Computers, Problem Solving and Cooperative Learning
Wiki Redux

Link:
http://share.wikispaces.com/

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Yes, I Wiki.

My final project for the semester will elaborate on my initial analysis of the wiki as a powerful tool in problem solving and cooperative learning. I have further embellished my original wiki to include pages which support literature, science and social studies curriculum units. Since I am not currently a teacher in the classroom, I have taken one literature and one science unit completed by my 5th grade daughter and transformed them into wiki format. The third wiki is a social studies unit which was my contribution to our group "Immigration" project.

As I was analyzing the wiki format, I tried to determine what components of meaningful learning could be added to the curriculum unit through the use of a wiki. Meaningful learning, as defined by Jonassen, is comprised of five components:

Meaningful Learning is Active:

"Humans of all ages, without the intervention of formal instruction, can develop sophisticated skills and construct advanced knowledge about the world around them when they need or want to." (David H. Jonassen 2003)

At the software level, the wiki format which is provided by edublogs utilizes simple editing tools. I included a page called [s][h][a][r][e] wiki etiquette which includes guidelines for team editing. This page also provides instructions to link to an internal (within the wiki) or external (on the world wide web) destination. I truly believe that the students will experiment with the editing and teach one another how to add links. The

construction of this advanced knowledge is placed in hands of the students. The teacher has the opportunity to review history logs of the wiki to determine if each student is participating equally. The history logs could also be used as a tool for assessment. The edublogs wiki software contains a change description field which can be filled in by the student or team. The student(s) have the ability to document the reason for their ongoing changes.

At the curriculum level, the wiki, when presented in a problem solving format, can provide the students with the opportunity to actively examine curriculum units by contributing thoughtful analysis of a problem being presented. I approached the literature unit, The True Confessions of Charlotte Doyle, by posing problems that Charlotte encounters throughout her voyage from Liverpool, England to Providence Rhode Island. From being left at the dock alone when she was supposed to join other families on a journey by clipper ship, to being presented with a knife for protection by a crew member, Charlotte has many problems to solve. I invite the students to examine Charlotte's options within the context of her time era. Then, I challenge the students to come up with a viable solution and to explain their choice. Each student becomes actively involved in the analysis of the problem and a proposed solution. A student who is not comfortable with verbal participation now has the opportunity though the wiki to contribute thoughtful analysis. Time can be taken to choose words carefully on a home or library computer. What I like best about the wiki is its accessibility. It does not remain behind a locked classroom door. The wiki does not get left behind in a locker. It can be always accessible by students or the teacher.

Within the science unit, the wiki naturally lends itself to recording the scientific process. The science experiment which I recorded in wiki format was completed by a team of students in the classroom using poster board and index cards. I structured the wiki as a forum to document the scientific process. The wiki enables the students to actively participate in the recording and reviewing of results on a day to day basis. The results can be viewed by all of the members and the teacher through any internet connection.

Within the Immigration Group project, I constructed a Wiki Book Club. Since we are examining the four regions of the United States under the umbrella of three essential questions, I assigned a different book pertaining to each of the four regions. For the purposes of the group assignment, I "fleshed out" the North East region's book Immigrant Kids. I opened the discussion of this book with a problem faced by the immigrants concerning the living conditions in the steerage compartment of the ship. Then, I provided a hyperlink to the S.S. Pennland's manifest from 1889. The Pennland is the actual ship pictured in the book. The student becomes actively involved in placing real immigrants into the context of their studies. The manifest lists the names, sex, age and assigned spot on the ship. The first assignment involves sorting the passengers of the ship by sex and age group. Then, I ask the students to fill in a chart which categorizes the accommodations on the ship. Most immigrants were place within filthy, crowded steerage compartments. The students must arrive at a percentage of passengers in each of the types of compartments. In this activity, I tried to apply the "Teaching for Transfer" concept spoken about by Perkins in Smart Schools. "Transfer means learning something in one situation and applying it in another, significantly

different one."(Perkins 1992) The counting, sorting, percentage calculations and collaborative reporting of results exercises the students' math skills within a social studies unit.

Meaningful Learning is Constructive:

"It is essential that learners articulate what they have accomplished and reflect on their activity and observations – to learn the lessons that their activity has to teach."(David H. Jonassen 2003)

I believe that the wiki provides an excellent forum to both articulate and reflect. Each student is invited to contribute to the development of their team's response to the questions asked within the assignment. The wiki is always available for review and revision. A student or team can return to their work at any time. Their work is not behind a locked classroom door. If a student wants to look at the assignment again, it is available for viewing and editing.

In speaking about constructivism and technology, Jonassen stresses that "first and foremost, teachers must relinquish at least some of their authority, especially their intellectual authority." (David H. Jonassen 2003) I incorporated this advice into the literature wiki unit. I am always frustrated when my daughters' teachers provide the class with a vocabulary list of words which must be defined. Instead, I created an "All Hands on Deck" page which is a collaborative list of vocabulary words. The list of words and definitions on this page represents the words that my daughter had to look up while she was reading Charlotte Doyle. I required her to stop and look up a word if she did not know the definition. I would do the same in my literature class. The "All Hands on Deck" is a collaborative list compiled by the students to clarify their reading.

How could you know what is going on in a book if you do not know the definition of a word being used by the author? I submit that it is impossible. In a constructivist environment, the teacher should relinquish control of the vocabulary list. How is the student supposed to define a word out of context? They will learn more if they stop reading, look up the word and continue to read after clarifying their understanding of what is going on in the book.

I was very disappointed to learn that our school is dropping Charlotte Doyle for next year's fifth grade class. Several parents complained that there were too many hard vocabulary words. If a wiki was used instead of individual projects, then the students can read each others vocabulary entries on the "All Hands on Deck" page. They could feel encouraged about adding a word to the collaborative list. I did not require the student to add their name after the vocabulary entry. I can see who entered a word through the history log. If a parent is observing their student's work at home, they could see over 170 vocabulary entries that were entered by the other students. If their child does not look up a word in context, then how are they supposed to learn? Then, they complain about low standardized test scores? Many parents squelch the learning process by asking that the curriculum be "dumbed down"!

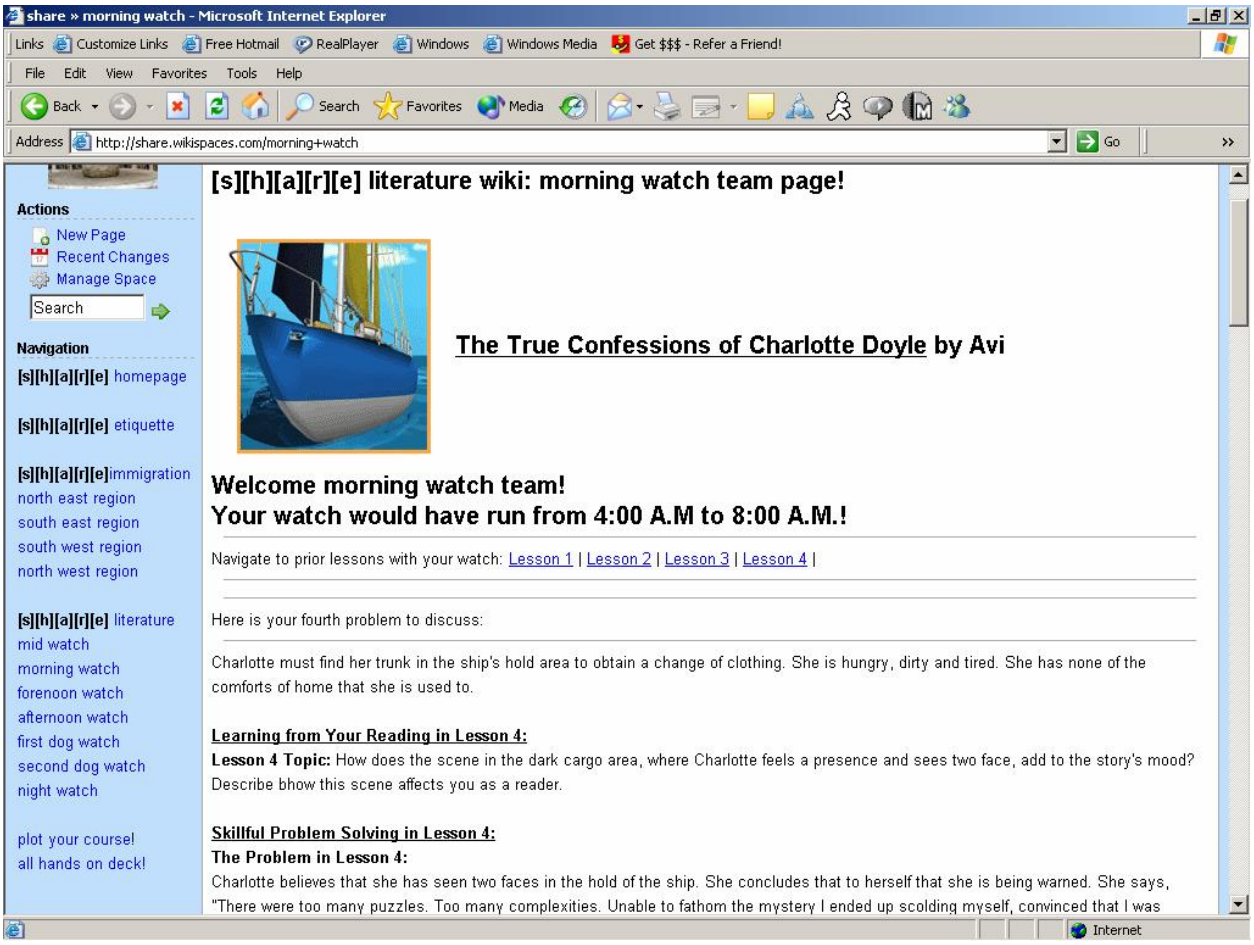
In the science unit, an experiment is being conducted and results are being recorded. The students are constructing their knowledge of the affects of acid rain on shells and coral. If a student is absent on a day that their team is recording results, then they can still participate by logging in and viewing results. They can even post questions for the teammates to answer. Other teams conducting other experiments could read each other's wiki entries and learn from each other's experiments. They

would not have to wait for the experiment to be done. They could have the opportunity to view ongoing observations in order to derive their own conclusions. This usually does not happen in a paper notebook environment. Jonassen states that "When students collaborate without permission, educators may even accuse them of cheating."(David H. Jonassen 2003) Looking at another team's wiki is not cheating, it is collaboration and constructing our knowledge.

Meaningful Learning is Intentional:

"When learners are actively and willfully trying to achieve a cognitive goal, they think and learn more because they are filling an intention." I believe that wikis fulfill intentionally learning. Within the Charlotte Doyle unit, I have structured the problems to be solved in a "push down stack" method. By this, I mean that once the team has finished an assignment, I add my comments to the top of their assignment. Then I add the next assignment above the last. This way, the student does not have to scroll beyond their prior assignment. Each team has a stack of accomplished work which encourages them to build from the bottom up, effectively building a foundation of learning.

The discussion of "intentional learning" also coincides with Perkins' discussion of "generative knowledge". He defines this as "knowledge that does not just sit there but functions richly in people's lives to help them understand and deal with the world." (Perkins 1992) By dealing with the main character's problems, the students are actively using their shared knowledge to come up with viable solutions.



I have added “anchors” to the wiki which create directed spots on the page. They can navigate directly to their prior assignments. Also, I created a page called “Plot Your Course!” Within this page, I created a table which has a spot for each “watch” to indicate that they are done with their current assignment. I have created opportunities for the teams to have short and long term goals. The short term goals are provided in the “Plot Your Course” page. The team that finishes an assignment is rewarded with a new lesson to complete. The long term goal is ultimately to finish the voyage while helping Charlotte with her numerous problems throughout the trip. A second long term goal is to fill out the “All Hands on Deck” vocabulary page. How many vocabulary words can we find? It becomes rewarding to look up a word and be the first team to post a

vocabulary word. If a vocabulary word is already posted, then an alternate definition can be posted.

The goals within the science page are to finish the project and to follow the scientific approach. The wiki is both a forum to record your observations and a presentation tool. Once the team has finished the experiment, then their results are ready to present. There is no need to prepare a separate presentation. More time can be spent on analysis and deriving results. There isn't a separate, time consuming presentation step. In constructing the science page, my daughter asked once how to connect an external link to the wiki. She then created a link to the Environmental Protection Agency's web page. This site explains the ph scale and at what levels certain fish begin to die.

Meaningful Learning is Authentic:

Jonassen states that "learning tasks that are situated in some meaningful real-world task or simulated in some case-based or problem-based learning environment are not only better understood, but also are more consistently transferred to new situations."

Placing the student within the context of a problem will certainly yield a better understanding of the situation. Within my Immigration Book Club wiki, I placed an assignment to examine the living conditions of the immigrants by inserting a link to the Lower East Side Tenement Museum. Here, the student can click on a virtual tour with audio narration of the tenements at 97 Orchard Street. I asked the students to post reflections on the living conditions of the typical immigrant and the dangers of such overcrowded housing.

In the Charlotte Doyle literature unit, I chose to name the teams according to the "watches" on a ship. A watch is a group responsible for the ship during a certain time period. There are seven watches on a ship in order to keep the vessel afloat and on a correct course. By placing the students in watches, I hoped to "place" them on the voyage with Charlotte to help her solve her problems.

By placing the link to the Environmental Protection Agency, the students can view the real dangers of acid rain. The ph chart lists the fish which die as a result of the change in ph to bodies of water caused by acid rain. Here, they can determine that the choices we make as citizens of the earth have negative consequences to the fish and wildlife population.

Meaningful Learning is Cooperative:

In his book Learning to Solve Problems with Technology Jonassen delves into the subject of communities. He defines a community as "a social organization of people who share knowledge, values and goals." Jonassen ponders this subject further by asking, "If working and learning together in communities is so natural, why do schools individualize learning and make its outcomes competitive among students?"(David H. Jonassen 2003) Within the world of wikis, there is an open invitation for a group to take part in the formation and maintenance of shared knowledge. I believe that the benefits to the students' cooperative and collaborative learning are exponential. Once several students learn how to perform a new skill, then that skill gets shared among the other students. The children become experts, and the teacher takes more of a role of the coach. In her book Teaching with Technology: Creating Student Centered Classrooms which is about the Apple Classrooms of Tomorrow, Sandholtz elaborates on the

unanticipated benefits of students as experts: "… the benefits of this role shift went far beyond saving them time. Teachers saw less advanced students blossom, unpopular students gain peer approval, and unmotivated students stay in to work at recess." (Sandholtz 1997) I believe that if pre-conceived notions about a student's ability can be left behind, and new "learning" personas adopted, then it is a win – win situation. Cooperation and collaboration can breed acceptance. Once the playing field is equal, then the students are "allowed" to learn.

Perkins highlights certain "Deep Causes" of the problems surrounding learning in schools in the United States. Perkins states that there is a big difference between American and Japanese attitudes concerning education. In Japan, learning is effort centered. If a child hasn't achieved success in learning math, then the response is that the student didn't try hard enough. In America, the parent replies that math was beyond the student's abilities.

I believe that the wiki provides a level ground on which each student can build upon their version of "effort" to become successful in learning.

Accessibility:

The wiki uses HTML (Hypertext Markup Language) structural markup to identify headings, lists and paragraphs. It uses Cascading Style Sheets to define its visual properties. This is the way in which an "accessible" web site should be designed, according to Horton in Access by Design. Horton indicates that, "The key to device independence and universal access is in the separation of content and presentation." (Horton 2006) The content is contained within the structural markup of the HTML. Any device or browser, such as the IBM Home Page Reader translates the tags and

information contained within those tags to a synthesized voice. The alternate text provided with clip art or other types of images will be read to the visually impaired user.

The following quotation from Wikipedia, describes the issue of the use of structural markup to manage content and Cascading Style Sheets (CSS) to manage presentation:

"With the advent and refinement of CSS and the increasing support for it in web browsers, subsequent editions of HTML increasingly stress only using markup that suggests the structure of the document, like headings, paragraphs, block quoted text, and tables, instead of using markup which is written for visual purposes only, like <font>, <b> (bold), and <i> (italics). Some of these elements are not permitted in certain varieties of HTML, like HTML 4.01 Strict. CSS provides a way to separate document structure from the content's presentation, by keeping all code dealing with presentation defined in a CSS file".(Wikipedia 2006)

By separating content from presentation, the wiki is inherently accessible to different devices. Horton further states that "When content is handled separately from presentation, documents can be accessed without requiring specific fonts, operating systems, software and display formats. Content can be read using different devices – graphical browsers, text-only browsers, speech synthesizers, printed output, PDA's and Web-enabled appliances. The actual rendering of the pages is left up to the client software."(Horton 2006) In this case, the client is perhaps a visually impaired student using the IBM Home Page Reader. The student is now able to enter the main stream of the class to actively participate in the construction of knowledge.

To test this concept, I asked my husband to access my "share.wikispaces" on his Blackberry PDA. Yes, it worked. I am very excited.

Teachers and the Wiki:

In his book entitled The New Meaning of Educational Change, Fullan describes the inherent problem of "isolation" in the teaching profession. Fullan states "there was little…to suggest active, ongoing exchanges of ideas and practices across schools, between groups of teachers, or between individuals even in the same schools." Time for teacher collaboration is almost non-existent. I believe that the wiki would provide a vehicle for other teachers to actively see the progress of another teacher's curriculum units. Further, a page could be added to the wiki to provide feedback from fellow teachers for suggestions, questions or comments.

During my class entitled Technology and School Change, we were invited to examine a published case study in the area of School Change. The case study which I analyzed was one involving Communities of Practice fostered during an in-service training of Heads of Information Technology (IT) departments of schools in Singapore. One of the goals of this in-service training was to adopt Information and Communications Technology that support constructivist learning.

Communities of Practice, as defined by the authors of the case study are "sustained social network of individuals who share a common set of core values and knowledge, including a past history, grounded on common practices."(Hung, Chee et al. 2005) This study documented the groups of IT heads who shared ideas and strategies to bring both the constructivist teaching method and technology back to their schools. What consequently happened was that the individuals taking this in-service training maintained their own Communities of Practices on an "Intra" school basis. They kept up their communications with each other across school lines. The sharing continued after

the course was over. This case study was presented in 2005. The Head of IT Departments could have used the wiki as a vehicle to construct learning at their schools. While there is no evidence within the study to show that wikis were used, they could have been used to share teaching strategies among the schools within the newly formed Community of Practice.

In one of the "Three Ways to Put Theory One to Work", Perkins reviews the concept of "coaching". He defines this role shift as a person who "stands back, observes performances and provides guidance."(Perkins 1992) This type of role reinforces two of the precepts of Theory One, thoughtful practice and informative feedback. Perkins maintains that coaching is a "powerful mechanism" for student motivation. The wiki provides the perfect opportunity for the teacher to assume the role of coach and to provide thoughtful guidance. The students can assume more of the role of "expert" in the knowledge building lessons.

The technical aspects of developing a wiki are very simple. I truly believe that if a teacher can open and edit a word document, then they can create and link wiki pages. Simple editing is best in a wiki. This simplicity allows the wiki to have the accessibility needed to be displayed on many devices. The wiki is geared to be text intensive, rather than visual appeal.

Conclusion:

Ultimately, I come back to Dewey to summarize the benefits of the wiki. Dewey states in his work, The School and Society, that "What is needed, in a word, is to afford occasion by which the child is moved to educe and exchange with others his store of experiences, his range of information, to make new observations correcting and

extending them in order to keep his images moving, in order to find mental rest and satisfaction in definite and vivid realization of what is new and enlarging."(Dewey 1915)

I believe that this summarizes the wiki as a forum for problem solving and cooperative learning. The child brings his experiences and points of view to his/her group. This point of view becomes shared and remodeled through the experiences of the other group members. The student can examine what is new and combine it with prior knowledge to construct their modified understanding of the world.

In his work, The Child and the Curriculum, Dewey comments that "Learning is active. It involves reaching out of the mind."(Dewey 1902) The wiki involves active participation by the student and their peers. The lessons have been designed to use the vocabulary of thinking as described by Perkins to be terms such as "hypothesize", "believe", "predict", and my own addition, "reflect".(Perkins 1992) The teacher must encourage these words and invite the students to "reach out" and make connections from what they are learning to what they could retain and use.

It is time to move, as Perkins suggests from an "ability counts most" attitude to an "effort model of success". Perkins states, "Some people take longer to learn certain things. However, if we organize education so that those who need more time have the opportunity and motivation to put in more time, they achieve much more." (Perkins 1992) I believe that the wiki provides the forum for all learning styles to participate. The wiki naturally moves from an ability model of success to putting in the effort to be successful.

In his discussions about effort based models of education, Perkins further elaborates about "entity learners" versus "incremental learners". The entity learner tries

to take in information all at once. “Either you get the material, or you don’t”(Perkins 1992) An incremental learner, however, believes that “learning comes in increments; you hang in there and persist, winning your way to an understanding.”(Perkins 1992) I believe that the wiki naturally lends itself to the incremental style of learning. The lessons are added and built upon. The students have the chance to absorb or look back on prior information, because it is readily available. The wiki is an accessible forum. It even worked on my husband’s Blackberry. Wiki on!

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