles-poking-out-the-sides
13. **BODY –** 4th grade – Franconia, NH: gigantic cobwebbed blue upright rectangle on top of an oval covered in bloody holes	14. **LIPS -** 3rd grade – Fargo, ND : pink, green checkered, frog-shaped , Cracked, hairy, bumpy , purple polka dotted
15. **NECK-** 2nd grade – Alaska: two feet long, red blood, guitars on it, green spikes, yellow flames	16. **HAIR –** 5th grade – Kansas City, KS: One side–red, dirty, smooth, 12 inches long, braided – Other side–green, dirty, rough, 48 inches long, puffy
17. **KNEES** - 1st grade – Webster, TX: (2 per leg)-10" red circle, blue star polka dots, 3 fangs-orange, black, white	18. **ELBOWS –** 4th Grade, Naches, WA: elbow 1: bloody torn warts, pink, sparkly, fiery hair. Elbow 2: eyeballs, polka-dots, triangle, cobwebbed, horn.
19. BELLY BUTTON - 4th grade – Hannibal, MO: Rounded oval shape, pierced with a worm, diamond studded hairs, fluffy maggots	**20. HORNS -** 4th grade – Taipei, Taiwan :2 horns, 30 cm long; made of iron, shape like volcanoes; burst out fire and rocky
21. **NECKLACE** - 4th grade – Hannibal, MO: yellow, 3-feet-long, 6-inches-wide, four 5-inch red bats, four flaming eyeballs, spidery skull	22. **BELT –** grades 3-4 – New Zealand: black, red yellow stripes; skull-shaped buckle, dangling green pompons or circles
23. **WINGS –** 1st grade – Buffalo, NY: big, red, heart shaped and covered with diamonds, jewels and spikes	24. **TOES –** 3rd grade – Icard, NC: 40 divided black toes, long, sharp, red nails, long red curly hair
25. **EARRINGS –** 5th grade – Durham, NC: bones, disco balls, rusty, wires, gigantic, bumpy, striped, spiky, wrinkly, sparkly, dangly	26. **FINGER-TOE RINGS –** grades 4-6- Kenya: 4 finger rings on each hand, red, 4 inches wide, 2 flaming eyeballs. Toe Rings: 40 toes, blue, 5 inches wide, 1 flaming eyeball after every 4 toes
27. **TONGUE –** 5th grade – Karachi, Pakistan: dirty-green 4 dark bands/saddles on back, bloody, nasty insects, 5 piercing-rings, 1-inch-apart on front	28. **CELL PHONE** – 5th grade – Laingsburg, MI: (Eyephone) Spike with eyeball antennae, bloodshot eyeball buttons, carnivorous, bat wings, pop-out spider screen

2.3 Situated Learning

The Monster Project is an example of situated learning; it is more than the general idea of *learning by doing*, but as explained by Lave and Wenger (1991) it is learning that occurs as "… an integral and inseparable aspect of social practice." Learning is the result of legitimate peripheral participation in communities of practice. That is, the learning is an inseparable part of the practice, a phenomenon of the community. A flurry of children's activity ensues as they design parts, compromise, and create the monster. In the project momentum, the teacher can guide related lessons almost with ease. The students are receptive to learning as they go about their socializing, assembling fingers to the hand, hands to the arms, nose to the face, arms to the body and so forth. Students are not being directly taught formally about sequencing, but *they learn from their immersion in social encounters*, that is, in negotiations associated with constructing the monster.

Derry and Steinkuehler (2003) stated "situativity theory views knowledge, not as individual mental representation, but as something that resides within communities and manifests itself through what the members do and create" (p. 804). The facilitating teacher is not delivering isolated lessons about cooperation or planning, but is demonstrating an *apprenticeship* approach, while students group themselves on the floor with the tools of their trade: scissors, paper, glue, paint, and rulers. The teacher shows monsters from prior years, allowing the students to experience the concrete form, to see how earlier communities created monsters. Artifacts of photos, stories, poems, and videos help new members become part of the greater whole, the feeling of *being* monster makers. Students operate at differentiated levels of participation, some more aggressively, some as learners or observers, but all are involved, all belong to the community.

Barab and Duffy (2000) hold that a community of practice has certain characteristics: a history of group accomplishments; a belonging to something larger, a connection to other members; and a reproduction cycle in which the community replenishes itself as veteran members leave and new members join, another common attribute of communities of practice.

2.4 Old Timers and New Comers

Each year, new teachers join the project, others leave the project, and in this coming and going, the community of practice stays alive. Over the last nine years, the project has seen a changing community of old timers and new comers in Nebraska, New Jersey, Texas, New York, Karachi, Tokyo, South Africa, Taiwan, England, Oklahoma, Missouri and other locations. Table 3 shows the changing participant levels. In 2000, 2001, and 2008, the project had more new comers than old timers. The numbers reflect teachers retiring and leaving the system, changing job, relocating, and in some cases quitting the project to focus more time on standardized testing.

Table 3. Old Timers and New Comers 2000-2008

Project Date	Old Timers	New Comers
2008	11	17
2007	12	8
2006	10	9
2005	10	8
2004	11	5
2003	11	9
2002	12	8
2001	7	9
2000	8	10

Barab and Duffy (2000) wrote, "Over time, these newcomers come to embody the communal practice (and rituals) and may even replace old timers. Reproducibility, in which newcomers are able to become central to and expand the community, is essential if the community is to have a common cultural and historical heritage. It is a process that is continually occurring in all communities of practice" (p.16).

There are no tests or traditional assessments in the project, but state learning standards can easily be identified. New comers, often with no other Internet project experience, sometimes view the project as tasks added to the regular curriculum, in other words, just more work to do. Experienced project-based learning teachers help new comers identify how assessment objectives are met within the project.

As teachers manage the project stages, their experiential growth is evidence of legitimate peripheral participation. A teacher's identity changes from a new comer wondering how she will implement the project, to a more expert position as chaos settles, and the monster is finished. Lave and Wenger (1999) describe this "participation as a way of learning – of both absorbing and being absorbed in – the culture of practice" (p. 23). Just as the teachers make this transition, so do the students. As they interpret the monster's physical form, as they share the language, and help each other in the process, they, too, move from a peripheral participant toward full participation in the community: "…learners must be legitimate peripheral participants in ongoing practice in order for learning identities to be engaged and develop into full participation" (Lave & Wenger, 1991, p. 64).

As Halloween approaches and monsters are completed, the project site fills with monster photos. Students speak more as experts as they compare other monsters to their own. In cases where descriptions were not followed exactly, students employ their critical skills to evaluate and comment on others. Teachers guide students in the art constructive criticism.

2.5 Importance of Artifacts

As teachers and students engage in learning events, they access the artifacts of the project, that is, the tools, communications, stories, photos, audio files, videos, traditions and rituals. It is through the artifacts that participants understand the history of the community. Participants have the opportunity to create similar artifacts, build upon the previous ones, or create their own. Table 4 shows a sampling of the activities, extensions, and rituals of the project. There are only three requirements for project participation: writing the adjective description, building a monster, and sending a photo. All other activities are options, an aspect that helps make the project a community of practice. The majority of these artifacts are contributions and ideas of both old timers and new comers.

Table 4. Monster Project Activities, Extensions, and Rituals

Monster Project Activities, Extensions, and Rituals	
Reading members biographies	Recording podcasts
Brainstorming adjective descriptions	Map and world geography skills
Designing individual parts before building	Reading comprehension games
Using historical photos and products	Brainstorming names
Comparing/contrasting Monsters	Voting on Monster names
Measuring length and width	Graphing voting results
Compromising as students fit parts together	Writing descriptive blogs
Communicating on the wiki	Writing Monster literature
Studying proportions	Making Monster videos

3 Observations: The Monster Project as a Community of Practice

The Monster Project is a project-based learning model and contrasts with traditional teaching-learning forms called "commoditized" (Barab and Duffy, 2000). It does not fit the usual packaged lesson structured for the purpose of assessment; it is multi-layered, open-ended, and a differentiated approach for students of many ability levels. Participants are a part of something larger than what exists within the walls of school; they are connected to a global family of monster makers, and indeed, they attain the identity of *monster maker*. If teachers act as true facilitators and allow the space and time to negotiate project activities, students develop an identity from their social encounters. They assume the identity of a *monster maker*: a planner, a designer, a thinker, a collaborator, and a builder – a part of a worldwide club of members doing the same thing. Barab and Duffy (2000, p. 34) make the point that students react to their environment with an identity response. If students experience an ongoing inability to understand or connect with a learning situation, they will likely disassociate from that situation, taking on the identity of a dissatisfied, uninterested student. Wenger (1998) argues that "We know who we are by what is familiar and by what we can negotiate and make use of, and that we know who we are not by what is unfamiliar, unwieldy, and out of our purview. This is an important point. We not only produce our identities through the practices we engage in, but we also define ourselves through the practices we do not engage in" (p. 174).

A question then arises for educators: What identities will students assume in response to the learning situations created for them by teachers? In a classroom designed to raise test scores, time is scarce, and students are directed toward targeted test objectives. It is common in schools to see many students disassociate from this structure, and further, for real learning to be inhibited. Lave and Wenger (1991) address two educational forms: a learning curriculum and a teaching curriculum. The teaching curriculum is a controlled, limited structure aimed at teaching objectives to newcomers. It seeks to deliver learning that is to be captured and held by the student for later use, a commoditized approach. The learning curriculum, however, is situated, not isolated, and functions in social settings to allow legitimate peripheral participation, a mix of context and content. Learning occurs through interactions with people and artifacts. Members are engaged in the knowledge of the community and learn *because* of this engagement. Educators have opportunities to choose methods which favor students' learning styles, fit their culture, and

meet social needs. Eckert, Goldman and Wenger (1996) observed the following about learning in communities of practice:

      1. Learning is fundamentally social
      2. Knowledge is integrated in the life of communities
      3. Learning is an act of participation
      4. Knowing depends on engagement in practice
      5. Engagement is inseparable from empowerment
      6. Failure to learn is the result of exclusion from participation
      7. People are natural lifelong learners

3.1 Summation and Future Thoughts

The Monster Project works well as a first-time Internet project, a beginning place for using technology in the classroom, for differentiating instruction, for connecting schools, and thereby sharing learning with audiences around the world. Teachers are free to interpret and implement the project as it best fits their schedules and curricular requirements. Participation may be minimal, doing only the basic steps, or it can broaden in scope to connecting with other classrooms, sharing media, and creating ongoing relationships across distance and language boundaries.

Teachers who are entrenched in traditional education tend to believe that project-based learning is not effective as a main approach and view it as a temporary activity (Zhao et al., 2002). Studies have shown, however, that this belief is not valid. One example is a program that combined project-based learning and technology with grade eight students in the Interactive Multimedia Education Trial. Students scored 10% higher on state reading tests than students in similar urban districts on reading, as well as showing improved writing and research skills (Education Development Center, 1994). Katz and Chard (1994) also reported positive results of students using project-based learning, that students of differentiated abilities performed well and enjoyed being in school when active with projects. Fredricks, Blumenfeld, Friedel, and Paris (2004) reported that project-based learning promotes student engagement and higher order thinking, which can lead to improved academic outcomes. Project-based learning was shown to result in students' active knowledge construction, and in teachers creating learning situations for collaboration, problem solving, and discovery (Penuel et al., 1999). Students thrive with project-based learning, are more satisfied, are more intrinsically motivated, are more likely to show conceptual understanding, and to be more well adjusted than students in traditional modes of education (Deci, Vallerand, Pelletier, & Ryan, 1991, p. 332).

My observations of project-based learning coincide with the research herein. Socially, students thrive in an active classroom; conversations with each other are as prevalent as with the teacher. Individually, students improve in basic reading and writing skills, in working with others, solving problems, and creating solutions. Students want to come to class because the time spent has meaning for them.

When administrators align academic energies on testing, a tone of conformity and mediocrity

results (Marshall, 1997). Overemphasis on programs of mandated instruction to raise test scores creates a serious barrier to the acceptance of situated learning with projects.

For the future, it will be beneficial for administrators to understand how project-based learning can lead to overall educational objectives. Student achievement can improve in social learning situations, and from immersion in experiential activities under the guidance of an effective teacher (Barron et al., 1998). Administrators and teachers entrenched in traditional ways may be challenged because of beliefs in longstanding school methods of commoditized learning. Finding ways to provide meaningful, effective, student-centered, enjoyable education, as well as designing assessments to show real progress are the challenges for professional teachers, administrators, and researchers. This paper offers pathways toward those goals using project-based learning to join context and content in classrooms, and to promote the characteristics of a community of practice.

References

Barab, S. A., & Duffy, T. M. (2000). From practice fields to communities of practice. In D. Jonassen & S. Land (Eds.), Theoretical foundations of learning environments, pp. 29-56. Mahwah, NJ: Erlbaum.

Barron, B. J. S., Schwartz, D. L., Vye, N. J., Moore, A., Petrosino, A., Zech, L., Bransford, J. D., & the Cognition and Technology Group at Vanderbilt (1998). Doing with understanding: Lessons from research on problem- and project-based learning. Journal of the Learning Sciences, 7, 271-312.

Brown, J.S., Collins, A., & Duguid, P. (1989) Situated cognition and the culture of learning. *Educational Researcher*. 18(1), 32-42.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26, 325-346.

Eckert, P., Goldman, S., & Wenger, E. (1996). *The School as a Community of Engaged Learners.* Institute for Research on Learning Report.

Education Development Center. (1994*). Union City Interactive Multimedia Education Trial: 1993-1994 summary report*. New York: Educational Development Center.

Fredricks, J., Blumenfeld, P., Friedel, J., & Paris, A. (2004). *School engagement: Potential of the concept, state of the evidence.* Review of Educational Research, 74(1), 59-109.

Jenkins, H., Clinton K., Purushotma, R., Robinson, A.J., & Weigel, M. (2006). Confronting the challenges of participatory culture: Media education for the 21st century. Chicago, IL: The MacArthur Foundation. Retrieved January 1, 2009, from http://newmedialiteracies.org/files/working/NMLWhitePaper.pdf

Joseph, D., & Nacu, D. C. (2003). Designing interesting learning environments when the medium isn't enough. *Convergence: The Journal of Research into New Media Technologies, 9*(2), 84-115.

Katz, L.G. and S.C. Chard. (1989). *Engaging Children's Minds: the Project Approach*. Norwood, NJ: Ablex.

Lave, J & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, U.K: Cambridge University Press.

Lave and Wenger (1999) Learning and Pedagogy in communities of Practice in: Leach, J and Moon, B, (Ed) *Learners and Pedagogy,* London, Paul Chapman Publishing Ltd

Marshall, B. (1997) Education: What they should be learning and how they should be taught. *Critical Quarterly*. 39(4), 85-91.

Penuel, W. R., Korbak, C., Cole, K. A., & Jump, O. (1999). *Imagination, production, and collaboration in project-based learning using multimedia*. Proceedings of CSCL '99.

Sluijsmans, D., Dochy, F., & Moerkerke, G. (1999). Creating a learning environment by using self- peer- and coassessment. *Learning Environments Research, 1*, 293-319.

Tomlinson, C. A., & Cunningham Edison, C. (2003). *Differentiation in practice: A resource guide for differentiating curriculum, grades 5-9*. Alexandria, VA: Association for Supervision and Curriculum Development.

Topping, K. J. (2005). Trends in Peer Learning. *Educational Psychology, 25*(6), 631-645.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity.* Cambridge, UK: Cambridge University Press.

Wenger, E., McDermott, R., & Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge.* Boston: Harvard Business School Publishing.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. L. (2002). Conditions for classroom technology innovations. *Teachers College Record, 104*(3), 482–515.