Georgia Southern University- Glynn County
Problem-based Learning and Common Core Standards for Mathematics
2012-13 Teacher Quality Program
Evaluation Report
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Overview

The Teacher Quality grants program is designed to “strengthen and deepen teachers’ content knowledge in their academic subjects with emphasis on how deepened content knowledge impacts teaching practices and student learning.” Specific content areas targeted by the program include language arts, mathematics, reading, science and/or social studies. Projects might include use of technology, or innovative assessment or teaching strategies to help achieve the overall goal of improving teaching and learning.

The PBL project was a new partnership among Georgia Southern University’s College of Education, College of Science and Technology, and Glynn County Schools. According to the project proposal, the overall goal was to prepare Glynn County teachers to create and utilize authentic, mathematics learning experiences, which incorporate the Common Core State Standards for Mathematics (CCSSM) and available instructional technologies.

The specific objectives of the program were to:
1. create PBL modules for mathematics based on examples from local businesses and industries.
2. create PBL modules, which address CCSSM.
3. integrate available instructional technology into PBL experiences.
4. implement and evaluate the learning modules created.

Summer Workshop
The five-day summer workshop was conducted in June 2012 and provided professional development in mathematics combined with visits to Glynn County businesses and industries to provide teachers with a meaningful context for the mathematics learning experiences they developed to use with their students during the academic year.

The workshop was held in Brunswick at Glynn County Schools' District Learning Center from approximately 9:00 to 3:30 June 25-29. The workshop was facilitated by Drs. Charles Hodges (College of Education), Dr. Robert Mayes (College of Education), and Dr. Susie Lanier (College of Science and Technology). Detailed agenda for each day of the workshop is archived on the project’s Wiki site. A summary of the daily activities/topics is below.

Table 1: Workshop Agenda Summary

<table>
<thead>
<tr>
<th>Day</th>
<th>Activity/Topic</th>
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<tbody>
<tr>
<td>Monday</td>
<td>Introduction and Common Core</td>
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<tr>
<td>Tuesday</td>
<td>Visit to GA Power and Port Authority</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Problem-Based Learning, Reflection on Field Trip, Understanding by Design</td>
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<tr>
<td>Thursday</td>
<td>PBL Unit Creation</td>
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<tr>
<td>Friday</td>
<td>Action Research, Refine PBL Units</td>
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</table>
Problem-based learning lessons/units were based in local businesses and industries and focused on common core standards in mathematics. Field trips to Georgia Power and to the Port Authority, and discussions regarding how math is used in these industries provided background for preparation of the lessons/units. Teachers were to continue to refine their plans by communicating electronically with Georgia Southern faculty. The project has a Wiki site for its teachers to communicate and share resources. When the plans are completed, teachers used them with their students and evaluated their effectiveness using a rubric (See Appendix A) they helped develop.

The proposal called for recruiting 16 grade 6-8 mathematics teachers. If there were openings, participation would be open to other educators in the district. Although 16 teachers registered for the summer workshop, only 11 attended, 10 teachers and 1 elementary school administrator. The majority of the participants (7) taught in elementary schools and 3 taught in middle schools. They represented 5 different schools in Glynn County and taught approximately 644 students this year. The teachers and administrator were very experienced with an average of 15.7 years teaching and a range of 8 to 25 years. All participants were female, 9 were white, 1 Black and 1 Hispanic.

Attendance at the workshop was very good. The 10 teachers missed no days and the administrator only missed one day of the workshop. Asked on the last day of the workshop why they chose to attend, the vast majority (9/11) said to learn more about the CCGPS. Two teachers indicated they attended to learn more about making real world connections or specifically more about PBL. One teacher said she was attending because an administrator recommended the workshop.
Follow Up Activities
Following the summer workshop, teachers remained in touch with the instructors electronically. Plans were to make use of a project Wiki site for instructors and teachers to share and provide each other feedback as teachers refined and then implemented the PBL plans they drafted in July. However, teachers chose not to use the project Wiki and the majority of communication was via email. Teachers also collaborated face-to-face.

After lesson/unit plans were implemented, teachers completed an Action Research Report using an outline provided by the PI. In their reports they were to describe their lessons and reflect on the effectiveness of their efforts. Teachers were also asked to include in their reports their research questions as well as their data collection and analysis procedures. Teachers submitted and presented their action research reports at a follow-up session in January 2013.
The evaluation combined both process evaluation, focusing on project implementation, and outcome evaluation, examining the impact of the project on participants. Process evaluation was designed to answer the following questions:

- P1: Were the initial experience and follow up activities implemented as planned?
- P2: What is the quality of the initial program activities?
- P3: Who are the program participants and how were they recruited?
- P4: What is the quality of follow up and support activities?

A variety of data sources were used to answer these process evaluation questions:

<table>
<thead>
<tr>
<th>Data source</th>
<th>Process Evaluation Question</th>
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</thead>
<tbody>
<tr>
<td>TQ PD Initial Experience Survey</td>
<td>P2: Initial Activity Quality</td>
</tr>
<tr>
<td>Workshop Surveys</td>
<td>P1: Implementation</td>
</tr>
<tr>
<td></td>
<td>P2: Initial Activity Quality</td>
</tr>
<tr>
<td></td>
<td>P3: Participants/Recruiting</td>
</tr>
<tr>
<td>Document analysis</td>
<td>P1: Implementation</td>
</tr>
<tr>
<td>Analysis of Wiki interactions (not included in</td>
<td>P4: Follow-up and Support</td>
</tr>
<tr>
<td>final report due to lack of use by teachers)</td>
<td></td>
</tr>
<tr>
<td>Post project focus group</td>
<td></td>
</tr>
</tbody>
</table>

The Workshop Survey supplemented the TQ PD Initial Experience Survey by targeting specific workshop content and activities in order to inform planning for follow-up and support. Workshop document analysis examined the content and the quality of workshop plans and attendance levels. Finally, the nature and quality of follow up and support was assessed by analysis of the content and level of participation in the Wiki and with the Post Project Focus Group.

Outcome evaluation questions are directly connected to the overall project goals and specific objectives:

- O1: To what extent were teachers able to develop PBL modules that were connected to local business and industries, aligned with CCSSM, and incorporated appropriate uses of technology?
- O2: To what extent were teachers able to implement and evaluate those modules? (Objective 4)

Outcome evaluation data collection activities were designed to gather information about indicators associated with each of the program objectives. These indicators provide evidence regarding teachers’:

- Knowledge of PBL;
- Knowledge of local business and industry connections to mathematics;
- Understanding of CCSSM;
- Knowledge of appropriate instructional technologies;
- Ability to implement PBL;
- Effectiveness implementing PBL modules and their effects on student learning.

The primary tools for analyzing outcomes are the Rubric to Evaluate Teacher-Created Lesson/Unit Plans, the teachers’ Action Research Reports, and the Post Project Focus Group and the teachers’ Research Reports.
Summer Workshop Surveys

Three surveys were administered to participants during the summer workshop. The first, the TQ PD Initial Experience was required by the TQ program. Participants completed the online survey administered by the TQ office at the University of Georgia. The purpose of the survey was to gather demographic information from participants and determine their satisfaction with the quality of the professional development experience. Results were passed on to the project director who shared them with evaluators.

Two other surveys (First and Last Day Surveys) developed for this project provided additional information about the quality of the professional development activities and asked participants about their confidence to implement problem-based learning modules in their classroom. Both surveys asked teachers to define problem-based learning thus providing a pre/post measure of their understanding of the approach.

TQ PD Initial Experience Survey

Several items on the TQ Survey targeted the quality of the professional development experience. Overall, opinions about the workshop were very positive. When asked to rate the quality of instruction in the project, 9 of the 11 respondents rated the instruction “Excellent”, one rated it “Good”, and one rated it “Satisfactory.” Participants described the primary method of instruction as being hands on, problem based, discussions, and group work.

Teachers were asked what percent of the materials and ideas in the workshop they expected to use in their teaching. Table 2 shows that the vast majority of teachers expected to use 75% or more of the workshop content in their teaching. This is an impressive figure given the range of grade levels represented among the participants.

Table 2: Percent of workshop content teachers will use. (n=10)

<table>
<thead>
<tr>
<th>Percent Range</th>
<th>Teachers Expecting</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% to 49%</td>
<td>0</td>
</tr>
<tr>
<td>52% to 74%</td>
<td>3</td>
</tr>
<tr>
<td>75%+</td>
<td>7</td>
</tr>
</tbody>
</table>

Teachers were also asked to rate the clarity of project objectives and the usefulness of the project in implementing the Georgia Performance Standards. 7 of 11 respondents said the objectives were “Clear” and the remainder said they were “Somewhat Clear.” 9 of the 11 rated the project as “Useful” (4) or “Very Useful” (5) in implementing the standards.
Summer Workshop Survey Findings

Asked if they would recommend the project to other educators, 9 of the 11 participants responded “Yes” and the other two responded “Uncertain.” When asked what were the strengths of this project, participants (10) responded:

- Field trips and learning about community (3)
- Collaborating with other teachers (2)
- Learning about PBL (2)
- Instructors (2)

Finally, participants were asked to make suggestions to improve the project. Eight teachers provided suggestions. These are categorized below.

- More time on Common Core Standards (3)
- More hands on activities (2)
- More time needed for workshop- 10 days (2)

First and Last Day Surveys

There were few differences in the teachers’ definitions of PBL from the first to the last day of the workshop. Other than their responses being slightly longer on the last day, the key ideas given in their definitions were similar. In both instances teachers generally defined PBL as an approach in which students solve real-world problems to learn (e.g., “Problem based learning is learning that requires inquiry and problem solving through real world situations.”) Table 3 shows the PBL themes in the teacher definitions and their frequencies. The only significant difference was that student engagement and motivation were mentioned 3 times on the last day and not mentioned on the first day.

Table 3: PBL definition themes- First and Last Day

Teachers were also asked to described what they have done prior to the workshop to learn about Common Core State Standards for Mathematics. All but one teacher indicated she had engaged in one or more activities to learn about the CCSSM. 6 reported participating in 2 different learning activities and 4 in 3 different activities. Most teachers (7) had either participated in a webinar or viewed training videos; 3 participated in unpacking the standards; 3 in internet research (including the GADOE site); and 3 indicated non-specific professional learning activities.

The last day survey asked several questions designed to assess the quality of the PBL workshop experience and to solicit recommendations for improving the workshop. When asked what they were most confident about regarding implementation of their PBL lessons, teachers mentioned:

- Making connections to real-world or community examples (6)
- Gathering and analyzing data (2)
- Managing and motivating groups (2)

Teachers indicated they were least confident about

- Creating good problems/questions (3)
- Time for planning or for working with community resources (3)
Summer Workshop Survey Findings

They also mentioned confidence with content, forms and tables, pacing, helping students see the connections between content and real-world applications, and classroom management.

When asked to rate on a 10 point scale (10 = very confident) their confidence level ratings for successfully implementing their problem-based learning module, ranged from 5 to 10 with a mean rating of 7.3.

Teachers were also asked to make suggestions for improving the workshop. There was no one area cited by the teachers. In fact only two suggestions (more time on CCSSM and having a checklist of project requirements) were given by more than one teachers and these were suggested by only 2. Other suggestions included separating elementary and middle grades teachers, more modeling of how to plan PBL, bring hands on activities to match to CCSSM, spread content into two summer sessions, and have less time in class and more interactive activities.

Finally, when asked if they would recommend the workshop to other teachers, 10 of 11 said they would. It was interesting that only 2 of the participants specifically mentioned learning about PBL as a reason for their recommendation. Reasons others cited included aspects of PBL (e.g., using community resources, making connections to surroundings, doing research projects) and the quality of the workshop (e.g., learned valuable information, great instructors).
A focus group interview was conducted at the end of the January follow-up session. The purpose of conducting the focus group was to gain insights into participant impressions of the benefits and challenges of implementing PBL lessons/units in their classroom and to determine what aspects of the TQ project they thought were most and least beneficial. All eight teachers who attended the final session participated in the focus group. The PI was present for the first part of the focus group that concentrated on unit implementation, its benefits and challenges. A summary of focus group findings is presented below.

**How did implementing place-based, problem-based methodology enhance teaching and learning?**

Several teachers mentioned that students had very little knowledge of local businesses, specifically the port and the power plant and that the units introduced these to the students. Some aspects of the local businesses (e.g., cars imported through the port) helped to create student interest in math and an awareness that they may actually use the math in their work.

“By the time they get to 7th grade they usually just zone out because they’re not interested, especially in math. It’s a difficult subject for them and the concepts are hard. But when you put something in that they know about or they know it’s where they are from and it impacts them somewhat, then you’ve got that interest and that curiosity and in order for them to learn they’ve got to be curious.”

“You’ve opened up a whole new world for them- Oh, this does affect me. I am going to need this somewhere down the line.”

Teachers were not able to point to specific content or concepts that the PBL units helped students learn. One teacher said that her students were better able to understand the problem they explored because of the hands-on nature of the activities.

**What was the biggest challenge in implementing the lessons/unit?**

Teachers most frequently cited time as an issue, both in terms of planning and finding time to implement their lessons. Some teachers mentioned some minor logistical problems (e.g., getting permission to go to the school parking lot to do an activity). However, most indicated they had support at their schools for the project.

“You try to squeeze it in where you can and if it’s going over it’s got to take the place of something else. You’ve got to double time. But it’s ok. We have a very supportive school, a very supportive principal.”

The PI asked if coming together and having a planning day would be beneficial or would it cause more problems. Teachers thought the additional time would be helpful but were mixed on the ideas of having to spend additional time away from their students. They were generally supportive of the idea of having time out of school hours to work on planning and sharing ideas, which may or may not be supported by stipends from the project.

**In what ways did teachers incorporate technology and how did it promote student learning?**

Consistent with the results of the lesson rubrics, teachers did not report extensive use of technology in their lessons/units. Access to computers was the biggest issue teachers faced as they implemented their lessons at the start of the school year.

“At the beginning of the year, we didn’t have our computer times set up. We didn’t get that schedule until around October.”

Others mentioned few computers available in their classroom and several said theirs were not working. The PI asked if the district was making any progress
in allowing students to use their cell phones for class activities. One teacher said that her students had completed the required paperwork and began using them after Christmas, but not as part of her PBL project.

“They think it’s the coolest thing… I had one group doing the Pythagorean Theorem and going online and doing the problems and it [the site] give me feedback on how long they’ve been on that problem, graphs and a grade on how they did…They bring in their iPad and their iPhones and they’ll ask me when they finish their work- can I get out my iPhone and go to the Pythagorean Theorem site.”

Any problems connecting what you were doing in the PBL activities with math standards? Teachers indicated there were not problems aligning their projects with the standards.

What modifications do you have in mind for the next go round with the lessons? Earlier in the session, when teachers completed their lesson/unit presentations, the PI asked if they planned to teach their units again. All said that they planned to teach the lessons, with one teacher saying she planned to use parts of her unit. Asked about modifications, several teachers said they would teach the unit later in the year. One teacher said field trips were difficult to arrange and suggested having business people come to her classroom to discuss jobs.

However, all teachers suggested keeping the field trips as part of the TQ project summer experience.

After the PI left the room, teachers were asked, what were the most valuable aspects of the experience for you professionally? Most teachers cited the hands-on math problems that Dr. Lanier demonstrated during the summer workshop. Again, all said the field trips were very valuable and that they learned things about their community they were not aware of and got ideas for situating math instruction in the community.

“With math you’re always trying to find a way to apply it to real world. This just gave us one more avenue of doing that. Many different avenues when it came to Colonel Island. I would have never come up with that. All the different ways we applied the port at elementary school and middle school.”

Teachers said that developing a network of teachers they could turn to for ideas and support was a valuable aspect of the experience. They also noted that the experience forced them to try new things, approaches they would probably not have used had it not been for the TQ project.

“Thinking out of my element this summer, I was so uncomfortable trying to create this
Teacher Focus Group Findings

lesson. And it’s forced me to go that step above. And having it not be so structured that I changed my first standard and saw it wasn’t going to work. I changed it to another one that was relative.”

How clear were the expectations for this program? How closely did they align with what you were told when you were recruited? Teachers said they were told that the program was going to focus on common core math and dealing with common core through a more problem-based approach. They interpreted this as being taught more hands-on math activities, which is why they were so positive about the lockers and circles activities demonstrated by Dr. Lanier. They also suggested that expectations for teacher products and use of local businesses (e.g., lesson/unit plans and research papers) be clearly explained, with examples, at the beginning of the experience. Teachers indicated that this would make the field trip experiences more meaningful and productive.

What were the least useful aspects of the experience? Teachers said they did not use the Wiki to share materials and exchange ideas and feedback.

“They said we could go ahead and put your stuff in there and can talk with each other about it, but we never really did.”

Teachers also had questions about the meaning of PBL and its utility in their classrooms. Teachers commented that they liked the PBL book but did not think this was actually what they did in their lesson/unit plans- “Based on what we read in the book that’s not what we did, I think.” Another teacher said, “We can’t use this problem-based learning in our real work teaching.” It seems that the biggest issue is time and the amount of time the system allocates for testing and test preparation.

“It takes a lot of time. You have time constraints because you have standards and your standards, when you can count out a standard and say I’ve got 100 lesson I pretty much need to teach in 180 days, subtract the 25 days after the CRCT plus subtract CRCT week plus subtract 15 days for preparing for the CRCT…”

Teachers suggested that the TQ project leaders

“need to think about how to make it relatable to classroom teachers. In college you can give a student a side project and if they are going to pass the class, they are going to come back with something. You give a middle school student an outside project you have to stay on them daily.”

They thought that working with teachers to plan for future PBL professional development would be insightful for the project leaders.

Was the level of support you received from TQ project instructors adequate? All teachers said they felt fully supported by the project instructors. They characterized it as being “fabulous” and “very good.” One teacher commented that “Anytime you had a question, they had an answer.”
Two methods were used to evaluate the lessons/unit teachers developed and used with their students: 1) analysis of Rubric to Evaluate Teacher-Created Lesson/Unit Plans; and 2) analysis of Teacher Action Research Reports.

**Rubric to Evaluate Teacher-Created Lesson/Unit Plans**

This rubric was used by the PI to evaluate the quality of the PBL lessons/units. The rubric consisted for four elements: (a) Use of Common Core Standards for Mathematics (CCSM); (b) Technology use-students; (c) Technology use-teachers; and (d) Problem-based learning principles) scored on a three-point scale: (1) Needs Improvements, (2) Acceptable, and (3) Target. For example, the description of the target for PBL principles reads: “Situates the lesson in authentic scenarios from, or related to the local community.” Eight of the ten teachers who participated in the Summer Workshop submitted plans. Of the four elements scored, teachers were rated the highest in use of CCSM with all receiving scores of 3. Teachers also scored well on PBL principles with a mean score of 2.29 and no one scoring lower than acceptable. Ratings for use of technology were lower with a mean score of 2.0 for teacher use and only 1.14 for student use of technology. Expectations were that students would use technology to investigate or access real-world data related to their community-based problem. However, teachers noted a number of obstacles to achieving this goal including difficulty accessing computer labs, malfunctions, or limited available of classroom technology. Although teachers scored acceptable on PBL principles, the PI noted, “Most participants used ideas from the project field trips to provide some context for their lessons, but only in general terms…”

**Teacher Action Research Reports**

Teachers completed a short research report in which they: 1) described their lessons, 2) identified their research questions and data they collected, 3) reported their data analysis and results, and 4) reflected on the meaning of their findings to them and to their students. Teachers submitted their papers at the conclusion of the project and presented their work at the final follow-up session. Seven teachers submitted reports and made presentations.

Review of the research reports showed a variety in the detail and adherence to report guidelines. Papers
ranged from a little more than a page in length to five pages. All but one of the papers reported on units that used the Port as the local business. In most cases the integration of the local business into the units was only cursory. Most frequently teachers identified cars as an aspect of the port that would interest students and designed activities in which students would have to estimate the number of cars on a lot or determine the proportion of cars in the school parking lot of different colors or makes. An exception was a problem for which students had to determine the most economical way to transport vehicles, taking a number of factors into account (e.g., ship sizes, fees). This was presented to the students as a real-world problem that people using the port had to solve. The one unit that used the power plant as a resource also focused students on a real-world environmental issue, water heat pollution and calculating the amount of river water needed to cool plant water to bring it to compliance with EPA water temperature standards. Students collected real data on river water temperature and calculated the amount (proportion) of river water needed to cool a quantity of plant water.

The cursory versus real-world application of the business resource resulted in different levels of authenticity of problems in the teachers’ units. In total, their own self-evaluations in the focus group meeting that what they were doing was not a strong implementation of problem-based learning was correct. A stronger application of PBL was the EPA water temperature unit.

Review of teachers’ use of technology is consistent with the PI’s evaluation of technology use through the lesson rubric. Teachers made little use of technology as a teaching tool and incorporated virtually no student use of technology to gather, organize, or analyze information related to their problems. Some of this was due to the lack of technology resources at the beginning of the school year when most units were implemented. However, given the focus of the units, it would be difficult to incorporate a significant use of technology to address problems students were to solve.

However, it must be kept in mind that this was an initial effort in PBL and place-based learning by these teachers. By their own accounts, the units they developed took them beyond their comfort zones and this approach to teaching was something very different from their regular practice. The fact that they are interested in continuing their work on the units is noteworthy.
Summary Findings and Recommendations

This final section of the report consists of two parts: 1) Evaluation findings organized around the evaluation questions and 2) Recommendations.

SUMMARY FINDINGS FOR EVALUATION QUESTIONS

P1: Were the initial experience and follow up activities implemented as planned?
Workshop documents, observations and discussions with participants and project leaders indicate that the project was implemented as proposed. Topics and activities proposed for the summer workshop were delivered and plans for follow-up activities were implemented. The most significant difference between the proposal and the workshop was in the grade levels of the participants. Although open to anyone in the district, the project initially targeted middle grades math teachers. In the end only 3 of the 11 participants were middle grades teachers. Additionally, the project did not use the Wiki site to the extent anticipated due to teachers, all for the same district, preferring to work face-to-face or via email.

P2: What is the quality of the initial program activities?
All data indicate that the workshop activities were of high quality. Participant ratings on the final day workshop survey and on the TQ Initial survey point to a well-organized workshop with clear objectives and activities that promoted understanding of PBL and of Common Core Standards in mathematics. 82% of participants said the project was “Useful” or “Very Useful” in helping them learn to implement the standards. For the most part, teachers were confident in their ability to implement PBL modules in their classrooms. 70% of teachers indicated they would use 75% or more of the workshop content in their teaching. 82% of the teachers rated the quality of instruction as “Excellent.”

P3: Who are the program participants and how were they recruited?
As mentioned above program participants represented a wide range of grade levels and included 1 elementary school administrator. Teachers were recruited with the help of Glynn County School System administrators, including building level principals. 7 teachers worked in elementary schools and 3 in middle schools. A total of 5 different Glynn County schools were represented. All participants were female and had an average of 15.7 years teaching experience.

P4: What was the quality of follow up and support activities?
Results of the teacher focus group interviews clearly show that teachers were satisfied with the level of support the received from program instructors. They indicated that their questions were always answered and answered promptly.

O1: To what extent were teachers able to develop PBL modules that were connected to local business and industries, aligned with CCSSM, and incorporated appropriate uses of technology?
All teachers left the workshop with plans for their PBL modules and were confident in their ability to implement their plans with their students. It was clear from teacher presentations at the January follow-up session and from examination of lesson/unit plans and research reports that teachers were able to connect their PBL plans to Common Core standards in mathematics. Unit activities and goals aligned with objectives. This is consistent with some initial findings regarding teacher confidence with CCSSM from the summer workshop where teachers spent a significant amount of time working with the standards project and GADOE framework tasks.
Meaningfully connecting local business and industries to the PBL units was more problematic. For the units that addressed problems related to water temperature pollution and to transporting cars in most economically, students addressed challenges directly connected to the port and to the power plant. In the case of the transporting problem, students had to manipulate a number of variables to develop solutions. For the water temperature problem, students collected river temperature data and manipulated water temperatures in a experiment modeling the problem. For the other units, teachers simply took an element of the setting (cars) and had students use cars in a variety of problems. Activities ranged from counting cars in the school parking lot to calculating ratios and proportions to estimate the number of cars that could fit in the port’s parking lot using measurements of the parking lot size and dimensions of cars.

Using technology was also problematic due primarily to lack of access to computer labs at the beginning of the school year when units were taught. For the most part, teachers used basic technologies (e.g., ELMO, SmartBoards) to present information from the web. There was little or no student use of technology to gather and analyze data. Where student technology was used it was primarily to conduct web searches or visit websites.

O2: To what extent were teachers able to implement and evaluate those modules? (Objective 4)

All teachers participating in the summer workshop were able to complete initial plans for lessons/units in the summer and to implement them in the fall. Reports and lesson plans were submitted by 7 of the 10 teachers, with two teachers working together on unit development. All plans contained evaluation components that the teachers also implemented. Evidence from presentations (more than from written action research reports) showed that they were able to use information gathered from their assessments to reflect on student learning and consider modifications for the next time they taught their units. Evaluations tended to focus on standards and did not reflect the problem-based nature of the TQ project.

RECOMMENDATIONS

By most measures the Georgia Southern-Glynn County project was very successful. Evaluation results from the 2012 Summer Workshop show that participants were very satisfied with the quality of instruction and left with drafts of plans for PBL units and were confident regarding their understanding of CCSSM. Analysis of the final plans and their implementation were more mixed with teachers making strong connections between their unit goals and standards but less effective in making meaningful use of local businesses in those units or incorporating student use of technology. Based on evaluation findings regarding the summer workshop and follow-up activities, we make the following recommendations.

1. If a wide grade-level range is served by the project, consider differentiation of work for elementary and middle grades teachers. Participants said they had time to work in groups during the workshop; some of this time might be organized as grade-level time.
2. Try to determine the reasons for the low participation rate of middle grades teachers and adjust recruiting strategies to target that population.
3. Most teachers said the objectives of the project were clear, but several suggested including some type of checklist describing tasks/assignments and due dates. Teachers also indicated that, although the objectives were clear, they were not the same as what school officials had led them to believe. They suggested that expectations be described in writing and that examples of the kinds of products they are expected to complete to provided.
4. Teachers chose not to use their Wiki site to communicate and share information. The project director and teachers reported that this was due to their preference to work face-to-face, which some could do because they either work in the same school or in schools near each other. If the Wiki is important to the project for documentation of teacher work (e.g., collaboration) consider structuring parts of the follow-up activities to require use of the Wiki.

5. Teachers enjoyed the field trips to the port and to the power plant. All said that they learned things about their community and made them aware of how there are many aspects of Brunswick of which they are not aware.

6. We understand that this was the teachers’ first attempt to develop place-based, problem-based lessons/unit and that there were explanations for why certain elements of the assignment was problematic (e.g., lack of computer labs at the beginning of the year). However, projects leaders need to explore strategies that guide teachers to more meaningful implementation of PBL where the community resource is more than a backdrop for activities. Teachers recognized that what they were doing was not PBL as it was presented in their materials and their training. (A strong indication that they understand PBL in principle.) They suggested providing examples of higher level implementations of PBL. However, they also questioned the feasibility of using PBL in their district given other demands on their time and recommended that teachers be included in the planning of the next iteration of this project to address the practical challenges of PBL implementation in Glynn County.
Rubric to Evaluate Teacher-created Lesson/Unit Plans

Resulting from the

Problem-based Learning and Common Core Standards for Mathematics Project

Charles B. Hodges, Ph.D. – Principle Investigator

<table>
<thead>
<tr>
<th>Needs Improvement (1)</th>
<th>Acceptable (2)</th>
<th>Target (3)</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use of Common Core Standards for Mathematics (CCSM)</strong></td>
<td>Does not include CCSM or does not provide specific CCSM addressed in the lesson/unit</td>
<td>Identifies specific CCSM addressed in the lesson/unit</td>
<td>Identifies CCSM addressed in the lesson/unit also identifies the CCSM Standards for Mathematical Practice addressed</td>
</tr>
<tr>
<td><strong>Technology Use – Student</strong></td>
<td>Does not incorporate technology or uses technology for drill &amp; practice exercises only</td>
<td>Uses technology for personal productivity (report writing, etc.) or mathematical calculations related to the lesson/unit</td>
<td>Uses technology to investigate real-world data or information related to local community</td>
</tr>
<tr>
<td><strong>Technology Use – Teacher</strong></td>
<td>Does not incorporate technology or uses technology where not needed</td>
<td>Uses technology for demonstrations (i.e. PowerPoint, YouTube)</td>
<td>Uses technology to investigate/access real-world data or information related to local community, shows simulations</td>
</tr>
<tr>
<td><strong>Problem-based Learning Principles</strong></td>
<td>Does not situate the lesson in authentic scenarios</td>
<td>Uses authentic scenarios from local community as a justification for the type of math covered/required for the lesson/unit</td>
<td>Situates the lesson in authentic scenarios from, or related to, the local community</td>
</tr>
</tbody>
</table>

*Note: The terms *authentic* and *real-world* will be interpreted in the context of the grade-level of targeted learners for each lesson/unit.*