Convergence!

Project Based Learning and the

Common Core Standards

A free webinar by Corwin Press, featuring:

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All Educators are Invited to Follow Dr. Bender on Twitter:

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www.CorwinPress.com

Personal Introduction:

Dr. Bender is was a Junior high teacher and higher education faculty member in education, who now does 30 to 50 workshops yearly, and writes professional development books for educators. Four recent books by William N. Bender relate to this presentation.

Bender, W. N. (2012). *Project Based Learning: Differentiating Instruction for the 21st Century.* Thousand Oaks, CA: Corwin Press.

Bender, W. N. & Waller, L. (2013). *Cool Tech Tools for Lower Tech Teachers: 20 strategies for the 21st century Classroom.* Thousand Oaks, CA: Corwin Press.

Bender, W. N. & Waller, L. (2011). *The Teaching Revolution: RTI, Technology, and Differentiation Transform Teaching for the 21st Century.* Thousand Oaks, CA: Corwin Press.

Bender, W. N. (2013). *Differentiated Instruction for Students with Learning Disabilities, Third Edition.* Thousand Oaks, CA: Corwin Press.

My perspective: A Preview

"We must not teach 21st century kids using 20th century thinking! Educational standards represent a 20th century instructional approach, and I am concerned that the implementation of Common Core Standards within our current instructional practices will probably not enhance learning for our students. As concerned professionals, we have to ask, "What instructional approach fosters the types of learning and thinking we want the 21st century learner to exemplify?" We can then use Common Core implementation to transition into an effective 21st century instructional model, and I believe Project Based Learning is that model."

Class Poll: Please select the indicator that best describes your level of experience with PBL.

A) I'm very experienced in PBL instruction
B) I've begun one or more PBL project and want to learn more
C) I'm fairly well read on PBL but have yet to try it
D) I've read just a bit on PBL but haven't tried it
E) I'm completely new to PBL

I.   *What Do Kids Need to Learn For the 21st Century? Who Are They, and Who Will They Become?*

21st century skills is one of the most in-demand topics in professional development right now.

A. *The What Do Kids Need Approach:*
 National Research Council Report for the National Academies of Science. (Sparks, 2012).

"The modern workplace and lifestyle demand that students balance cognitive and personal, but current educational policy discussions have not defined these abilities well." Answers to what 21st century skills are needed is framed in terms of

Cognitive Skills: such as deep understanding and the ability to transfer and apply knowledge to a problem in a new context,

Interpersonal Skills: such as the ability to work effectively with others in the workplace, complex communication and teamwork skills,

Intrapersonal Skills: skills such as resiliency when undertaking a task, persistence, resourcefulness, and conscientiousness.

The report goes on to suggest that these skills lead to success in later life!

"If we really believe that the fundamental proposition here is transfer, it would dramatically affect what we did in curriculum assessment and instruction. In math, for example, we wouldn't necessarily just give kids these problem (solving) sets, but engage them in identifying, framing, and solving real-world problems that would use those problem sets."

--Dr. Linda Darling-Hammond, Stanford University

B. The Who Are These Kids Approach:
C2S2 Kids! My Conceptualization in Cool Tech Tools for Lower Tech Teachers

These skills are roughly synonymous with a recent description I and my co-author, Ms. Laura Waller developed when we discussed C2S2 Kids (**The Teaching Revolution,** Corwin Press). We were not trying to describe skills they need, so much as their learning characteristics. We came up with C2S2.   *collaborative, creative, social, and self-directed ---C2S2!*

1. Students today learn differently and thrive in collaborative learning, rather than exclusively individual or competitive learning experiences.

    Students will collaborate more in the workplace in the next century than did their parents generation, and such collaboration should be fostered in the schools. While teaching today typically stresses individual work moreso than collaborative work, the 21st century workplace is, typically, the opposite.

2. Students today expect to create content rather than consume content.

    Consider a 19th or 20th century model of instruction where students come into classrooms where teachers pour knowledge into their head. They students regurgitate that knowledge on memory-based assessments, and finally forget that content soon after the exams are over.

    This has now given way to opportunities for students to identify their interest in a given topic, to create information on that topic and then publish it; today students want and expect

to solve real-world problems. The creativity of millions and millions of students worldwide represents a vast, wholly untapped resource of thought that can now be directed at fundamental real-world problems. In fact, that is the very basis of project-based learning, focusing students' collaborative creativity on real problems to seek real solutions that can then be applied in the real world.

3.   Students are Social in ways today that were unimagined only 15 years ago.

Today students choose to invest significant time in a virtual, digital social environment, and, the social expectations of today's learners goes far beyond collaborative work in the classroom. Even when students are not collaboratively working on a task, they crave today, the opportunity to socially engage in discussions of their learning either in the real world or in the digital world. Students spend nearly unimaginable amounts of time in the digital, social environments of *Facebook, Twitter,* and many other social networks, and this desire for virtually unlimited social interaction can and should be harnessed as a powerful educational force. Teachers today simply must begin to use this force in order to reach our students. I typically recommend Ning, or Moodle, or some other option that provides a safer haven for educational work that would Facebook ; Still many teachers are using Facebook and Twitter for education today, and kids are responding positively to it.

4.   Students today are self-directed.

The 21st century student desires the option of choosing what they study and when they study. They don't mind interfacing standards with their selection of projects, but they do want choice. In spite of being quite social, they also sometimes want to work independently on new content. That is why Khan Academy seems to be catching on explosively. Finally, these students absolutely insist on using technology in their learning.

Thus our construct C2S2 kids: ***collaborative, creative, social, and self-directed.*** While this doesn't fit a wholly unmotivated kid, it does describe many if not most of the students in classrooms today.

Thought Question Chat: What would you guys add to this list of characteristics? Do you see some of these student traits in your classroom?

II.   *Convergence of Current Trends in Instruction*

Next, we should discuss, what is happening in education that might impact these C2S2 learners. I posit that instruction in the near term of the 21st century will represent a convergence of several current instructional trends, each of which can undergird and support the Common Core. Differentiated instruction, response to intervention, technology, and the Common Core are transforming education already, and PBL seems poised to have an important impact as educators move into implementation of the Common Core Standards. All of these instructional innovations seem to be contenders for convergence.

A. Differentiated Instruction Transformed The Traditional Lesson Plan

   1. Traditional Lesson Plan Phases of Learning: All whole group lessons were done this way, with one activity for all students.
   2. Tomlinson's concept of differentiated instruction exploded that—by emphasizing multiple, simultaneous academic tasks, without all students doing every task.
   3. This tended to de-emphasize one of the icons of education—that traditional whole group lesson.
   4. I've suggested that even the recent trends including the flipped classroom, and PBL should be seen as recently developed ways to differentiate instruction (Bender, 2013; *Differentiating Instruction for Students With Learning Disabilities, Third Edition:* Corwin Press).

B. Technology promises to Transform Education.
   --Much discussion today of "Personal Learning Networks" for each student, going far beyond differentiated instruction.
   --Bill Gates, who is not an educator himself, nevertheless has a significant impact on education has suggested that game-based leanring is the basis for instruction during the next century. I prefer the broader term, project based learning, but game based learning, particularly alternate reality gaming, will certainly be a critical component of PBL in the future.
   --We do know that high levels of technology, rooted in sound instructional practices can drastically transform a school or a school district (Bender & Waller, 2013: *Cool Tech Tools for Lower Tech Teachers)*.
   --multiple examples of one to one tech-based teaching initiative leading to 25% or 35% gains in academic achievement across the board. I think every teacher should review the Frontline episode on line called: Digital Nation. Moorseville, NC is another example of well integrated technology, supporting sound teaching principles increased academic achievement around 25% to 35% across the board.

C. RTI: Perhaps as much as any single factor, RTI has impacted how teacher deliver instruction. Ten year ago very few primary or elementary teachers were doing multiple screenings yearly, but today, almost all do so. Even in middle and high school, RTI is now mandated in many states. Today, in many schools students are receiving tier 2 and tier 3 interventions that do result in fewer kids failing, and that is because of rigorous RTI procedures. (Bender & Waller, *The Teaching Revolution,* 2012).

D. Common Core State Standards --clearly one of the major influences in education today, and while I support these standards, some have argues that we should not expect miracles from merely the implementation of them (Lovelace, 2012). Others have raised questions on the appropriateness of the CCSS for students with learning problems.

E. Project Based Learning: Finally, as teachers explore the Common Core Standards, they increasingly see that PBL is an excellent vehicle for the deeper learning, conceptual emphasis envisioned with the Common Core. (Bender, *Project Based Learning,* 2012).

PBL offers the best hope for the Common Core to result in significant enhancement of student learning.

I should point out that, if differentiated instruction and implementation of technology tended to break down the traditional lesson plan in most classrooms, PBL tends to break down the traditional assumptions of unit based instruction, and perhaps even our traditional course based structure for schools. In some PBL models, students literally negotiate their projects rather than take any specific courses in high school. They negotiate these individual projects based on their interests and choices, and the students then "Map" their selected projects to the educational standards.

As you can see, PBL is a whole new ball-game!

Again, to get a more complete sense of what 21st century Project Based Learning looks like for the students, I urge you to view a video on a Take a look at the Mummified Chicken Video from EdVisions Schools. It is a bit too long to incorporate into this webinar, but it is worth seeing what students think of PBL, and how it can be structured to be independent even of traditional courses.

I have posited that all of these trends are converging to impact what the teaching and learning process will look like in the near future. Teachers need to know that this is coming, and I discussed this Convergence last year in my new book *The Teaching Revolution!*

Thought Question Chat: What other instructional trends would you guys add to this list? Am I correct in that these trends can all support Common Core Instruction?

III. *What Is Project Based Learning?*

A. Let's take a look at a five minute introductory video on PBL from Canada:

Project Based Learning

http://www.youtube.com/watch?v=NPQ1gT_9rcw&feature=related

I'll then make the point: If Canadian kids are taught in this 21st century way, what are we doing for American students?

B. *My PBL definition:* I prefer an Occam's Razor type of definition—not a feel good, general statement. I need a definition that states what PBL is and what it isn't. I'm refining this all the time, but at this point, here it is.

Project Based Learning is instruction in which student generated questions and projects drive the curriculum and instructional timeframe, and the primary focus is study of highly motivating topics, reflective of real-world problems, resulting in authentic application of the products produced. Student generated projects must drive the timeframe of study in PBL, rather than teacher generated assignments, instructional unit structure, or even course structure. Curricular content standards must be "mapped" across projects to assure content coverage. Therefore, an excellent, teacher generated, project assignment within an instructional unit of study, is not PBL. Rather PBL may be said to be taking place under 3 conditions; when student driven projects (1) replace course structure confines; (2) replace instructional unit structure within a course, or (3) cut across multiple units of instruction, courses, or disciplines.

C. Project Based Learning Explained: a 4 minute video example:

http://www.youtube.com/watch?v=LMCZvGesRz8&feature=related

Thought Question Chat:

What aspects of PBL did this example stress that were not emphasized in the former example?

Many different perspective exist on exactly what PBL is. That's why I provided my definition previously.

A Homework Viewing Assignment: Please review this video!

This is a student developed, 30 minute video on PBL. If you watch this kids developed video and you will leave that experience convinced that PBL is the teaching method of the future! Students in this example are learning to enjoy learning. They are learning how to learn! Students have advisors rather that teachers.

Edvisionsschools (2013). "*Project Based Learning: Mummified Chickens, Mutant Frogs and Rockets to the Moon.*" –a student generated video introducing Project Based Learning. Retrieved 7/13/12 from: http://edvisionsschools.org/custom/SplashPage.asp

IV. *What Components Are Involved In PBL?*

A. Components of PBL (Bender, 2012: *Project Based Learning,* Corwin Press).

Different authors describe different components of PBL. In my book I list the types of activities that students engage in to do a PBL project.

Brainstorming
Student Choice and Student Voice
Topics identification
Identification of artifacts (or products) required (artifacts might be almost anything—a
    powerpoint presentation, storyboard for a planned video as well as the actual a video
    advocating a position, a report, a proto-type construction addressing the project issues,
    work within the environment for some projects, etc.
Dividing up the workload to develop artifacts
Timelining the project
Searching for information
Synthesizing the information
Collaborative decision-making and teamwork
Identification of additional information necessary
Developing a final project product (or multiple products and artifacts) that allow students to
communicate their work
Publication of their work/presentation of it, to address the real world problem or project.

These are the exact skills out students need in the 21st century.

B. Steps in a PBL project: (again multiple terms are used)

1. Initiation and Team Planning

   Project Anchor –a narrative describing the real world problem)
   Driving Question --stresses the basic question/issue around with the project will be
         Formulated
   Brainstorming
   Identification of Teams (student choice encouraged here)
   Develop team goals and timelines

2. Initial Research Phase

   Development/completion of webquests, on-line research, in-person interviews, etc to
   collect information

3.   Initial artifact/product creation

   Synthesis of information collected, and refining of planned artifacts and projects
   Develop proto-type artifacts and the team evaluates them. Should seek to identify
   additional information to be added

4. Second Research Phase

   Team re-deploys to gather additional information and enhance the project and various
   artifacts.

5. Final Presentation/Project/Artifact development and preparation

Here all information is synthesized by the student or the team, and then is evaluated at the team level. Students undertake various tasks (some speak, some develop storyboards, some do hands-on development of objects/artifacts, etc.)

6. Final Presentation or Publication of the project

Whenever possible, students should publish their work by presentation of projects and findings to groups outside the school. Sometimes this is publication of a youtube or teachertube video on a topic, and sometimes is the a powerpoint presentation to a local governing body. Sometimes it is the official opening or a greenway locally, or a small park for students on the school campus. The publication or presentation of the work is a critical motivator for students—they want to sense that their work means something.

V.   Advantages of Project Based Learning for Common Core Instruction

A. PBL teaches the exact 21st century skills stressed within the Common Core. These include: deeper learning, learning transfer across problems, collaboration, modern research skills, planning for problem solving in an unknown environment, communication skills, etc. (Author, 2012).
B. Research on PBL shows that PBL dramatically increases student engagement with the content (Center for Excellence in Leadership and Learning, 2009). These studies were done with standards that were not the Common Core, but with the emphasis within the Common Core on deeper learning, transfer, etc., there is every expectation that this result will likewise hold once the Common Core is implemented.
C. Research shows that PBL results in increased academic achievement on average. This has been true for current educational standards (Center for Excellence in Leadership and Learning, 2009), and is likely to be more true for Common Core, because of the increased emphasis on deeper learning within the Common Core.

VI.   In Summary:
A Promise, A Warning, and A Prediction on Common Core

A Promise: PBL provides the best opportunity for our implementation of the Common Core to have a true, positive impact on our students!   A shift into PBL will enhance learning the Common Core Standards, compared to traditional instruction. We can do instruction better than we currently are, and that includes implementing the Common Core better, within a PBL framework.

A Warning: Now here's the warning: If Common Core becomes merely, "the next set of standards we have to implement," for most teachers, it will not have the positive impact we all want. In short, if we don't change instruction, the Common Core will fail in its promise for

deeper learning, enhanced problem solving, and transfer of knowledge. In spite of this massive Common Core effort, we will have failed our kids.

A Prediction: I choose to believe that as we move into the Common Core, teachers will see the exact fit of Common Core and PBL, and will implement PBL across the grade levels. In that context, sans units of instruction, without teacher developed assignments, and even without specific course structures, we will be preparing minds for the 21st century. PBL involves each modern instructional trend, differentiated instruction, technology, etc., and truly represents the greatest hope of educational reform for the next century. It is our best hope for positive outcomes from the Common Core.

An Invitation: Extended PD Experience: PBL and the Common Core

I would like the opportunity to work directly with you and your faculty on PBL implementation, in conjunction with your move into the Common Core. I frequently work with schools over a year or more, coupling one or more workshop days, with webinars, a book study, conference calls, and faculty PBL project development. If you are interested, please contact my wife, Dr. Renet L. Bender (800-991-1114; www.teachersworkshop.com) or Corwin Press.

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Appendix A: Several PBL examples

1.   Developing Our Students as Active Citizens

Posted by Margaret Haviland on Jul 18, 2012 in Less Teacher, More Student, Making The Shift, Student Life, The How of 21st Century Teaching, The Moral Imperative, Voices | 10 comments

PLP Network: Powerful Learning Practice: Retrieved on 7/23/12 from:

http://plpnetwork.com/2012/07/18/developing-students-active-citizens/

In a May post here at the Voices blog, I suggested that one of the things I thought colleges should be looking for from prospective students was civic engagement. Certainly, having students see themselves as actors and creators of history is one of my goals for my history students.

In our team-taught classes, my colleague Whitney Suttell and I emphasized periods in history in which ordinary citizens united to bring about change, to make their voices heard. From the Sons of Liberty and the choices made by colonial housewives to boycott British goods, to the many who wrote and demonstrated for and against the US Constitution between 1787 to 1789, to all the men and women who risked their lives to hear Angelina Grimke speak out against slavery in Philadelphia 1838, these and other early actions set into the American psyche from the nation's earliest years a sense of the United States as place where citizen voices mattered.

The question becomes, how do we translate our students' understanding of past actors into action by young people today? Whitney and I decided in March to chuck the traditional exam format and craft a project to help students make this connection.

We wanted students to act on their growing knowledge and to connect with others beyond our school walls. With this objective in mind we focused the project on three components: student interest, sustained research, and engagement with peers in school and elsewhere who shared their interests or were leaders in one way or another.

Student interest builds engagement

Student engagement depends upon interest. Perhaps one student lives and breathes music, another student has a natural gas well going up in her backyard. A third student loves sports and worries about all the negative coverage their favorite sport is generating, a fourth student is curious about an issue discussed earlier in class. In each of these cases and those of our 28 other learners, student choice and agency in that choice provided each student with a way into this project.

In the written self-reflections at the end of the project one student shared that he had thought this was going to be a stupid project, that he hated politics and had thought he would have to pick

some topic related to the election. Instead, his focus was on developments in robotics. All year he had found sustained follow-through difficult. In this case, he consistently read new articles and blogged about them on time. Too often we think of history in terms of politics, presidents, panics, wars and economic booms. This student came to connect developments in robotics with the earlier transformation wrought by the cotton gin and the telephone — the good, the bad, and the social implications.

Students need to find a way into the study of their history and their roles as citizens. Interest, within the context of this course, proved a powerful connector. I have seen this same connection happen in language classes when Spanish II students join a Spanish language discussion forum dedicated to an appealing topic.

Deepening the exploration of topics

Having chosen topics ranging from puppy mills, to invasive species, to the military and the draft, to anorexia, to fracking, to robotics, to head injuries in sports, and many others besides, for three weeks students read recent articles and blogs on their topic.

Each week students were to choose something from traditional news sources such as the New York Times or CNN, as well as less traditional information sources — blogs about natural running or advocacy websites such as Riverkeeper. Each week in our discussion forum they wrote summaries and analyses of the articles they were reading. Then they commented on each other's entries, offered insight and suggested links.

In a few cases, they pushed back. For a student following the court challenges to Arizona's immigration law, a friend replied with her own link and another area of the issue worth considering. This sort of community learning enlarged the focus of some students' topics. A student following head injuries in football had written that football players should know they played a violent sport and not hold the NFL responsible for injuries. Another student pushed back and asked whether coaches might not be equally responsible for knowingly sending injured players back on the field. The discussion forum was one of the liveliest we have had to date.

In our debrief following presentations, we asked students whether or not three weeks was the right amount of time. Overwhelmingly, students wished this project had been modified to extend over the whole term. Many felt they were just beginning to understand all the nuances and aspects of their topic.

Moving to involvement and activism

From the beginning, we asked our students to consider how they might join in the ongoing public discourse on their topic. Some students added comments to articles they were reading, others wrote letters to editors and their local elected officials. Still others wrote to advocates for a particular cause.

We wanted students to find others interested in their interests and to connect with them where possible. One student corresponded with a friend at a school with a one-to-one tablet program. She then wrote a letter to our Principal about the reasons she believed we should adopt such a policy. Another student corresponded with an immigration lawyer in Los Angeles, wanting to better understand the issues from the lawyer's point of view.

As the final individual step, students wrote essays summarizing what they had learned about their topic and how it related to their sense of what it means to be an engaged citizen. Of her first-ever comment on an online news article, one student wrote: "I found that my sense of citizenship, by contributing to one of the articles, was strengthened because I felt that I had a political voice, however small it might be."

She was one of my quietest students, but she had put herself out in the middle of a heated and divisive issue and done so with a level of civility and honesty too often lacking in our public discourse. In class we discussed her reply and students assessed whether or not strident, winner-takes-all rhetoric works better than a more tempered approach. One of my students wondered if the most effective approach might be influenced by whether the goals were long term or short term.

Another student pursued an issue that even his peers felt was a bit ho-hum: invasive species. In his final essay he wrote, "My research on invasive species has lead me to believe that in order to be the best citizens we can, we have to be thoughtful in our actions so that we do not create problems in the future, but also we have to be willing to lend a hand and help solve these problems when they arise." He felt that his peers' indifference revealed one of the many challenges activists face –even when there is a direct demonstrable cost being borne by those who remain unaware.

A third student followed Fracking. Until we started the project, he hadn't realized it was an issue in his own New York State. He wrote: "For me, voicing my opinion on an issue of the wider community is a way to stay connected and involved in the world I live in. Writing letters to people in the state government gave me a greater sense of my responsibility as a non-voting citizen. Following current events, voicing my opinion, and acting on my beliefs are the most effective ways to be an active citizen."

Wrapping up and lessons learned

For our final exam, students worked in groups to translate their individual projects into a coherent means of understanding their world and then to present their conclusions to the combined classes – 32 students, 8 presentations. The presentations were not to be summaries of individual projects. Instead, shared themes were to be explored and conclusions argued and defended. In all cases the presentations were much better than previous ones (our efforts were bearing fruit!). In one case, two boys who had been complete underachievers all year joined with a third to put together an excellent presentation on the shared responsibility of athletes and athletic organizations to understand and mitigate the risks of sports injuries.

Following the presentations we asked students to help us understand how to make this project better the next time around. One student commented on the way in which the project helped her make better sense of US history in a personal way. In particular, she reflected on the ways that the meaning of freedom has changed over time — and how her topic, school stress and depression in students, helped her better understand distortions in our current educational climate.

We asked students whether commenting on an article, joining a discussion forum at an advocacy website, or writing to a state Senator made them feel sufficiently involved or was this just slacktivism? The students felt that what elevated this beyond simply clicking "like" on Facebook was that they had been following the story for a few weeks and trying to find sufficiently balanced sources to develop a better understanding of their topic. One student wanted to let the group off the hook by pointing out that they couldn't vote yet. But another student pointed out that women hadn't waited for the vote to oppose slavery and advocate for temperance.

In sum, students wrote one last essay, in every case the best of the year. They made one last collaborative presentation. Most importantly, students reflected on the meaning of freedom and citizenship in 21st century America and they connected beyond the walls of our school. In 2012-13, we hope our experiment will become the way all Westtown's US History sections end the year.

To return to a point made in my earlier Voices post, none of this could be captured in the SAT II US History subject test. Instead, the themes our students discussed and explored over the course of the year found expression in the actions of these young citizens.

2. Middle School Scholars Join Elite Team to Study Region's Water

By Laurel L. Scott: Posted July 15, 2012 at 10:57.   Retrieved on 72312 from: http://www.gosanangelo.com/news/2012/jul/15/aqua-squad-teen-force-for-nature-middle-school/

SAN ANGELO, Texas — When the 2012 Aqua Squad met for the first time this month in the Upper Colorado River Authority's Water Education Center, they were immersed in what is possible. Native fish swim in tanks on each side of the door, mosaics of fish decorate a wall, a diorama of a healthy riparian habitat sits below a display of stamp art and poetry about water pollution. Photographs capture the highlights of water quality testing, and informative exhibits are ready to travel to classrooms or community centers. But the center on South Oakes Street was an empty shell when the first Aqua Squad was named in 2008.

Katie Dean was part of the first squad, born out of a partnership among the UCRA, the San Angelo Museum of Fine Arts and the San Angelo Independent School District.

Aqua Squad is made up of middle school students who have an aptitude for science and who are willing to commit to being San Angelo ambassadors on water issues. "We were the group that went to the Smithsonian because this place was empty, with nothing in it, so (the organizers) decided maybe we should see some exhibits, meet with exhibit designers," the [Central High School](#) senior said. "We have a place in San Angelo now where we can learn about water education. Everyone is freaking out right now, saying we have two years of water left. Now you can come here and learn about things to do."

Katie and other Aqua Squad alumni were back the last two weeks, helping the 10 new Aqua Squad members get up to speed. The squad has been studying and preparing a presentation on San Angelo's water issues, such as pollution and drought, and on the solutions the city and the UCRA, which manages the Concho River watershed, are working on.

The students have picked up trash along the Concho River and tested for water quality at the South Concho in Christoval. They also heard from experts, including Tim Wolff, a San Angelo city stormwater engineer. "I gave them a presentation on how polluted stormwater affects fish and other aquatic life (plants, algae, etc.)," Wolff said in an email. "I showed them pictures of fish living in water with extremely low oxygen levels, fish kills, trash and debris in waterways, algae, and sewage overflows. Then I showed them some of the things that the city does to help mitigate stormwater pollution, such as inspections, drain cleaning, street sweeping, drainage way rehabilitation, etc.," Wolff added. He said the students were "very knowledgeable," more than some adults he talks to. "They're our future, and how they treat our precious resources dictates what the quality and quantity of those resources will be when they're adults and have their own kids," Wolff said. "I told them that stormwater quality protection is like voting; if everyone does just their tiny little part, everyone will reap the benefits."

Thanks to a $270,000 three-year grant awarded in 2010 by the federal Institute of Museum and Library Services, the seventh- and eighth-grade students from Glenn, Lee and Lincoln middle schools will travel to San Diego next week to visit the San Diego Zoo and other sites in the California coastal city. As San Angelo ambassadors, they will make a presentation to zoo staff and learn about water issues in another part of the country.

Gillian Taylor, 13, said she is already enjoying being a member of Aqua Squad. "I'm looking forward to learning about more water problems and ways to solve more water problems, different solutions," she said. "I moved here a year ago, and all of this is really new to me. It's really opened up my eyes to what everyone can do, not just what I can do. It's really cool."

UCRA Education Director Christy Youker, who helped write the proposal, said the grant is in its second year. The Aqua Squad of 2011 traveled to Chicago, and the squad of 2013 is scheduled to visit Philadelphia. "These students, they know they are making a difference," Youker said. "They have a lot of fun, they take breaks, but they know they

have a job to do." She said the Aqua Squad program is gaining national attention. "We are putting ourselves on the map," Youker said. "We present about this. People are using us as a model." The key is that the students do the work. "This is project-based learning. It's goal-oriented," Youker said. "This is how kids are learning. When you give kids a task, they learn all kinds of things."

Their work does not end when they return from San Diego. They will continue making presentations on water issues and will prepare a photography exhibit that will go on display at the art museum in October.

SAMFA Education Curator Megan DiRienzo said their task is to illustrate not just the problems but the solutions. "The title they came up with for their photo show is 'Crisis in the Concho: Water Quality and Quantity in San Angelo.' At the end of the show, they're going to have a section on solutions so it's not just about shaking their fingers at the community but about inspiring the community to care about the water and keep it clean," DiRienzo said.

She and Sean Halstead, a photography student at Angelo State University, helped the students learn how to use the digital camera each has on loan for their tenure in Aqua Squad. "I worked with them for a couple of days, talking about the elements and principles of design, giving them a crash course in not only what makes a good photo but also the elements of what makes a great work of art," she said.

Joe Navarro, 12, is ready for his Aqua Squad duties. "It gives me a good feeling that, even though I'm one out of billions of people, I am making a difference," he said.

Free!   Corwin Press Webinar:

Convergence!   Project-Based Learning and the Common Core Standards

with William N. Bender, Ph.D.,

Monday, August 27, 2012:   12:00 noon PST

William N. Bender, is the author of *Project-Based Learning, The Teaching Revolution,* and *Cool Tech Tools for Lower Tech Teachers*

We must not allow ourselves to create a 21st century learning environment using a 20th century instructional approach! If we allow the move to the Common Core to be merely another "curriculum mapping exercise" with a new set of educational standards we will miss this unique, nationwide opportunity for significant school reform. Common Core Standards stress deep understanding and critical thinking in an effort to prepare students for college and the workplace of the 21st century. In this presentation, Dr. William Bender argues that the move into Common Core provides an excellent opportunity for convergence of multiple innovations in teaching that can truly revolutionize instruction. In fact, it only makes sense to embrace the Common Core in terms of the current and on-going emphases on differentiated instruction, increased use of technology in teaching, and the growing emphasis on project based learning (PBL).

PBL represents teaching for the 21st century, as the skills necessary for PBL are the exact skills necessary in the 21st century workplace—problem solving, critical thinking, collaboration, and effective communication. In fact, the critical thinking and problem solving emphasis within the Common Core can be addressed most effectively by using PBL, an instructional model that directly requires active use of those skills. In the 21st century, the curriculum should not be spoon-fed to students via a set of teacher organized instructional units, mapped across a skill set—a 20th century approach. Rather, students should be placed in an educational environment in which they actively select their individual and group learning opportunities that intentionally target development of knowledge and critical thinking skills that are directly tied to the Common Core. PBL provides the best opportunity to do exactly that type of 21st century teaching.

PBL should be viewed as a differentiated instructional model, with a heavy emphasis on 21st century teaching/learning technologies. In short, PBL is the convergence of many instructional innovations, and represents the most effective option for teaching the Common Core. The specific skill-set for PBL directly translates into critical workplace skills, including:

--identification of a project (or a driving question for the PBL experience)

--project brainstorming to generate possible project solutions (stressing problem solving)

--task-description and activity selection,

--formulation of plans and time-lines for on-going work;

--hypothesis development and testing;

--development of artifacts that move the student (or group) toward project resolution;

--recognition of personal strengths and weaknesses, and selection of tasks based on those personal learning attributes;

--application of exploration and research skills using the latest technologies;

--continuing critical examination and monitoring of progress;

--focus on the end-goal--development of a significant solution to a real-world problem;

--presentation of that solution in order to do some good for the local community!

This presentation bridges the gap between the Common Core and the classroom of the 21st century that we all hope to create for our students. Come and sense the excitement of PBL; come and share the vision!