

**The Ready to Teach Program
A Federal Initiative In Support of
Online Courses for Teachers**

by

Wanda E. Gill, Ed.D.

November 28, 2011

The Ready to Teach Program Report

Acknowledgments

This report is the culmination of the work of all of the past directors of the Ready to Teach Program grantees, the local public broadcasting stations and state departments of education who implemented their projects over the course of the funding cycles and the teachers who completed courses online, many for the first time and to the approximately 1/3 who returned to take courses. A special note of thanks goes to personnel working through the two remaining funded projects: PBS TeacherLine and the Alabama Public Television Foundation's eLearning for Educators. I am particularly grateful to Lynne M. Meeks, Ed.D. of the Alabama Public Television Foundation whose friendship has been an anchor as she referred state people to me for interviews on the project's impact on their daily work. Lynne patiently listened and provided insights and information for this report. Barbara Treacy, Director, EdTech Leaders Online (ETLO), Education Development Center (EDC), Newton, Massachusetts who works on program implementation and research and evaluation of the eLearning for Educators project set up a website link of the research studies and reports for my use. Rob Lippincott, PBS Senior Vice President, Education, Marcia D. Foster and Tim E. Taylor of his team, have met with me and shared their ideas on future directions for PBS TeacherLine. Another major contributor from PBS is Melinda G. George who directed the Ready to Teach Program for many years before accepted a job as Vice President of the National Commission on Teaching and America's Future (NCTAF) that began in June 2011.

A special note of gratitude is extended to the state people who were interviewed for this report: Donna Landin, West Virginia Coordinator of the e-Learning for Educators Program; Cathy Higgins, New Hampshire State Educational Technology Director; and, Michael Stetter, Director of Accountability Resources, Delaware Department of Education.

A special note of thanks goes to Sharon Harris, longtime program officer for the Ready to Teach Program, who worked tirelessly with grantees and ED staff through the years to assure program viability. Special thanks to Padraic Collins and Jim Richards of the Training and development Center for formatting assistance and David Tsuneishi of the National Library of Education for research support . Thanks to Dr. Michael Slade and James Nosal who reviewed the report. Thanks to Nia Phillips and Margo Anderson for receiving drafts of this report. Thanks are also extended to Jim Shelton for his changes to the outline and report assignment, as it documents the contributions of the Ready to Teach Program to the nation's teachers, as they provide high quality learning opportunities for all of our children.

Wanda E. Gill, Ed.D.

September 28, 2011

The Ready to Teach Program Report

Abstract

The report, “The Ready to Teach Program: A Federal Initiative in Support of Online Courses for Teachers”, describes the history of the Ready to Teach Program and its role as one of the solutions to the national need to increase the performance of teachers through professional development. The report describes selected findings from the Eisenhower Professional Development Program and through it, the evolution of findings on effective professional development for teachers. These major efforts to improve teacher professional development by the U.S. Department of Education were supplemented by smaller efforts like the optional use of up to 10% of Title I monies for professional development, as determined by the principal of a Title I school or by the District, depending on the State Plan at that time.

As is true of most other initiatives that have been identified for scaling up, the Ready to Teach Program grew out of *MathLine*, a national telecommunications-based demonstration project for mathematics that was developed and implemented by PBS for teachers of students in grades K-12. *MathLine* linked resources and articles to mathematics topics for teachers to increase teaching and learning strategies and options for their classrooms. *MathLine* was so impressive that Congress readily funded the Ready to Teach program; indeed, Congress continued to fund the program through the U.S. Department of Education from 2001-2011 when the last two remaining grantees, Alabama Public Television Authority and PBS’ TeacherLine completed their projects. This report documents the substantive evaluations, reports and Government Performance & Results Act (gpra) findings from this innovative program to substantiate the effectiveness of online professional development for teachers by:

- introducing teachers to online instructional strategies, resources, and options;
- improving student achievement through improved and varied instructional strategies and approaches;
- increasing teacher retention by building comradery and networking opportunities through the use of online communities of learning;
- demonstrating improvements in online programs for learning as a result of advances in curriculum content that uses television production capabilities for more inviting academic programming;
- demonstrating the effectiveness of partnerships between local public television stations and state departments of education in producing high quality online professional development modules;
- demonstrating the use of coaching modules for improved teaching and learning; and,
- elevating theoretical best practices by developing them into actual best practices by coupling them with expert design team and evaluator feedback in ongoing curriculum and program module/lesson development.

This report highlights the Ready to Teach Program assessments and studies in light of other existing research studies of online teacher professional development to document the significant contributions of this program towards a better understanding of the online professional development issues and what works.

The Ready to Teach Program Report

Executive Summary

The Ready to Teach Program grew out of *MathLine*, a national telecommunications-based demonstration project for mathematics that was developed and implemented by PBS for teachers of students in grades K-12. *MathLine* liked resources and articles to mathematics topics for teachers to increase options in their classrooms. The Ready to Teach program was funded through the U.S. Department of Education from 2001-2011 when the last two remaining grantees, Alabama Public Television Authority and PBS' TeacherLine completed their projects. This report documents the substantive evaluations, reports and Government Performance & Results Act (gpra) findings from this innovative program to substantiate the effectiveness of online professional development for teachers by:

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- demonstrating the use of coaching modules for improved teaching and learning;
- elevating theoretical best practices by developing them into actual best practices by coupling them with expert design team and evaluator feedback in ongoing curriculum and program module/lesson development.

As a result of the required program evaluation of each grantee's project in the last funding cycle, the Ready to Teach Program developed a body of assessments and studies of the program to include design components, user demographics, attitudes and habits, and short and long term use of products at the conclusion of the formal courses. Overall, these studies contribute substantially to the body of evidence of what works in online professional development for teachers. Some of the studies also indicate what doesn't work, particularly in regards to one time users of online professional development as opposed to related to repeat users.

Existing studies of online professional development for teachers in content areas is sparse. Indeed, some of the headings in this report include single studies. While we expect increases in the number of studies in content areas over the years, these articles were found online by this report writer and the head librarian at the National Library of Education at the time of this report.

In science, studies by Annetta & Shymansky(2006), Sherman and others (2008). Niess and others (2010), Marrero and others (2010) Fleming & Easton (2010) and Lebec & Luft

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(2007) focus on distance education strategies in science or science teaching efficacy beliefs of teachers or design principles or some combination of these foci. Not surprising, researchers have published articles around NASA 's online professional development courses for teachers (Marrero and others (2010) and Gosselin & others). Similarly, Sherman and others (2008) published results of a pilot study of online science professional development that used materials developed by the National Science Teachers Association. The academic content of the courses described in this research section includes one or more courses in biology, spreadsheets, and environmental education topics for teachers of mostly K-8 students and some high school students.

In terms of mathematics, pedagogical content was a favored area of study for Cady & Rearden (2009), Russell, Carey, Kleiman & Venable (2009) and Russell, Kleiman, Carey & Douglas (2009). In the first study by Rearden, teachers' content knowledge didn't change but their pedagogical content knowledge did. Findings from both of the 2009 Russell studies were concerned with results based on teacher self selection and indicated a need for more study to substantiate the reasons for their results. Koc, Peker & Osmanoglu (2009) support the use of online case video studies and discussions for teachers' growth at the pre-service and service levels to increase their collaborative engagement.

This report includes a single reading content study by Zygouris-Coe, Swan and Ireland (2009) that examines a reading assessment process for monitoring a statewide online professional development model. This article is critical in demonstrating how one state (Florida), is testing its reading assessment program online and demonstrates this state's lead in online assessment as well as teaching and learning.

The study in English language arts focus on literacy assessment (Huai, Braden, White, & Elliott (2006), to improve teachers' instructional practices related to reading comprehension, vocabulary and writing instruction.

A 2010 study of language teachers by Shih-hsien Yang focused on studying teacher performance through their online actions as evaluated by students' evaluations of their teaching. Data was collected and analyzed through the use of questionnaires.

The 2009 study of history teachers by Kale, Brush and Saye focused on the types of assistances teachers got from each other and how that assistance and dialogue influenced them and their practices in an online forum.

Findings from Frey's 2009 study of special education teachers is promising in terms of student outcomes because each of the students improved in the areas of focus of their special education teachers' online professional development. However, one of the main concerns for researchers is the small student (4 students) and teacher size in this study.

The two studies of online professional development in the area of early childhood (Donahue, Fox and Torrence (2007) and Olsen, Donaldson & Hudson (2010) focus on

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appropriate uses of technology for this population and barriers to professional development, respectively.

The broader discussion of existing research studies of online teacher professional development demonstrates the preponderance of studies related to the development and use of specific products. For instance, a study by Teemant, Smith, Pinnegar & Egan (2005) of a product developed to improve socio-cultural pedagogy for English as a Second Language teachers called ProfessorsPlus, developed at Brigham young University, supports the need for the product. While studies of products like this assist the developer in reaching the intended uses, goals and objectives of the product and can be used for marketing purposes, their input into the field with an outcome of improving student performance is still untested.

There is considerable overlap in the foci of the studies cited in the areas of studies of teacher practices, teacher practices related to design, online teacher observations, teacher control, attitudes and satisfaction with overall studies of professional development. The following sections of this Executive Summary highlight selected areas of interest.

In studies of teacher practice related to the design of online courses, Recke and others (2007), Hebert (2009), and others make a case for the inclusion of collaborative spaces for teachers in any online professional design. Locke (2006) further suggests that the design should be deliberately fluid in nature, to better meet teachers' ongoing professional development needs. Gu and others (2009) support improved pedagogy for experiential teacher learning in online designs. Most research supports increased social interaction for teachers (Macdonald & Hills (2005), Spicer & Dede (2008) to overcome the social isolation of single teacher classroom teaching.

Some of the online professional development studies focus on Professional Communities of Learning, believed by some current thinkers to be necessary for teachers' job fulfillment because of the networking possibilities, sharing information and strategies that work. However, there is little data from these studies related to outcomes in student achievement.

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Chapter 1. Introduction

1.1 Federal efforts to support teacher professional development

The U. S. Department of Education has a history of providing states and local governments that apply for federal funds through both discretionary and formula grants funds for professional development. The historically largest program funding teacher professional development, the *Eisenhower Professional Development Program*, was in effect from approximately FY 1986 – FY 2001 when it was eliminated in the ESEA Reauthorization or *No Child Left Behind Act of 2001* and is a precursor to what ED now calls Teacher Quality Programs.

ED funded a major three year 1997 evaluation of the *Eisenhower Professional Development Program* that forever changed how we look at effective teacher professional development. The findings of this three year evaluation, conducted by the American Institutes for Research (AIR) for the U.S. Department of Education’s Planning and Evaluation Service and reported in 2000 (DOC # 200-04), found that teachers were more likely to apply the techniques they learned through professional development activities to the classroom if what they learned focused on specific, higher-order teaching strategies and the activities that represented coherent, active learning, consistent with the teacher’s goals. Professional development strategies and techniques were most effective and used more often if they involved the participation of teachers from the same subject, grade, or school. This report identified the types of professional development that were instituted across the country, best practices, and how the program fit into then current reform models at the state, district and local levels. Researchers provided ED with an update on the national status of the effectiveness of the performance indicators used internally to determine program effectiveness.

This AIR report signaled the end of the “one shot” session workshops that were prevalent at the time. The researchers found little change in teaching practice from 1996-1999, as a result of the one shot approach to professional development activities in those years.¹

For at least twenty years, teachers have been encouraged to use educational technology, including computers, as an educational method or strategy. School systems in urban and suburban areas have included professional development activities that included the use of educational technology.¹ Recognizing this need, the U.S. Department of Education, as an initiative under the *No Child Left Behind Act of 2001*, ran the Enhancing Education through Technology formula grant program in the Office of Elementary and Secondary Education.²

¹Hagey, M.S. (1985). The computer: An assessment of teacher training, teacher attitudes, and computer inventory in grades K-8 in the metropolitan public schools of Nashville – Davison County. *Dissertation Abstracts International*. 48(11), 2850(11), A (UMI No. 8802602).

²

<http://165.224.250.70/search?q=Enhancing+Education+Through+Technology+Grants&client=ConnectED&proxystylesheet=ConnectED&pro=1>

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Similar technology programs ran in other offices, before various internal reorganizations. States used funds to purchase computers and other forms of technology and some used funds for professional development. At the same time, Title I schools could use up to 10% of their funds for teacher professional development and sometimes included technology strategies. (Records weren't maintained on the technology purchases or online professional development through Title I.) Some of the Congressional earmarks were used for educational technology. Some Title III funds, used for developing higher education institutions, were used to develop, enhance or update computer labs. Whether K-12 or higher education, the U.S. Department of Education was and is contributing towards the technology explosion and the professional development that came with it.

Online professional development is growing in popularity and school systems are actively exploring options to increase teachers' skills in the art of teaching. Teachers themselves are looking for ways of satisfying requirements for IT coursework, in particular. Later studies of the Eisenhower Professional Development Program concluded that to be effective, instruction should be paced, practiced and observed for newly taught strategies. As a natural consequence of providing professional development that is consistent with research and evaluation findings on best practices, more current models of professional development include a wider acceptance of online learning in many formats. One overarching advantage with online systems is that teachers can access learning whenever they choose to in any platform they wish. With this multiple modal and multiple sources access come concern for the quality of instruction and the impact of teacher professional development on children.

1.2 State Changes in Teacher Reform Impact Teacher Professional Development

Most recently, due of severe economic cuts faced by state and local governments, there have been calls for changes in teacher tenure laws by Governors in Florida, Idaho, Indiana, Nevada and New Jersey³ in efforts to eliminate poor or underperforming teachers. Unions and teacher professional organizations have called for a greater emphasis on effective teacher professional development to retain good teachers and to produce an elevation in the status of teaching as a profession. These governors have moved to make the changes they believe will enhance learning for all students. On July 19, 2011, Governor Rick Snyder of Florida eliminated seniority and replaced it with teacher effectiveness as a criterion for job retention. The law increases teacher probation from 4 years to 5 years before teachers can earn tenure. School districts have to notify parents, in writing, if their children are being taught by a teacher who is rated ineffective.⁴ At the time of this report, the details of the teacher evaluation system were not yet worked out completely. In Idaho, the law repeals teacher tenure for new teachers, fades it out for teachers who have not yet achieved tenure and then awards one or two year contracts after a

&output=xml_no_dtd&sort=date%3AD%3AL%3Ad1&submit.x=8&submit.y=6&entqr=3&oe=UTF-8&ie=UTF-8&ud=1&filter=0&site=default_collection

³ **The New York Times**, G.O.P. Governors Take Aim at Teacher Tenure by Trip Gabriel and Sam Dillon, Published: January 31, 2011.

⁴ Ann Arbor.com at <http://www.annarbor.com/news/gov-rick-snyder-signs-major-changes-to-teacher-tenure-into-law/>

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probationary period of 3 years.⁵ Indiana now bases pay on performance only.⁶ On June 15, 2011, Governor Rick Sandoval signed four education reform bills into laws that reduced the importance of tenure, includes teacher performance and student performance in teachers' evaluation and subsequent pay decisions. Under the new law, the Governor of Nevada now appoints the State Superintendent of Public Instruction and only 4 members of the Board are elected with the remainder being appointed by the Governor and legislators.⁷ Governor Christie's teacher reform bills were blocked in New Jersey due to fears of teacher favoritism, despite the governor's efforts to change the laws.⁸ All of these tenure and promotion reforms signal greater emphasis on teacher professional development and online course options as a clear and significant choice among educators who can learn anytime, anywhere at relatively little cost.

At the same time, some Governors are implementing reforms in teacher tenure, promotion and evaluation systems, all are faced with very difficult budget decisions. Online professional development for teachers and online courses for students are being advocated in many quarters as solutions to some budget concerns based on cost savings for instruction. Online courses for teachers and students are also seen as a source of teacher expertise sharing, particularly in remote and rural areas of Alaska, North and South Dakota and Wyoming, where there are critical teacher shortages in science and advanced mathematics courses. Shared online instruction for students provides one possible alternate solution for assuring that all of the nation's children are provided with a high quality education, irrespective of their geographical location.

1.3 Spring 2011 Developments in Online Test Development that Impact Teacher Professional Development

In a press release on April 27, 2011⁹, the Pearson Foundation announced a partnership with the Bill & Melinda Gates Foundation to fund the development of a series of digital instructional resources, including online mathematics and reading/English language arts courses for teaching curriculum based on the Common Core Standards. Forty-one states, two territories, and the District of Columbia have adopted standards that were developed by the National Governors Association with the Council of Chief State School Officers. While this announcement emphasizes the development of digital resources and courses in English and mathematics to meet common core standards, it also signals more interest in private partnerships

⁵ Nashua telegraph at <http://www.nashuatelegraph.com/opinioneditorials/926836-263/tenure-law-fine-as-far-as-it.html>

⁶ July 29, 2011 Rural Policy Matters at <http://www.ruraledu.org/articles.php?id=2737>

⁷ Nevada News Bureau, June 15, 2011 at <http://www.nevadaneews bureau.com/tag/tenure/>

⁸ July 13, 2011 Huffington Post at http://www.huffingtonpost.com/2011/07/13/education-reform-proposal_n_897133.html

⁹ Pearson Foundation Website at <http://www.pearsonfoundation.org/pr/20110427-pf-partners-with-gates-foundation-to-create-digital-learning-programs.html>

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and funding to more fully utilize technology including online professional development to improve the nation's schools.

1.4 Brief Overview, History and Purpose of the Federally Funded Ready to Teach Program

The Ready to Teach Program, authorized by the Elementary and Secondary Education Act of 1965, as amended, Title II, Subpart 3, Sec. 2431; 20 U.S.C. 6775, grew out of *MathLine*, a national telecommunications-based demonstration project for mathematics that ran concurrently with the Eisenhower Professional Development Program that was underway in the Office of Elementary and Secondary Education at the U.S. Department of Education. *MathLine* was developed and implemented by PBS for teachers of students in grades K-12 and included different mathematics topics with an article and resource links on that topic for teachers to use in their classrooms.

In the *Congressional Record, Volume 147, Part 3, March 8, 2001 - March 26, 2001*, Congress introduced "The Ready to Learn, Ready to Teach Act of 2001". While the initial paragraph description focused on the Ready to Learn Program, the second paragraph authorized an increase from \$30 million to \$50 million for the Ready to Learn Program and authorized \$20 million for the Ready to Teach Program. Specifically, "The Act also authorizes \$20 million for high quality teacher professional development building on the success of the *MathLine* program (initiated in 1995); the bill will expand the program to include materials for helping teachers to teach high state standards in core subject areas." The section went on to say "...participating stations make the teachers workshops available through districts, schools, and even on the teachers' own television sets," reflecting technology progress at that time. The bill went on to reverberate current expectations, "In that way, at their own pace, and in their own time, teachers can review the materials, observe other teachers at work, and reflect on their own practices. They can consider ways to improve their teaching, and make adjustments to their own practice. Teachers will also receive essential help in integrating technology into their teaching." The *Congressional Record* even reflects data collected by PBS and indicate from PBS' findings that, "88% of teachers surveyed in 1997 by the Corporation for Public Broadcasting said that quality television used in the classroom helped them be more creative, 92% said that it helped them be more effective in the classroom."

Three months later, the *Congressional Record (Congressional Record, Volume 147, Part 8, June 12, 2001 to June 25, 2001, page 11702)* indicates findings to support funding the Ready to Teach Program that include:

"(1) Since 1995, the Telecommunications Demonstration Project for Mathematics, established under this part pursuant to the Improving America's Schools Act of 1994, has allowed the Public Broadcasting Station to pioneer and refine a new model of teacher professional development for kindergarten through grade 12 teachers. Video-modeling of standards-based lessons, combined with professionally facilitated online learning communities of teachers, has been proven to help mathematics teachers adopt and implement standards-based

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practices. This integrated self paced approach breaks down the isolation of classroom teaching while making standards-based best practices available to all participants.”

“(2) More than 5,800 teachers have participated over the last 3 years in the demonstration. These teachers have taught more than 1,500,000 students cumulatively.”

“(3) Independent evaluations indicate that teaching improves and students benefit as a result of the program.”

“(4) the demonstration program should be expanded to reach more teachers in more subject areas under the title of TeacherLine. The TeacherLine program will link the digitized public broadcasting infrastructure with education networks by working with the program’s digital membership, and Federal and state agencies, to expand and build upon the successful model and take the advantage of greatly expanded access to the Internet and technology in schools, including digital television. The TeacherLine Program will leverage the Public Broadcasting Service’s historic relationship with higher education to improve pre-service training.”

“(5) Over the past several years, tremendous progress has been made in wiring classrooms, equipping the classrooms with multi-media computers and connecting the classrooms to the internet.”

“(6) There is a great need for high quality, curriculum based digital content for teachers and students to easily access and use in order to meet State and local standards for student performance.”

“(7) The congressionally appointed web-based Education Commission called for the development of high quality public-private online educational content that meets the highest standards of educational excellence.”

“(8) Most local public television stations and state networks provide high quality video programming and teacher professional development, as a part of their mission to serve local schools. Programs distributed by public broadcasting stations are used by more classroom teachers than any other because of their high quality and relevance to the curriculum.”

“(9) Digital broadcasting can dramatically increase and improve the types of services public broadcasting stations can offer kindergarten through grade 12 schools.”

Clearly, Congress was advocating and funding online professional development for standards based content and learning communities of teachers who, as a result of high quality and relevant online professional development through courses, could better meet the needs of their students. The public-private partnership, evident with the pairing of local television stations to schools, is still a much sought after goal to bring the unique features of production companies to the table to develop better online courses.

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After FY 2002, competitive discretionary grants were awarded to support projects that promoted online professional development for teachers in core curricular areas and projects that developed, distributed, and produced educational video programming. Projects were to be based on challenging state academic content and student academic achievement standards in reading and/or mathematics.

The February 24, 2005 notice in the *Federal Register*, Vol. 20, No. 36, describes the purpose of the Ready to Teach program as assisting “...*elementary school and secondary school teachers in preparing all students to achieve challenging State academic content and student academic achievement standards in core curriculum areas*” by awarding two types of grants, those designed to carry out a national telecommunications based program to improve teaching in core curriculum areas and those that use digital programming to develop, produce, and distribute innovative and instructional video programming, referred to as “A” and “B” grants. The “A” grants were funded for five year periods and the “B” grants were typically funded for three years and had a matching requirement. The regulations included a priority for projects with high quality evaluation plans based on scientifically grounded research.

Long term grantees have done much to develop online courses based on state and professional organizational standards. PBS TeacherLine, through the first 5 year cycle that ended in 2005, produced about 100 online courses to include those in content areas like reading, mathematics and science as well as those in instructional strategies and technology and curriculum mapping.¹ Through the years, courses have been improved and many now are developed on Moodle and run on multiple platforms. Courses that once relied solely on videos are now streaming in content and resources of all sorts, some with interactive features.

When TeacherLine was funded as a 2006 grantee developers indicated that the project would go far beyond the online courses of the time by aligning with local initiatives aimed at teacher reform. The project expected that its focus on math, reading and language arts would result in improvements in teacher content knowledge in math, reading and language arts as well as student achievement. The project anticipated reaching 40,000 educators by the fifth year of funding, as a result of its affiliation with 80 local stations and partnerships with Indiana University, Hezel Associates and Learning Point Associates¹⁰.

Another 2006 grantee, e-Learning for Educators (eFE), a project developed by the Alabama Educational Television Education Foundation Authority, focused on building states’ capacity with a goal of improving student performance. Working with state departments of education in Alabama, Delaware, Mississippi, Missouri, New Hampshire, Pennsylvania, South Carolina and West Virginia, the project provided training for state leadership teams and facilitators and large-scale research trials on the effectiveness of online professional development training, the abbreviated results of which are presented at in the research findings section of this document. The same section contains a description of a shared pilot program designed to save resources in these tough economic times.¹¹

¹⁰ Report, PBS TeacherLine National Survey of Teacher Professional Development 2005-2006, Hezel Associates, LLC, Executive Summary.

¹¹ West Virginia shared courses with Kentucky.

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When Rocky Mountain PBS joined forces with the Colorado Department of Education, Digital Directions, Inc. and Responsive Research and Consultation to scale up the online intervention program for Limited English Proficiency (LEP) students called HELP (Help with English Language Proficiency), they built the professional development component around the product. The effectiveness of the intervention program's promise to increase the comprehension of English language content by students whose native language is not English is described through the evaluations. These developers strived to create a research based product that is replicable across multiple types of users.

Funded during the same cycle to conduct project VITAL (Video in Teaching and Learning), the Educational Broadcasting Corporation (WNET) proposed identifying and making available in a digital form, educational videos for teachers in New York State to improve the student achievement of 3rd through 8th graders in language arts and math. The professional development designed was around greater familiarity with technology and effective ways to incorporate the videos into the state approved curriculum by incorporating products and professional development training models that align with the state's standards. The project focused, as a goal, on Title I schools' teachers and other educational professionals.

The 2005 awardees included Alabama Public Television's e-Learning for Educators Initiative and PBS TeacherLine, both of which were described above and received no cost extensions and are on-going today. VITAL and HELP, the other 2005 awardees that were described under the 2006 awardees section, have completed their projects and performance reports.

By the time of the FY 2010 competition, approximately \$10,650,000 was available for new awards in FY 2010 with an estimated range of awards of \$2,662,000-\$5,325,000 for the first year and subsequent years dependent on the availability of federal funds. The FY 2010 funds were rescinded and there were no funds available for the program.

1.5 Perceptions of State Department of Education Officials of Ready to Teach Program Impact

In interviews with Donna Landin,¹² West Virginia Coordinator of the e-Learning for Educators Program, Cathy Higgins¹³, New Hampshire State Educational Technology Director, and Michael Stetter¹⁴, Director of Accountability Resources, Delaware Department of Education,

¹² Interviewed February 23, 2011 by telephone in her office.

¹³ Interviewed March 3, 2011 by telephone in her office.

¹⁴ Interviewed March 3, 2011 by telephone in his office.

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the benefits of the Ready to Teach funded e-Learning for Educators Program were highlighted. These interviews reflect the substantial contributions the Ready to Teach Program has made to state departments of education and are sustainable.

West Virginia has a catalogue of seventy online professional development course offerings for teachers in all fifty-five counties, as a result of the Ready to Teach Program. In the first year of funding, West Virginia was able to adapt and use five courses from Mississippi in the development of thirty new courses for West Virginia. The state has joint ventures with Mississippi, New Hampshire and Kentucky through which they share and modify courses to fit teachers' learning needs and state standards. North Carolina is sharing courses for lingual pods and portfolios with West Virginia. West Virginia is also working with Alabama on courses for Intel as they change platforms, like Moodle, Blackboard, Desire to Learn, and others to accommodate existing infrastructures. West Virginia has a third course that runs on cell phones, as a result of this project and is in the process of increasing courses for mobile platforms.

Delaware has been very nimble and quick to adapt the knowledge base and processes used to develop coursework for the Ready to Teach Program and have expanded the scope of offerings to include real live instructional vignettes in science to demonstrate student questioning and teacher responses and inquiry based instructional methods. The State is also using the model to use online instruction to accomplish the goal established by the board of training seven thousand teachers on common core standards. They've developed 2-hour modules that include "train the trainer" approaches in districts which have led to very positive feedback. Dr. Stetter leads the State's Assessment Team and is using the team and partners in developing 1 hour, 2 hour and 3 hour modules taken at anytime for credit in assessment. In the over five years of funding under the Ready to Teach Program, from 100 + hours online content per course were developed in differentiated areas to meet the specific needs of learners. These include adaptations that represent hybrid models with online instruction supplemented with face to face or video sections of the course.

New Hampshire offers online professional development for teachers but has used the program to think about how to deliver professional development and instruction in general and how to build systems of support around the new opportunities online activities offer. New Hampshire uses the Moodle platform. As a result of the program, New Hampshire has systematized online courses more. The Homeless Education Coordinator, Title I Coordinator and Community Coordinator created a team to serve homeless kids better. Their collaboration has allowed them to reach more rural teachers and children across the state. New Hampshire is using the expertise developed through the Ready to Teach grant to develop a cyber-bullying course with the safe and Drug Free Schools office. All three states report more collegiality and more adaptability to other learning needs in districts, as a result of the Ready to Teach funding.

This report documents the history and purposes of the federally funded Ready to Teach Program, the program evaluations, reports, and findings in light of the existing literature in the field of professional development for teachers. The future directions suggested from the findings are based on the growing body of literature that is evident, as experts around the world are

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exploring the benefits of online courses for the professional development of teachers with an eye towards benefits for their students.

The appendix includes a list of online professional development courses to provide the reader with the scope of the project over time. The content of the report includes:

- Ready to Teach Program external evaluations, research studies, and reports;
- Findings from GPRA assessments of grantee produced courses;
- A literature review and discussion of Ready to Teach in the context of the current body of knowledge on online teaching and learning for teachers and educators;
- Research on course design elements, technology methods and techniques;
- Results from teacher satisfaction surveys; and,
- Findings on mentoring and coaching models.

While the availability of online professional development courses is increasing, the lessons learned from the Ready to Teach Program provide us with benchmarks on the evolution of the field. While televisions were cited in the Federal Register when the program was first introduced, and stationary computers were used for most years of funding the Ready to Teach Program, laptops and handheld devices may soon augment and outnumber stationary and laptop computers and notebooks. Platforms are changing as well. Moodle had not been used extensively when the Ready to Teach Program started but appears to be growing in popularity. Whether handheld or computer driven, the quality of the courses will determine the benefit to the nation.

Chapter 2. External Evaluations and Reports of the Ready to Teach Program

2.1 Evaluations and Reports on Ready to Teach Program funded activities of PBS TeacherLine



*Testing the Efficacy and Impact of a Selected PBS TeacherLine Course, Final Report, Prepared for PBS TeacherLine by Hezel Associates, LLC, Syracuse, N.Y., December 23, 2010.*¹⁵

This summative evaluation represents findings from a 2-year study designed to measure the impact of the PBS TeacherLine 6 - week Reading Fluency course on teacher and student outcomes. The study began in September 2008 and concluded in December 2010. The course, designed for teachers of students in grades 2-5, blends theory and research on fluency with individual teacher's teaching practices. The course content addresses the standards developed by the National Council of Teachers of Education and the International Reading Association. Data was collected through surveys, content knowledge assessments and students' oral reading fluency assessments.

The major research questions are:

- “1. What impact does the PBS TeacherLine Reading Fluency course have on pedagogical knowledge for teaching reading fluency, self-efficacy in teaching reading fluency, and proficiency in using reading fluency teaching strategies?”
- “2. What impact does the PBS TeacherLine Reading Fluency course have on student reading fluency and engagement in reading? “
- “3. To what extent do the effects of the PBS TeacherLine Reading Fluency course on teaching depend on characteristics of teachers and/or students being taught, and/or on the amount and quality of reading materials available?”
- “4. How do the effects of the PBS TeacherLine Reading Fluency course on teaching change over the course of the school year?”¹⁶

¹⁵ Testing the Efficacy and Impact of a Selected PBS TeacherLine Course, Final report, Prepared for PBS TeacherLine, December 23, 2010, Hezel Associates, LLC, Syracuse, New York.

¹⁶ Ibid, p.3.

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Fifty-nine (59) teachers from seven districts in five states participated in the Reading Fluency study. Eighty-eight percent of participants taught second or third grade during the 2009-2010 school year. The remaining 12% of teachers who were assigned to other grades in 2009-2010 were included in the teacher analysis. However, only second and third grade students were included in the student analysis because of the numbers needed for statistical analysis. In the overall sample, 38.9% of teachers have eleven or more years of teaching experience, 24.1% have six to ten years of teaching experience, and 37.1% have five years or less of teaching experience. 57.6% have a Master's degree and 33.9% have a Bachelor's degree with some graduate credit. 72.7% described their undergraduate degree as education-related. 24.3% of the graduate degrees reported were in curriculum and instruction, 21.6% were in education, or elementary education. 87.9% of teachers identified themselves as White. During the 2009-2010 school year, each teacher delivered reading fluency instruction to an average of 19.5 students.

Of the students, 50.3% of the sample was in the third grade and 49.7% was in the second grade. Males represented 50.5% of the student sample and females represented 49.5%. On average, seven students per classroom had an individualized education program and six students were English Language Learners.

The selected major findings indicate:

- treatment students' scores on oral reading fluency increased significantly over control group students over the course of the year;
- Although the course increased teachers' efficacy upon its completion, the effect was not long term and declined over the course of the year;
- Teachers increased their use of differentiated instruction over the course of the year, as a result of the Reading Fluency course; and,
- The Reading Fluency course did not lead to increases in content knowledge.

One of the major limitations of the study is that it did not test for the impact of teaching practice on the results obtained.



PBS TeacherLine Pre-Survey and Post-Survey Evaluation Report prepared by Jonathan Margolin, Ph.D, Debbie Davidson-Gibbs, and Natalie Tucker with Jiuping Chen, Data Analyst, Learning Point Associates, Chicago, June 2010.

Learning Point Associates were contracted to provide an evaluation to determine the effectiveness of PBS TeacherLine courses on improving teachers' knowledge, skills and practice. A secondary purpose of the evaluation was to determine why courses may vary in improving instruction in these three areas.

Researchers reviewed and analyzed data from the nineteen items pre-survey and the 32 item post survey. The pre-course survey included: five items on reasons or goals for course

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participation; six items on level of comfort; two items on course content knowledge; two items on district or school involvement in course selection; and, four items on experience with non-TeacherLine courses for professional development. The post-course survey included: two items on overall satisfaction with the course; two items on level of content knowledge; three items on impact on teaching practice; two items on logistics of course participation; nine items on satisfaction with course facilitation; five items on satisfaction with course quality; five items on satisfaction on customer service quality; three items on liked most, liked least and how to improve; and, one item on suggested additional courses. Some items were combined (course satisfaction items) into a single item for statistical comparison purposes on the pre- and post-surveys.

Researchers received 24,562 pre-course surveys and 17,933 post-course surveys and were able to use 75% of them for 13,544 respondents covering registrations and completed surveys over the course of years from 2005-2009. Additionally, researchers conducted in-depth interviews with twenty-one learners who had taken a course in the summer of 2009 or later. Of this number, eighteen were repeat learners. Three took courses on instructional strategies, five took courses in mathematics, five took courses in reading/language arts, four took courses in science and six took courses in technology. Four of the interviewees taught at the Pre-K through 2nd grade level, one taught at the Grade 3-5 level, seven taught at the Grade 6-8 level, four taught at the Grade 9-12 level and five taught multiple grades or were counselors.

There were five evaluation questions under study. Selected key findings are indicated under each research question in quotations below.

“1. To what extent has participation in Courses enhanced knowledge of subject content, pedagogy, and assessment? “

Findings indicate that:

- a. Only 30% of learners rated themselves as very knowledgeable (3%) or knowledgeable (27%) before the courses compared to approximately 92% who rated themselves as very knowledgeable (46%) or knowledgeable (46%) after the courses.
- b. From the interviews, researchers found that three interviewees gained knowledge of teaching strategies (2 learned strategies for teaching math to special education students), one learned web design, one learned about online resources in mathematics.
- c. On instructional strategies, in the pre-course survey, 27% rated themselves as very knowledgeable (2%) or knowledgeable (25%) compared to over 90% (43% very knowledgeable and 48% knowledgeable) on the post-course survey.

“2. To what extent has participation in Courses influenced learner practices related to curriculum, instruction, and assessment?”

Findings indicate that:

- a. 75.3% of respondents to this “yes” or “no” question in the post-course survey indicated they had incorporated content knowledge into their instruction. 9.2% indicated that they had not incorporated content knowledge from the course into their instruction. About 5% planned to.

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- b. During the interview process, eighteen of the twenty-one interviewees indicated they now use technology integration in their classes as a result of the courses they took.
- c. Sixteen interviewees indicated they now use the online resources they learned about from the courses.
- d. Seventeen of twenty-one interviewees indicated they were more confident than they were prior to completing the PBS TeacherLine courses.
- e. Fourteen of those interviewed said they increased their community of practice during the course but only three of those interviewed said they still use the community of practice on line that they learned about during the course.

“3. Which Courses, and which types of Courses, have the greatest impact on learner knowledge and practice, and for what reason(s)?”

Findings indicate that:

- a. Nine of the twenty-one teachers interviewed indicated the courses impacted student learning. Most said the impact was direct or indirect as a result of the new strategies they applied as a result of the courses.
- b. Six of the twenty-one teachers indicate their students are more engaged, as a result of their implementation of the strategies, practices, and resources they learned from the courses.
- c. Five of the respondents indicated their students benefited because they know more about the content they are teaching (three of the five took PBS TeacherLine courses in science).
- d. There were no differences in impact on learner knowledge and practice by curriculum area or across and between courses.

“4. What is the level of satisfaction with course quality, and how can Courses be improved?”

Findings indicate that:

- a. 80% or more respondents in the pre-course and post-course surveys indicated facilitators always or most of the time:
 - i. provided at least one summary post per week on the discussion forums site;
 - ii. demonstrated knowledge of the content area;
 - iii. established a weekly schedule with e-mails and announcements;
 - iv. responded to requests for assistance within 24 hours;
 - v. gave weekly feedback via e-mail or the online grades tool or online journal tool;
 - vi. began each discussion with a well written question or prompt;
 - vii. provided administrative information like graduate credit information.
- b. 79.4% indicated facilitators asked probing questions. The researchers suggest this is an area for facilitator professional development.
- c. Over 90% indicated they'd recommend the course to a colleague and almost all expressed satisfaction with the facilitator of the course they completed
- d. During the interviews, interviewees were asked about facilitator feedback, responsiveness and grade clarification. Eleven of the twenty-one interviewees indicated the facilitator provided very useful feedback that led to course completion. Nine of the twenty-one interviewed indicated facilitators were very responsive getting back to them within 24 hours. Six of the twenty-one talked about the methods the facilitators of their courses used to clarify grades, reporting expectations and administrative details related to the course.

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- e. Fifteen of the twenty-one did not have any areas of improvement for facilitators. Nine of the twenty-one felt facilitators should provide more clarity through examples and more feedback.
- f. Three of the respondents felt the instructor was rigid or inflexible.
- g. 90% of respondents in the post-course survey strongly agreed (57.4%) or agreed (32.4) that the course met their expectations (relevance). Six interviewees indicated the courses were exactly as represented in the syllabus they reviewed prior to registration, demonstrating consistency of the description with the course that was delivered.
- h. 94.1% of respondents in the post-course survey strongly agreed (63.3%) or agreed (30.8%) that the course provided them with content knowledge they can apply to their classes (usefulness of courses).
- i. 94% of respondents in the post-course survey strongly agreed (63.2%) or agreed (30.8%) that the course provided them with instructional strategies they could apply in their classes.

“5. What are the characteristics of repeat learners in terms of professional development background, Courses taken, satisfaction with Courses over time, and changes in teaching practice? “

Findings indicate that:

- a. In the post-course survey, 58% of respondents indicated they liked the online format best.
- b. Interviews with repeat learners indicate that twelve of the eighteen took courses again because of the anytime, anywhere access to courses and the online format.
- c. Survey completers could check all of the following reasons for taking courses: to fulfill highly qualified teacher requirements; to earn graduate credit; to increase their knowledge and skills; to earn cues towards professional development requirements or other.
- d. Of all survey completers, 1,840 were non – repeaters who took courses to increase their knowledge and skills (76.7%), to earn graduate credit (41.1%), to earn continuing education units (39.8%), to fulfill the highly qualified teacher requirement (35.5%).
- e. 661 respondents had taken 2 courses to increase their knowledge and skill (68.2%), earn graduate credit (48%), to fulfill highly qualified teacher requirements (34.5%), to earn continuing education units towards professional development (33%).
- f. 313 completed three courses to increase their knowledge and skill (69.3%), earn graduate credit (56.9%), to fulfill highly qualified teacher requirements (29.7%), to earn continuing education units towards professional development (33.5%).
- g. 225 completed four or more courses to increase their knowledge and skill (72.4%), earn graduate credit (63.1%), to fulfill highly qualified teacher requirements (28.4%), to earn continuing education units towards professional development (30.2%).

One important area for improvement is the technical access of the online courses. 19% of respondents had difficulty with technical aspects of the online courses they took, as indicated in the post-course survey.

The evaluators made the following four recommendations, based on their conclusions from the data analysis:

1. Maintain a regular schedule for review and course content revision.
2. Summarize assignments with due dates in one place online.

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3. Provide flexible guidelines for discussions at the beginning of the courses.
4. Solicit feedback from learners on the amount of coursework.



A Study of TeacherLine Online Course Facilitation, Prepared for PBS TeacherLine, September 20, 2010, by ALTA Solutions Group LLC, Plattsburgh, New York.¹⁷

The Executive Summary indicates this is a one year formative –summative study of the national facilitation model and 3D course review process that documents how PBS evaluates its facilitators. This study builds on a smaller study that was conducted regionally the year before.

Selected findings indicate:

- 16.3% of facilitators hold doctorate degrees or their equivalency while 83.7% hold Master's degrees, as is required for employment as a facilitator.
- All facilitators have online course experience with 1/3 having enrolled in 30 or more courses before working as a facilitator.
- PBS offers courses entitled Online Facilitator Training 1 (Mastering the Skills of Online Teaching); Online Facilitator Training Plus Mentoring; Online Facilitator Training II or Dusting Your Facilitator Hat. 59.4% of national facilitators and 30.5% of local facilitators have completed both OFT 1 and OFT II.
- Facilitator courses include embedded opportunities for networking and collegial support through faculty meetings, a real time resource library, and a professional community of TeacherLine facilitators (FUN). 40% of national facilitators use FUN to network and gain information more than they provide information and 30% of the national facilitators believe a measure of their success can be attributed to FUN.
- Facilitator performance and quality is assessed using an evaluation rubric on the PBS TeacherLine's Associate Director for Online Facilitation site, PBS TeacherLine facilitator reflection logs, and post course learner assessments that include a section on facilitators. Although scores were converged, the data analysis indicated:
- National facilitators were assessed higher than local facilitators:
 - PBS TeacherLine facilitators excel in effective online facilitation skills such as instruction, interaction and discussion facilitation, course organization, assessments implementation, course climate and community building, consistent with current research findings and PBS TeacherLine policies. Facilitators indicated areas for their own self-improvement to include their need for a presence on the discussion board, providing specific feedback to individual learners, and the need for landscape posts.

¹⁷ http://www.pbs.org/teacherline/courses/common_documents/research/teacherline_facilitator_study-alta.pdf

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- Learners' ratings were very high for quality of facilitation and similar for both national and local courses (and facilitators).
- Most facilitators intended to enroll in another TeacherLine course, recommend courses to other colleagues and apply what they learned to their work environments.
- For future implementation, facilitators recommended courses for professional development include research tested strategies that are embedded and problem based with a hand on format that reflects modeling of best practices content.



The Impact of a NCLB-EETT Funded Professional Development Program on Teacher Self-Efficacy and Resultant Implementation by Richard Overbaugh and Ruiling Lu of Old Dominion University, **Journal of Research on Technology in Education**, 41(1), 43-61, Fall 2008.¹⁸

This study analyzed surveys and interviews from 377 Pre-K-12 in-service teachers from 18 school districts in southeastern Virginia who took free courses in the 2nd and 3rd years of funding (2004-2006) of the TeacherLine project in addition to one six-week summer face-to-face course (Tek Trek) designed to better acquaint them with technology. All participants were to take the pre- and post-course surveys and a follow-up survey. Of the group, 58 or 15% were male and 319 or 85% were female. 224 or 59% had not taken any instructional technology courses before, 121 or 32% had taken 1-3 courses before, and 32 or 9% had taken more than 4 courses. Of the group, 185 or 49% taught in suburban schools, 124 or 33% taught in urban schools, and 68 or 18% taught in rural schools. The largest group, 117 or 31% were between the ages of 41 and 50, 109 or 29% were over the age of 50, 52 or 14% were between the ages of 25 and 30, 83 or 22% were between the ages of 31 and 40, and 16 or 4% were under the age of 25. 171 or 45% taught in elementary or pre-kindergarten classes, 82 or 22% taught at the high school level, 79 or 21% taught at the middle school level and 45 or 12% provided no information on the grade level taught.

Statistically, there were significant differences between the pre- and post survey results, as well as the pre-survey and follow-up survey on the three variables examined (standards, product, and process). Self-efficacy increased in all three areas, meaning the teachers gained competence and confidence in integrating technology into their teaching strategies and, therefore, into their classrooms. Researchers also looked at the demographic factors of completion of previous courses and educational levels (demographic factors as related to self-efficacy) and found no differences based on whether or not participants completed courses previously and whether there were differences in efficacy between participants at different

¹⁸ *The Impact of a NCLB-EETT Funded Professional Development Program on Teacher Self-Efficacy and Resultant Implementation* by Richard Overbaugh and Ruiling Lu of Old Dominion University, **Journal of Research on Technology in Education**, 41(1), 43-61, Fall 2008.

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educational levels. 51 of the participants were interviewed “a few months” after the completion of the course. The major findings from the analysis of the interviews (which represented qualitative results) include:

Interviewees reported learning computer skills, resources, tools and strategies in courses and viewed them as useful.

- New technology skills could and would be incorporated into teachers’ practices.
- For some teachers, technology expanded traditional teaching methods and materials and enriched the process for teachers as well as students.
- Some interviewees requested follow-up courses to keep them abreast of technological changes.
- Some teachers in rural schools expressed limited access because of outmoded hardware and software.



The Impact of a Federally Funded Grant on a Professional Development Program: Teachers’ Stages of Concern Toward Technology Integration by Richard Overbaugh and Ruiling Lu, **Journal of Computing in Teacher Education, Vol 25/Number 2 Winter 2008-2009**¹⁹

Using data from the study described above, Overbaugh and Lu examined teachers’ stages of concern for technology integration in their classrooms and again examined their ages and level of students they taught against concerns for technology integration. In this study, researchers used the Concerns-Based Adoption Model based on Fuller’s work as a conceptual framework. Teachers move from self concerns to task concerns to impact concerns as they are increasingly comfortable with the new teaching experience. The study that was conducted is grounded in previous research primarily conducted by Hall, George and Rutherford (1977)²⁰, Atkins and Vasu (2000)²¹ and Cheung, Hattie and Ng (2001),²² among others. The 7 stages of concern

¹⁹ *The Impact of a Federally Funded Grant on a Professional Development Program: Teachers’ Stages of Concern Toward Technology Integration* by Richard Overbaugh and Ruiling Lu, **Journal of Computing in Teacher Education, Volume 25/Number 2 Winter 2008-2009, pp. 45-55**

²⁰ Gene Hall, Archie George & William L. Rutherford, *Measuring Stages of Concern about the Innovation: A Manual for Uses of the SoC Questionnaire*, ERIC #147342.

²¹ N.E. Atkins & E.S. Vasu (2000). Measuring knowledge of technology usage and stages of concern about computing: A study of middle school teachers, *Journal of Technology and Teacher Education*, 8(4), 279-302.

²² D. Cheung, J. Hattie & D. Ng (2001) Re-examining the stages of concern questionnaire: A test of alternative models. *The Journal of Educational Research*, 94(4), 226-236.

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identified by Hall in 1977 and used as dependent variables in this study include: awareness, information, personal, management, consequence, collaboration and re-focusing.

The method description varied a bit. Courses were designed with interaction between the teachers and a local facilitator who would communicate with them via discussion board and e-mail. Teachers participated in the discussions of topics in depth and had to complete a lesson plan reflecting course goals and objectives and included technology as a teaching strategy. Each course lasted from 15-20 hours or 30 hours and was selected from the course offerings from the PBS TeacherLine catalog.

The sample was the same. There were three hundred seventy-seven (377) Pre-K-12 in-service teachers from eighteen (18) school districts in southeastern Virginia who volunteered to take the courses during the 2nd and 3rd years of funding (2004-2006) of the TeacherLine project. They also got the six-week summer face to face immersion courses (Tek Trek 1 and Tek Trek II) that were designed to better acquaint them with technology. All participants were to take the pre- and post- course surveys and a follow-up survey. Of the group, fifty-eight (58) or 15% were male and three hundred nineteen (319) or 85% were female. Two hundred twenty-four (224) or 59% had not taken any instructional technology courses before, one hundred twenty-one (121) or 32% had taken 1 -3 courses before, and thirty-two (32) or 9% had taken more than four (4) courses. Of the group, one hundred eighty five (185) or 49% taught in suburban schools, one hundred twenty-four (124) or 33% taught in urban schools, and sixty-eight (68) or 18% taught in rural schools. The largest group, one hundred seventeen (117) or 31% were between the ages of 41 and 50, one hundred nine (109) or 29% were over the age of 50, fifty-two (52) or 14% were between the ages of 25 and 30, eighty-three (83) or 22% were between the ages of 31 and 40, and sixteen (16) or 4% were under the age of 25. One hundred seventy-one (171) or 45% taught in elementary or prekindergarten classes, eighty-two (82) or 22% taught at the high school level, seventy-nine (79) or 21% taught at the middle school level and forty-five (45) or 12% were described here as working at private or religious schools.

The findings indicated significant differences between the pre- and follow-up surveys on four of the 7 stages of concern or dependent measures: Information; Personal; Management; and, Consequence. Also noted were significant differences between the post-course survey and the follow-up survey on 5 dependent measures, awareness, management, consequence, collaboration and refocusing. The lowest type of concern was awareness followed by management.

The second research question focused on whether teachers' concerns were related to the age of the teacher. Significant differences were found on all variables except collaboration. The group of teachers younger than age 25 exhibited higher self and task concerns than other age groups which is really not surprising. The teachers ages 25-30 had the lowest concerns of all age groups for all variables. Teachers ages 31-40, 41-50 and 50 and over had the similar concerns. All groups had concerns for collaboration, thereby demonstrating no differences between and across groups.

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In terms of differences based on the school level taught, there were no statistical differences in the variables. However, researchers cautioned that small sample sizes could have contributed to this finding.

In terms of gender, male teachers had statistically higher concerns at the personal and management stages than did female teachers. In other words, male teachers were concerned about how they could personally infuse technology into their classrooms and how that infusion would affect them personally. However, researchers cautioned that this was a very small effect and should be looked into more closely.

The researchers felt the younger teachers benefitted from this professional development more than any other age group. The researchers concluded that the management concerns were related to barriers in the environment for teachers' use of technology at their respective locations. Researchers recommended that products include a description of preferred implementation conditions so that administrators can make more accurate assessments on whether their districts can support professional development and classroom strategies using technology.



Professional Learning Communities: Key Themes from the Literature by Stephanie Feger and Elise Arruda with assistance from Robin Pringle, Danielle Briggs, THE EDUCATION ALLIANCE at Brown University, Providence, Rhode Island, Spring 2008
(The Education Alliance completed this study as a subcontractor for the PBS evaluator, Hezel Associates, LLC, for the federally funded Ready to Teach Program.)

The study by THE EDUCATION ALLIANCE at Brown University provided the PBS Peer Connection Design Team with the most current literature on the topic of professional learning communities. Prior searches focused on instructional coaching and mentoring. Using Google Scholar, ERIC, Digital Dissertations, Education Premier, World Cat, *Education Week* archives and the All Things PLC, findings from research were presented to assist the team in their development of the PBS Peer Connection site. Researchers indicate an uneven distribution of research reports and findings on the research questions posed.

The research questions with corresponding brief descriptions of findings are as follows:

- “What are the characteristics of professional learning communities? How are they structured? What activities do teachers in professional learning communities engage in?”

Researchers cite Hord (1997, 2003) who indicates different definitions based on local uses of professional learning communities. Sometimes it means students and teachers' extended learning outside of the classroom and at other times it means educators working on a shared vision. Hord goes back to Peter Senge's 1990 use of the term as a workplace as a learning organization. Employees can collectively work to identify and share and solve problems through collaboration. Hord also indicates Astuto's work relating the term to educators

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exchanging ideas around teaching and learning issues to improve practice and learning. The characteristics of professional learning communities, according to Hord are:

1. Shared supportive leadership.
2. Shared values and vision.
3. Learning collectively and applying the learning.
4. Shared practice.
5. Support for maintenance of the professional learning community.

A 2006 study by Stoll, Bolam, McMahon, Wallace and Thomas add mutual trust, an inclusiveness for school-wide membership and networks and partnerships that look outside of the school for other sources of learning. Characteristics added by Little (1993), Kruse, Louis and Bryk (1995) and McLaughling (2001) include reflective dialogue, de-privatization of practice, mutual support for professional growth and mutual obligation.

In 2004, DuFour described the characteristics of effective professional learning communities as learning focused, results focused with a collaborative culture. He believes critical questions for educators are what do we want students to learn; how will we know they've learned it; and, how can we improve levels of student achievement? Graham (2007) adds conversation, commitment and contention as principles for schools. 2002, 2006, 2008 and 2007 studies by Hiebert, Gallimore and Stigler, Hanna, Montgomery County Public Schools, and Shen, Zhen and Poppink, respectively, emphasize action research and inquiry to develop professional learning communities using discussions for district wide reform and organizational behavior. At the district level, professional learning communities rely on equity, trust, distributed leadership capacity, documentation and a focus on instruction. A 2001 study by Grossman, Wineburg, and Woolworth identify four stages of community formation; group identify and norms of interaction; fault line navigation; tensions negotiation; and, developing communal responsibility for individual growth. Kline's 2007 dissertation indicates that professional learning communities are viewed positively if seen as voluntary rather than compulsory.

- “What existing theories ground the activities of professional learning communities?”

The researchers mention Lortie (1975), Little (1990) and Lieberman (2000) findings that center on a needed shift in teaching from an isolated profession to one that capitalizes on the need for social interactions to improve teacher practice. They indicate that literature on professional learning communities highlight sharing best practices in a social context. Of particular note in the literature review is the work of Lave and Wenger (1991) that describes how novices adopt the practices of experts through shared practices. Additional studies are cited on the social process of designing online learning.

Of interest is the work of Galluci (2007) who responds to the question of how organizations learn by addressing the interactions from planning and discussing instructional practices that are embedded in the local school as a basis for publicly sharing and implementing a culture of professional learning. In 2002, Boreham described “process knowledge” as knowledge needed to facilitate networking and lateral communications through information technologies in order to

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work flexibly and nimbly. In 2007, Wood addressed the inclusion of teachers in the development and sharing of information through professional learning communities through collegial dialogue, collective inquiry, systematic observations and classroom analysis.

- “What kinds of experience and knowledge do professional learning communities bring to their work?”

The authors cite school based teams including grade level groups and/or multi-grade teams that focus on lesson plan developments and assessments as a means of improving teachers’ individual content knowledge and professional practice (2004). In 2005, Richardson wrote about the need for principal support of teams for validation.

Of note is the work of the National School Reform Faculty (2008) that emphasizes reflective practice and collegiality in a “Critical Friends Group” model. Characteristics of such a group include openness, trust, respect, supportive leadership, a foundation in teaching (knowledge and skills), and school and social structures that go beyond the school’s mission. Wood (2007) adds conflict resolution and meeting facilitation as factors. She also addresses tools like protocols to structure conversations around.

- “What issues/initiatives do they address?”

According to the authors, the literature by DuFour (2004) and Wells & Feun (2007) cited professional learning communities as schools addressing the issues of effective teaching and student learning, equity and high expectations, leadership capacity building, shared norms and values development, decision-making that is driven by data, planning collaboratively and curriculum development. Other findings from the literature search included district initiatives that center on standards, parental involvement, children’s literacy improvement, and the resolution of student motivation and behavior issues. The literature search included a study by 2004 Hollins, McIntyre, DeBose, Hollins and Towner of how a sustained learning community improved literacy acquisition and development of African American children. The process included the identification, approaches and implementation of strategies to meeting challenges, the evaluation of the implementation and guided future practices based on theory.

- “What kinds of dilemmas and challenges do professional learning communities face?”

Time is one of the major challenges facing urban teachers and administrators (2004 study by Hollins, McIntyre, DeBose, Hollins, and Towner). Stoll and others (2006) identified challenges as a function of school size, location (urban or rural, etc.), student body culture, policy issues, learning infrastructure, among others. Stoll and others (2006) also talks about the teachers’ orientation towards change as a challenge. This work was validated by a 2007 case study by Wells and Feun of high school teachers at six different high schools that demonstrated difficulty in finding common ground due to individual teacher differences in philosophy, style, and agreement on the content for assessments. Teachers expressed frustration with the group process because they were trained differently and found it hard to talk about changes. Of note is

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the research of Kennedy (2005) that indicates tensions due to accountability and transforming practice as a result of teachers' views on attempts at collaboration versus individual efforts.

The researchers cite an *Education Week* panelist, Anne Jolly (2007), who listed, as barriers, the absence of school supports and policies to promote collaboration and the need for teacher training, incentives for teamwork, and teacher feedback.

- “What is known about technology use to facilitate work in professional learning communities for educators, other professions and hobby communities?”

The authors start with a 2000 article by Lieberman that describes how the internet has changed how people communicate. Authors then cite specific content based research including:

- a. A 2000 study by MacIsaac describing how physics teachers used the internet to focus on physics lab design and construction, research on physics learning and other topics for collaboration.
- b. How, in a 1997 study by Dalgarno and Colgan, the internet was used by elementary school mathematics teachers during pre-service to: technology integration; differentiate instruction; share lesson plans and activities; confer with experts on the curriculum; and delve into deeper mathematics concepts.

Other literature, research studies and articles focus on research in computer controlled music, hobby and healthcare communities.

- “What evidence, if any, is available about the effectiveness of professional learning communities for teacher professional development?”

The most comprehensive study reported was completed in 2008 by Vescio, Ross and Adams who looked at 11 studies on professional communities of learning and documented change in teacher practice. Evidence indicated teachers were more focused on student learning and both the teaching culture and collaboration improved as a result of the professional learning communities. Of the eleven studies, six reported increases in student achievement over time.

Another impressive study was one done by Guldberg and Pilkington in 2006 of adult learners enrolled in a university certificate program who were able to have discussions based on both school and work. This research emphasized the design of the online collaboration for both individual and group learning and collaboration, as well as mentoring. The group got to collective consensus in this study.

- “Are professional learning communities increasing or decreasing as a model of support for teachers?”

Although there were no numbers at the time of the research, there were indicators of the growth of professional learning communities as support structures for teachers. DuFour's 2007 study indicated the following groups were starting professional learning communities:

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- a. National Board of Professional Teaching Standards;
- b. National Staff Development Council
- c. National Council of teachers of Mathematics;
- d. National Science Teachers Association;
- e. National Council of Teachers of English;
- f. National Association of Secondary School Principals;
- g. National Association of Elementary School Principals; and the
- h. National Commission on Teaching for America's Future.

School systems that used their website to report instituting Professional Learning Communities include:

- a. Austin Independent Schools District in Texas(2008)
- b. Durham Public Schools in North Carolina (2008)
- c. Torrance Unified School District in California (2008)

Researchers in this study cited other experts who indicated increasing interest and inquires on how to implement Professional Learning Communities in various publications.

- “What further studies of the topic are recommended? What makes them sustainable?”

In a 2003 study, Kwakman found collaboration involving talking about professional reading and sharing ideas with colleagues more frequent than collaboration involving feedback during classroom observations suggesting the socialization with teachers did not in and of itself translate into best practices in the classroom.

In the already cited Vescio and others 2008 study, Vescio called for “rigorous” research on the impact of teaching practice on student achievement as a result of Professional Learning Communities. He also called for the documentation of any teacher practice changes in analyzing student work, as a result of the teachers’ participation in Professional Learning Communities.

- “How do school/district administrators support the development of these communities?”

The researchers indicated that the studies, reports and articles they reviewed indicated a mixed picture of support for Professional Learning Communities from school and district administrators. Evidence from Fulan (2006) indicates these are seen as fads rather than sources of long term change. In a 2007 Wood study, changes in leadership at the school or district level impacted support for these communities. In their study of six (6) middle schools, Thompson, Gregg, and Niska emphasized principal support in driving Professional Learning Communities. This included the principal spearheading small group discussions on how to implement innovations learned through these Professional Learning Communities. Halverson suggested that principals could influence these communities through the artifacts selected for lessons such as those like lessons plans that are designed locally, those from district or external sources and those that are inherited like the calendar and schedule. There was agreement that administrator support is key to the support and sustainability of Professional Learning Communities.

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- “What role do school-based professional development providers play, if any, in professional learning communities?”

Few articles were found on school based professional development providers in professional learning communities. The most developed example in the literature comes from Montgomery County Public Schools in Montgomery County, Maryland (2008) where the purpose of the Professional Learning Communities Institute is to increase student achievement. Leadership teams from county schools are given structured professional development to build the local school capacity to increase student achievement. Richard (2004) indicates that in house advocates and staff developers serve as facilitators for Professional Learning Communities.

- “Is funding an issue? What types of resources are needed?”

Lucent Technologies has funded costs associated with Professional Learning Communities (Wood, 2007). In a 2008 report, Smith and Tamez reported on Alcatel-Lucent Foundation’s initiative that included transforming school districts through the implementation of Professional Learning Communities in Albuquerque, New Mexico, Seattle, Washington, Lancaster, Pennsylvania, and Broward County, Florida. The project was extended to Trenton, Plainfield, and Edison, New Jersey as a result of the successes in New Mexico, Washington, Pennsylvania and Florida.

In North Carolina, the Triangle High Five Partnership (2008) funded programs in Chapel Hill-Carrboro, Durham County, Johnston County, Orange County, and Wake County, North Carolina. As a result of successes in selected school systems, private foundations like the Joint Ventures of Silicon Valley, Bay Area School Reform Collaborative, and Coalition of Essential Schools have funded teacher training around Professional Learning Communities (McLaughlin & Talbert, 2007).



PBS TeacherLine National Survey of Teacher Professional Development
Project VITAL Year 2, Interim Evaluation Report Q1, PBS Thirteen/WNET, by Hezel
Associates, LLC, January 26, 2007

This report presents the status of an experimental study started in the first quarter of 2006-2007 by Hezel Associates on VITAL materials. The report outlines the procedures, methods and findings based on the data collection through December lesson logs, attitudinal survey, and a summary of an expert panel’s assessment of the VITAL resources. This report covers the four months during which the study was designed, teachers recruited for participation and data was collected. An expert panel reviewed the pedagogical content of VITAL resources. There were seventy-seven (77) teachers in the control group with sixteen (16) math and twenty-four (24) English Language Acquisition teachers in grade 4, four (4) math and one (1) English Language Acquisition teacher in grades 4 and 5, and eighteen (18) math and fourteen (14) English Language Acquisition teachers in grade 5. There were seventy-seven (27) teachers in the

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treatment group.²³ Seventy (70) or 90.9% of the treatment group responded to the survey. Of these, thirty-two (32) were Grade 4 teachers, thirty-five (35) were Grade 5 teachers and three (3) were combination Grade 4/5 teachers. Thirty-two (32) were English Language Acquisition and thirty-eight (38) were Math teachers.

Selected Methods and Findings for Treatment Group Teachers

Brief Description of the Purpose of Using the Lesson

The multiple activities using a computer or overhead projector with VITAL materials were used in a group lesson (sixteen-twenty-five students for 31-60 minutes per day). 67.2% of teachers downloaded clips before class while others streamed clips in live. The primary purpose for 47.1% of teachers (largest group) was to deepen content knowledge that was previously presented to the group. The primary purpose for the next largest group of teachers responding (27.1%) was to develop student skills, specifically, reading comprehension and problem solving.

Brief Description of Activities

The activities were characterized by 97.1% of teachers as “teacher –led instructional delivery” and “asking question of students”. 92.9% of teachers indicated “guided practice” and “summary” where the teacher wraps up the key ideas in the lesson. 85.7% reported activities of “anticipatory set/introduction activities” and “summative assessments”. 84.3% of teachers reported students’ independent practice, while 80.0% reported small group work and 74.3% reported formative assessment (teacher identifies future lessons based on student needs). 90.0% of teachers reported more than one activity going on at the same time.

Teachers’ Perceptions of VITAL’s quality for the Lesson Reported On (December Lessons)

For the lesson reported on above, 93.8% of teachers reported the VITAL clips were appropriate for their grade level while 81.4% agreed or strongly agreed that the activities associated with the lesson were appropriate for their grade level and 89.1% believed the VITAL materials and worksheets used were appropriate for their grade level. In terms of VITAL’s appropriateness for use with local or pre-packaged curriculum materials, 85.9% were satisfied with the VITAL clips for the existing materials. 76.5% of teachers believed the VITAL clips addressed different proficiency levels of their students. 54.7% would have modified the VITAL worksheets if they’d been in a format to allow them to do so. 76.6% said they’d use the clip again.

Selected Methods and Findings for Control Group Teachers

Fifty-four (54) or 84.4% of the Control Group responded to the survey. Of these, thirty-four (34) were Grade 4 teachers, twenty-seven (27) were Grade 5 teachers, four (4) were Grade 4/5 teachers, thirty-three (33) were ELA teachers and thirty-two (32) were Math teachers. 91.1% did not use any type of video in the lesson reported on but 73.8% used non-technology based

²³ Ready to Teach: Project VITAL year 2 Interim Evaluation Report Q1 by Hezel Associates, January 26, 2007.

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visual displays and 55.4% used worksheets. 50.0% used an overhead projector and 33.1% did not use any non-video technology.

Brief Description of the Purpose of Using the Lesson Reported On

52.3% of teachers indicated the purpose was to deepen students knowledge of content that had been previously presented whereas 32.3% said the purpose of the lesson was to prepare students for a state test. 30.8% of teachers indicated the purpose of the lesson was to deepen student skills at reading comprehension and problem solving. 24.6% of teachers indicated the purpose was to introduce a new lesson or topic whereas 21.5% indicated the lesson was to present an entirely new content. 15.4% indicated the purpose was to assess student learning of previously presented content whereas 9.2% indicated the purpose of the lesson was to review a unit. 3.1% said mid-year review and 4.6% indicated other purpose. Teachers could and did identify multiple purposes so the figures don't add up to 100%.

Brief Description of Activities

98.5% of teachers indicated asking questions of students, 98.5% indicated guided practice, 95.4% indicated teacher –led instructional delivery, and 92.3% indicated introductory or anticipatory activity. 89.2% indicated the lesson was a summary whereby the teacher wraps up the key ideas. 84.6% indicated formative assessment, 83.1% indicated independent practice, 73.8% indicates small group work and 69.2 % indicated formative assessment or the identification of student learning needs for future lessons.

Comparison of Treatment to Control Teachers' December Lessons

Similarities:

- Multiple activities were implemented during the same lesson
- Comparable percentages (44.3% Treatment Group Teachers and 46.2% Control Group Teachers) used this lesson as an application.
- Both groups shared primary purposes.
- Local curriculum and assessments influenced the content of the lessons.
- Half of teachers reported student influence on lesson content.
- The majority of teachers in both groups plan to use their assessment results to shape future lesson activities.

Differences:

- In December, Control Group Teachers most often used overhead projectors compared to Treatment Group Teachers who used computers to input non-video technology.
- Treatment Group Teachers used worksheets more.
- Most Treatment Group Teachers used videos as expected in the study whereas 91.1% of Control Group Teachers did not.

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The study further indicates attitudinal survey differences including barriers to video usage. Expert panel reviews of materials are included in the study. The summary of findings for this section of the report (p.34) indicates:

The videos are engaging, current, short, fast pace, age appropriate and highly regarded as rated by experts. Science videos were given the most positive teacher feedback on quality. Social studies videos had mixed results with some teachers finding them boring and others finding them easily attainable. Teachers need more time and better technology to adequately use the videos in their classrooms. Some highly regarded the videos because of student enthusiasm while others felt the product was not age appropriate nor did the product offer real world applications.

Researchers cited the following issues (p.35):

- VITAL activities are not complete and treatment resources are limited.
- Student performance outcomes are not timely.
- One school had both treatment and control teachers and the treatment teachers gave materials to the control teachers.

The following recommendations were made:

- Further develop and add on resources to VITAL, especially for 4th and 5th grade Math and English Language Acquisition students.
- Continue the development of age appropriate resources with real-world applications.



PBS TeacherLine Peer Connection Pilot Study Report, Hezel Associates, Syracuse, New York, September 5, 2007

(This report is one phase of evaluation research conducted during Year 2 of the PBS TeacherLine's Ready to Teach Program. The report is a context study that examines the overall effectiveness of an online coaching tool PBS developed to support coaches.)

Findings indicate:

1. Before using the PBS TeacherLine Peer Connection, most participants were open and positive about the use of technology for professional development
2. Respondents indicated a need for the PBS TeacherLine Peer Connection.
3. Respondents valued the resources offered through the PBS TeacherLine Peer Connection rather than use for professional learning.
4. Respondents indicated infrequent use of the PBS TeacherLine Peer Connection.
5. Respondents viewed the PBS TeacherLine Peer Connection resources and discussion board positively overall.
6. Technological barriers to the PBS TeacherLine Peer Connection usage were relatively common.

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7. There is a need for the PBS TeacherLine Peer Connection to align with school standards and curricula.
8. Teacher time is limited and teachers found the time it takes to use the tool as a barrier.
9. In order for coaches to integrate the tool into their practice, and make using resources more efficient, the tool functionality needs to be improved.

Researcher recommendations include the following:

1. PBS TeacherLine should clarify the purpose and the intended audience to ensure the effective use of the tool.
2. PBS TeacherLine should disseminate the tool for use as best practices in instructional coaching.
3. PBS TeacherLine should increase opportunities for administrators who coach to use the tool in their supervisory work.
4. PBS should continue using formative research in order to make sure that new functionalities added to the tool are educator-friendly, and to remain sensitive to trends in instructional coaching.

The researchers concluded from this and the pilot (first) study that PBS TeacherLine will be well-positioned to impact coaching programs and practices that impact teacher and student outcomes.



*PBS TeacherLine National Survey of Teacher Professional Development
2005-2006*

Report by Hezel Associates, LLC, November 16, 2006
The PBS Facilitator/Coach Study

Hezel Associates completed a series of studies for PBS and the U.S. Department of Education including the PBS TeacherLine Facilitator/Coach Study. The Syracuse based company accomplished this through a survey instrument, literature review of instructional coaching, and national survey data analysis. They also completed a Coaching Needs Assessment Study with findings reported in the same document. One hundred twenty-one (121) or 19% of facilitators responded to the survey and of these, one hundred-one (101) or 81% are involved in teacher professional development at their schools in addition to their roles as PBS facilitators or coaches. The responses of this group of one hundred-one were used for the analyses. Their findings that relate to online professional development include the following:

- The most valuable PBS TeacherLine courses, according to coaches, were those where content included readings, activities and assignments.
- Based on the responses of coaches, Hezel Associates recommended that PBS TeacherLine:

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- Continue updating the course content with related online resources, improved lesson plans, teaching and learning strategies, current readings, activities and assignments;
- Organize resources sequentially;
- Foster collaboration through e-mail, discussion boards to share ideas;
- Expand video options with directions for use by coaches;
- Link lesson plans to discussion themes;
- Standardize and clearly define for all participants, PBS copyright regulations and PBS TeacherLine policies on resource sharing and course content;
- Include research data to prove the effectiveness of the content and resources;
- Create an accessible database;
- Develop a coaching course based on the facilitator training course.



PBS TeacherLine National Survey of Teacher Professional Development, 2005-2006, Hezel Associates, LLC, Syracuse, New York

These findings come from data collected in the first year of the second five year award made to PBS TeacherLine from the Ready to Teach Program through the U.S. Department of Education's Technology in Education Programs Office in the Office of Innovation and Improvement. Selected findings highlighted in the Executive Summary indicate:

- Superintendents and principals differ in their perceptions of who is responsible for professional development options with superintendents saying districts take the lead and principals assigning themselves or their assistant principals as leads.
- Teachers believe they and their principals, based on school improvement plans, determine professional development options.
- 84% of principals as opposed to 57% of teachers indicate classroom observations are often used to determine professional development needs of teachers.
- More principals (65%) than superintendents (46%) indicate that instructional coaching is used for teacher professional development.
- 76% of teachers report they spent time completing online courses or modules while 89% reported completing internships, 76% reported completing research projects, 62% completed instructional coaching and 69% reported no time on college courses.
- 87% of teachers paid for face to face college courses and 73% paid for all or some portion of costs for their online courses or modules.
- Teachers who work in schools with lower socioeconomic students as determined by free and reduced lunches seem to have more centralized control of teacher professional development.

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Experimental Methods and Results in a Study of PBS TeacherLine Math Courses by Paula S. Dominguez, Ed.D., Craig Nicholls, Ph.D., Barbara Stordant, M.Ed., M.S. of Hezel Associates, LLC, Syracuse, New York, 2006

In an unpublished article by Hezel Associates found through a Google search, authors wrote about the methods they used and findings from their study of PBS TeacherLine math courses. This very brief description includes key elements from the article.

At the time of the research, twenty thousand educators (20,000) had taken ninety (90) online facilitated courses in instructional strategies, technology, curriculum mapping, reading, science and mathematics through TeacherLine, the federally funded program to support online professional development for teachers and other educators. The researchers used an experimental design to study ninety-two (92) elementary teachers of children in grades three to five, from Miami-Dade County (Florida), Richland Two (South Carolina), and Buffalo(NY) public schools. Treatment group teachers participated in two PBS TeacherLine courses in elementary mathematics in the 2004-2005 school year and control group teachers did not participate in any of the PBS TeacherLine courses. Teachers received an honorarium for their participation. All teachers completed a pre-course and post-course online survey based on attitudes towards teaching and learning mathematics. The Reformed Teaching Observation Protocol (RTOP) was used to track instructional practice. The Evaluation Facilitation Group of the Arizona Collaborative for Excellence in the Preparation of Teachers as used to validate findings about the teachers' instructional practices (p.3). The RTOP protocol covers a description of the math lesson, description of the materials and physical characteristics of the classroom. The observation rating form included twenty-five items rated from no evidence (0) to highly descriptive of the lesson (4).

Classroom observations were made by eleven (11) members of the evaluation team who were extensively trained on the protocol and observation methods. Data was collected from classrooms in three (3) districts on two hundred eighty-eight (288) mathematics lessons at three times corresponding to the beginning of the study, the completion of the teacher's first online course, and, at the conclusion of the school year. Student data was collected in the form of twenty-item student pre- and post- tests in algebra and geometry. Authors reported a total of one thousand one hundred thirty-seven (1,137) usable student records. Additionally, two districts granted researchers permission to access students' standardized test scores in mathematics for the preceding year and for the year of the research study. For this data set, the team calculated gains based on the difference between numeric proficiency scores for the two years.

Findings indicate no difference in teacher attitudes but significant differences in teachers' recognition of the value of the newly learned online math teaching and learning practices over traditional ones ($p=.93$). For student findings, there were no significant gains for treatment over control group students overall and race and gender didn't contribute to these findings. However, students in Florida and South Carolina significantly outperformed students in New York in gains

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in both algebra and geometry. The authors concluded that there are contextual differences in states (and possibly regions) that influence findings. Researchers didn't look at other professional development that may have been underway in the districts, nor did they look at the textbooks schools were using in the different areas.



PBS TeacherLine National Survey of Teacher Professional Development, 2005-2006 Report by Hezel Associates, LLCⁱⁱ

Hezel & Associates completed a national survey of over one thousand four hundred (1400) teachers and administrators which focused more on the organization and management of teacher professional development and the relation between district and school professional development activities and the decision-making around professional development. Some of the selected findings related to the use of online professional development, technology and the products developed by Ready to Teach grantees include the following:

- Where school improvement plans were in place, teachers rated themselves and their principals as more influential than the district in decisions related to professional development.
- 65% of principals and 46% of superintendents surveyed say that instructional coaching is used by the district as a part of professional development.
- Although schools and districts have technology for use in professional development and are supportive using the internet, all three groups (teachers, principals and superintendents) reported moderate use of technology.
- 89% of teachers spent no time in internships, 76% of teachers spent no time in online courses or modules, 69% spent no time in college courses, 67% spent no time on research projects and 62% spent no time in instructional coaching.
- 73% of those teachers who took online courses paid in full or part for the courses or modules. Similarly, 87% of those who took classroom college courses paid for them in full or in part.
- 2/3 of the teachers surveyed reported being comfortable or very comfortable with taking online courses. However, 19% indicated they were not comfortable at all. About 2/3 indicated they would be interested or very interested in an online professional development activity.
- For subject area knowledge and impact on instruction, teachers rated college courses, workshops and conferences highly. Instructional coaching was not highly rated.
- Coaching is more likely to be used in urban school systems.
- In terms of support for the use of the internet in professional development activities, geography plays a role. 44.2% of town and 43.8% of rural superintendents were more likely to support the use of the internet for professional development compared to 30.9% of urban fringe superintendents and 23.8% of urban superintendents.

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- In schools with large numbers of low socio-economic-status students as determined by free and reduced lunch, teachers are rated as less influential in initiating professional development.



“Ready to Teach Algebra Evaluation”. A Report prepared for the Concord Consortium, PBS TeacherLine, and the U.S. Department of Education by Edcentric of Wilmington, North Carolina and Hezel Associates, LLC, Syracuse, New York, September 2005.

Some of the funding secured from the U.S. Department of Education for the Ready to Teach Program (#R286A000006-03) was used by the PBS TeacherLine grantee to fund a new course, Ready to Teach Algebra. The program was developed by Concord Consortium’s Seeing Math Telecommunications Project in Wilmington, North Carolina with PBS TeacherLine. The document indicates on p.i, that goal of the course is “To improve student achievement by developing high quality standards-based digital professional development to teachers and by developing high quality, standards -based digital classroom content. “ Topics in this online course include: ratio; proportion and scale; linear functions; transformation of linear functions; linear equations; quadratic functions; transformations of quadratic functions; quadratic equations; and descriptive statistics. According to the Executive Summary, since “...the U.S. Department of Education established new priorities or evaluation, with a strong emphasis n experimental and quasi-experimental research...resulted in Concord Consortium’s development of a comprehensive research plan for the overall Seeing Math project beginning with the 2003-2004 school year and extending through the 2004-2005 school year. This final evaluation report focuses on the research and evaluation efforts conducted by the formative evaluation conducted by Edcentric and the quantitative evaluation conducted by Hezel Associates. Edcentric and Hezel Associates are the external evaluators for the Ready to Teach Algebra project.”

Evaluators selected two objectives of the Seeing Math Telecommunications Project produced by Concord Consortium as the focus of this evaluation. They elected to evaluate the quality and usefulness of project materials and strategies; and research the effect and impact of the Seeing Math materials. Findings indicate teachers who completed the Ready to Teach Algebra modules were no better prepared in content that those who did not. However, teachers’ pedagogy improved in this study, as a result of the online courses.



PBS TeacherLine 2000-2001 Evaluation Report by Carla Lane, Ed.D., Principal Evaluator, The Education Coalition, San Clemente, California, October 31, 2001.

At the time of this evaluation report, TeacherLine partners included the National Council of Teachers of Mathematics (NCTM) and the International Society for Technology in Education (ISTE). Both professional organizations have standards in mathematics and technology that the TeacherLine project meets. Other partners included six local educational agencies and sixteen

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public television stations. The local broadcasting stations were in Arizona, California, Colorado, Iowa, Louisiana, Maryland, Massachusetts, Missouri, New Hampshire, Ohio, Pennsylvania, Texas, Washington and Wyoming. Local educational agencies paired with stations included ASSET AZ in Arizona, Glendale School District in California, Catahoula Parish School Board in Louisiana, Prince Georges County Public Schools in Maryland, Hampshire Education Collaborative in Massachusetts, North Country Education Foundation in New Hampshire, Glendale School District in Pennsylvania, San Antonio Independent School District in Texas, and Cape Flattery School District in Washington. At the time of the study, additional local educational agencies were to be paired with public broadcasting stations.

The PBS TeacherLine pilot services produced at the time of the evaluation were described as:

- *Virtual Mathematics Academy (VMA)*
- *NCTM Online Follow-Up*
- *Facilitated Learning Modules*
- *Certificates*

The VMA provided teachers with internet activities, articles, lesson plans, resource links, streamed video scenarios, and moderated discussion boards based on the use of National Council of Teachers of Mathematics developed mathematics standards. In this phase, participants developed Plans of Action for use in their classrooms. Once the VMA was completed, teachers had a six-week follow up (NCTM Online Follow-Up) that included moderated discussions with experts, chats, and open sharing that allowed them to refine their Plans of Action. The Facilitated Learning Modules were completed as a part of the VMA and certificates were awarded after the teacher assessments of the program were completed.

The evaluation is both formative and summative, addressing the impact on teachers' practice through the modules, websites and online resources provided by TeacherLine. Data collection methods include questionnaires, interviews and descriptive statistics, correlation analysis and linear regressions are used to analyze data. Only selected findings are described in this document.

Brief Description of Methods with Significant Findings from the PBS/LEA Professional Development

The Pre-course Survey administered on the first day of the course indicates:

1. Surveys were completed by five hundred seventy-seven (577) teachers who indicated a high level of comfort (3.03 on a scale of 1-4) with online professional development. Experience with using technology in their classrooms was moderate with three hundred seventy-nine (379) teachers or most using technology for less than two years. Two hundred ninety-nine (299) teachers indicated technology had little or no impact on how they taught in their classrooms. One hundred ninety-nine (199) indicated technology had changed their teaching a bit or greatly. Three hundred twenty-six (326) teachers completed courses at home whereas one hundred fifty- nine (159) worked from their classrooms on courses. Three hundred fifty-four (354) teachers

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indicated the course helped them develop in mathematics or technology. As a result of the statistical analyses, researchers concluded that the more experience teachers are with technology, the more likely they are to be comfortable with online professional development.

2. Researchers also surveyed ninety-two (92) administrators, technology specialist, math specialists and higher education administrators and faculty using the “K-12 Other Educators Pre and Post Evaluation Surveys”. Most members of this group indicated extensive experience or more than two years of using technology but only 2.88 on a scale from 1-4 of comfort with online professional development. This group indicated technology had changed the way they taught quite a bit” with 3.07 on a scale from 1 to 4. Researchers used information about years taught and whether they were working on a degree (bachelor’s, master’s doctorate) to determine comfort level with online professional development. They found that working on a degree was followed by the number of years taught as indicators of satisfaction with online professional development for this group. However, the lower the degree held, the more comfortable the respondent was with online professional development. Researchers also found that the comfort level was related to the respondent’s sense that technology had changed the way they taught.

Survey data was also collected on the online facilitators. The majority of facilitators had no prior experience as an online learner or teacher. The three surveys that were completed included:

1. The “TeacherLine Online Module Facilitator’s Survey” after each facilitator completed one day of face-to-face training.
2. The “TeacherLine Online Module Facilitator’s Six Weeks Seminar Pre-Evaluation Survey” before taking the online seminar.
3. The “TeacherLine Online Module Facilitator’s Six Weeks Seminar Post-Evaluation Survey” after taking the online seminar.

Brief Description of Methods with Significant Findings from the Online Module Facilitators surveys indicate:

One hundred seventeen (117) facilitators completed the instruments and rated their experiences with online education a mean of 2.3 on a 4 point scale. Their mean score of 3.3 on a 4 point scale for initial expectations demonstrates enthusiasm for what they were about to learn. Prior to completing the course, their comfort level was, on an average of 2.487 compared to 3.417 after completing the course. Significant facilitator competencies included tracking, implementing and assessing online learning, design activities, online group facilitation, choosing media and being learner centric. Of the topics: weekly activities and assignments; module lesson plans; large group discussions; small group discussions; instructor feedback via e-mail’ self paced online learning; teaching tutorials; readings and resources; feedback in private office space; only feedback in the private office space was significant for facilitator comfort level. Other statistical analyses were completed and found that the more facilitators’ skills increased,

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the greater their comfort level at being an online facilitator. Not surprising, online experience was significant in determining comfort level on the first day of the facilitator's training.

Learners were also surveyed. Pre-course survey responses were included but the course had not been completed at the time of the report, so there are no post-course data available for pre-course- post-course comparisons. Eighty-four (84) learners completed the post module survey instrument and a mean of 3.036 on a 4 point scale indicated they were comfortable with online professional development. Respondents indicated they were excited about learning online (mean of 3.554 on a 4 point scale) When asked how the course would help their teaching practice, they indicated new teaching methods and information, providing their students with another tool, adding to their teaching strategies, improving communications with their students, improving their presentations and increasing their time for more productivity and efficiency. They saw access to technology as a barrier, resource limits (smaller than needed number of computers), and computer lab schedules. At the time of this study, most teachers had a single computer, if any, in their classrooms and labs were more widespread. Other challenges cited included parental permissions, time to monitor student use of the internet, keeping up with technological changes and parental permissions to use the internet at school. Librarians felt they had inadequate information about teacher lesson plans and could not effectively help students who came in without greater communication with the teacher. Some participants could not foresee problems with integrating technology into their classrooms. Of potential problems identified as possible barriers in the study (learning styles and strengths awareness, knowledge of types of online learning activities to appear to learning styles, knowing how to find activities on the internet, collaboration with other educators in the local school or district (including action research groups, team teaching, collaborations on professional books and reading groups, etc.) a strong level of significance existed for what to expect as a student in an line facilitated course and the comfort level doing professional development outside of a traditional classroom.

Selected Findings from Training for PBS Station Partners and Local Educational Agency Partners

The "Train the Trainer Survey" was completed by fifty-five (55) station partners and LEA staff after training in March (32 people) and August (23 people). After the training, responses representing a mean of 3.2 on a 4 point scale indicated they were very comfortable with initiating training at their sites. This correlated strongly with post course data sets on teachers' satisfaction. The evaluation team worked to develop a tracking mechanism on the web sites (<http://www.TECweb.org/PBS/TeacherLine>) to develop benchmark data and to follow teachers' progress through the modules and certifications in technology and mathematics. Built in is also an "Evaluation Administration Web Site" so that users can download spreadsheets and other charts and sets of data to view and use individual and group responses.

Plans for K-12 Learners

The developers anticipated collecting data on the students of teachers who completed the modules in mathematics and technology to determine if the modules made a difference in student

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performance. This group of students was anticipated to be added in the second year of the project.

This research study includes a number of helpful appendices. Appendix A includes the Scope of Work. Appendix B includes all Survey Instruments. Appendix C includes Focus Interviews with selected individuals from: Arizona's ASSET, AZ; KRMA TV, Denver, Colorado; Louisiana Public Broadcasting, LA; Catahoula Parish School Board in LA; Jackson, Mississippi; KCET Los Angeles, CA; and, WPTV, Riverton, WY.

2.2 e-LEARNING FOR EDUCATORS



Predictors of Teacher Satisfaction with online professional development: evidence from the USA's eLearning for Educators Initiative by Todd D. Reeves and Joseph J. Pedulla, Educational Research, Measurement and Evaluation, Lynch School of Education, Boston College, Chestnut Hill, Massachusetts, in **Professional Development in Education**, March 16, 2011, pp. 1-21.²⁴

In this article in **Professional Development Education**, researchers examine evaluation data from the Ready to Teach Program's eLearning for Educators program funded through the Alabama Public Television Foundation to provide online professional development in ten states. Local public television stations in those states partner with state departments of education to implement the program. The researchers have identified one of the findings from the body of evidence from other studies that suggest that online professional development creates challenges. The researchers cite a finding by Smith and other that in the first three and a half years of the project, of the twenty nine thousand one hundred four (29,104) teachers who registered for courses, twenty-one thousand five hundred thirty-six (21,536) or 74% completed the courses they enrolled in. This study examines satisfaction and identifies new factors that contribute to satisfaction, course completion and ultimately the attainment of professional development goals for online course enrollees. The authors looked at satisfaction studies in traditional professional development as well as satisfaction with online professional development in other professions.

The study looked at the number of contact hours, facilitator feedback, quality of learner interactions, technical assistance availability, clarity of expectations, ease of use of the website, and course organization. The new design and implementation variables they studied included "facilitator knowledgeableness", facilitator effectiveness in setting the tone of the discussions and class and encouraging participation, facilitator availability for support, and ease of content transferability as well as alignment with professional development plans to meet local

²⁴ Predictors of teacher satisfaction with online professional development...by Todd D Reeves and Joseph J. Pedulla in **Professional Development in Education**, March 16, 2011.

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professional development needs. They also looked at the links between satisfaction and pedagogical skill; course content related to satisfaction; cultural non-bias of materials and resources; relevance of discussion topics; and, whether adequacy of compensation was related to satisfaction with the courses.

The sample included three thousand nine hundred ninety-eight (3998) elementary and secondary teachers from nine states who completed the courses they enrolled in. Only participants who completed the pre- and post- course surveys were included in the study. Only the pre- and post- surveys from the first course of those who completed more than one course were included in the sample. Researchers used existing pre - and post- surveys as well as constructed satisfaction composite variables from three evaluation items. The statistical methods are described briefly in the article. The three composite variables constructed from existing survey items were “satisfaction”, computer proficiency, and “quality of learner interactions”.

The research findings for the first block of predictors indicate statistically significance for teacher computer proficiency, gender, prior online course experience and ease of access to technology. High computer proficiency was highly correlated with dissatisfaction whereas the other variables were correlated highly with satisfaction. In this study, these predictors explain 9.2% of the variance in satisfaction.

In the second block of predictors, increases in course organization, quality of learner interactions, expectations, user friendliness of the technology, clarity of learner expectations and facilitator feedback were significant for satisfaction. Contact hours and technical assistance were not significant factors in satisfaction. When these predictors were included, proficiency and gender were no longer significant factors in satisfaction but ease of access to technology and prior experience were still significant. The first two blocks explained 41.5% of the variance.

The third block added nine variables: ease of content transferability; adequacy of compensation; the benefit of discussion topics; facilitator knowledgeableness; the effective linking of content and pedagogy; materials without cultural bias; facilitator keeping discussions on topic; clarity of stated goals; and, communicating clear expectations. Of these, increases in adequacy of compensation and ease of content transferability were related to increased satisfaction. Ease of access to technology was no longer significantly related to satisfaction. While increases in facilitator’s clear expectations and clarity of stated goals, their effective linking of course content to pedagogy and the benefit of discussions were related directly to increased satisfaction, increase in the other variables were not but were related to dissatisfaction.

The variables most related to satisfaction in a positive direction were: course organization; prior experience with online courses; helpful facilitator feedback; quality of learner interactions; clarity of expectations; ease of content transferability; adequacy of compensation; user friendliness of technology; and facilitator knowledgeableness. The variables most related to dissatisfaction were: cultural non- bias of materials; facilitator keeping discussions on track of topic; and clarity of stated goals.

The authors concluded the satisfaction of teachers with online courses was not related to the course design or implementation elements. This study found evidence of satisfaction consistent with some of the research on satisfaction in the literature on in person professional

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development like the clarity of course expectations. The study also supports satisfaction related to the collaboration of teachers enrolled in these online courses. In this study, ease of use of technology and proficiency in technology were not related to satisfaction. The authors speculate that this finding may be due to the fact that participation was voluntary.

The finding on transferability from this study is well grounded in the literature provided by the authors of this research and indicates that content that is practical and useable in their classrooms is better than theoretical content for teachers. By applying the findings of this and other studies on teacher satisfaction with respect to these specific variables, the authors hope to influence more course completion by enrollees, as they become more satisfied and see more applicability of their coursework to their classes.



e-Learning for Educators: Effects of Online Professional Development for Teachers and Their Students: Findings from Four Randomized Trials by Laura M. O'Dwyer, Jessica Masters, Sheralyn Dash, Raquel Magidin De Kramer, Andrea Humez & Michael Russell, Technology and Assessment Study Collaborative, Lynch School of Education, Boston College, Chestnut Hill, Massachusetts, inTASC Report, June 2010.

This report presents the findings from four studies of teachers in the e-Learning for Educators project, funded by the Ready to Teach Program, to evaluate the effect of online teacher professional development on teachers' knowledge and professional practices and on students' content knowledge and practices. The four randomized controlled studies were conducted using teachers from the eight -state initiative who enrolled in e-Learning for Educators courses between January 2007 and June 2009. There were three rounds of data collection across the eighty (8) states during three school semesters. While the description of the sampling methods and data collections procedures are inclusive in each study and in the comparative sections reporting on all four studies, this report will briefly describe the courses and samples and will then highlight selected key findings from the individual trials.

Brief Description of Teacher and Student Sample in the Fourth Grade ELA Trial

The English Language Arts (ELA) Workshops completed online included "Best Practices for Vocabulary Instruction in the Elementary Classroom", "Promoting Reading Comprehension Skills in the Elementary Classroom", and "Teaching Writing in the Elementary Classroom". The goals of each workshop are clearly spelled out and relate directly to the impact being examined.

Two hundred fifty-five (255) teachers were recruited for the study with one hundred seven (107) in the control group and one hundred forty-eight (148) in the treatment group. Sixty-five (65) control group and fifty-three (53) treatment group teachers completed all of the

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requirements for the study. The final teacher sample included sixty-one (61) control group and forty-nine (49) treatment group teachers for a total of one hundred ten (110) teachers. 95% of the teachers identified themselves as white, and 3% identified themselves as African American. There were no significant differences between the treatment and control groups based on race. 100% of the teachers in the treatment group were female compared to 92% in the control group. Coincidentally, all five male teachers were assigned to the control group. All of the teachers were certified and most held Master's degrees (72% in treatment group and 62% in the control group). There were no significant differences based on gender, certification and Master's degrees held between the treatment and control groups. 70% of the teachers had been teaching for six years or more and there was no significant difference between the treatment and control groups based on teaching experience. 61% of teachers in the treatment group and 75% of teachers in the control group taught in high need schools receiving Title I funds.

Although two thousand four hundred eighty-one (2,481) eligible students were identified, one hundred sixty-five (165) were disqualified because they were from schools where they had multiple teachers, ninety-two (92) students were not confirmed to be in the 4th grade, and five hundred thirty-six (536) students completed less than half of the items on the survey instrument which left the final student sample size at one thousand six hundred eighty-eight (1,688) with nine hundred twenty-two (922) in the control group and seven hundred sixty-six (766) in the treatment group. In terms of race, 67% of students self identified as white, 13% as African American or Black, 12% as another race (Hawaiian, Native American, Asian), and 9% didn't self disclose race. There were no significant differences across the treatment and control groups based on students' race. 95% of students indicated English as their first language. 86% of students reported having a computer in home and 73% reported using a computer a couple of times a week. 70% of students reported using a computer in school a couple of times a week. There were no significant differences in the treatment group and in the control group on student ownership of computers or use in school.

Brief Description of the Results of Fourth Grade ELA Trial

1. The treatment group of teachers' average pre-test scores was higher than the control group's pre-test scores, although not significantly higher.
2. For most teacher subjects, the post-test scores were higher than the pre-test scores.
3. The control group's scores decreased from the pre-test to the post test on vocabulary and writing.
4. The treatment group gained significantly more than the control group in the areas of reading comprehension and writing domains. (Researchers conducted additional statistical analyses to control for differences in the pre-test scores that may have inadvertently inflated the differences between the control and treatment groups. After doing so, treatment group's scores were still significantly higher than the control group's scores.) The treatment group also scored significantly higher than the control group on average vocabulary knowledge and overall English Language Arts knowledge.
5. In terms of instructional practices related to vocabulary and writing, the treatment group's pre-course scores were higher than the control group's scores however the

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control group was higher on reading comprehension in the pre-course survey. However, none of the differences were statistically significant.

6. In post-course surveys, teachers in the treatment group scored higher than the control group in all 3 areas.
7. Although pre-test scores for students in the treatment group were higher than those in the control group, they were not statistically significant. However, on the post-test, student gains in the treatment group were significantly higher than student gains in the control group in vocabulary knowledge, reading comprehension knowledge, writing knowledge and overall ELA knowledge
8. In terms of student practices on the pre-test, there were no statistically significant differences reported between the treatment and control groups. There were very small statistically significant gains for treatment group students compared to control group students on the post-test, although students in both the treatment and control group gained in each subject.

Brief Description of the Teacher and Student Sample in the Seventh Grade English Language Arts Trial

The three Seventh Grade English Language Arts workshops used in the trial were: “Best Practices for Vocabulary instruction in the Middle School Classroom”; “Promoting Reading Comprehension Skills in the Middle School Classroom”; and “Teaching Writing in the Middle School Classroom”. Eighty-five (85) teachers were recruited for the control group and one hundred twenty-three (123) for the treatment group for a total of two hundred eighty (208) seventh grade English Language Arts teachers. The final sample size was forty-five (45) control group teachers and thirty-five (35) treatment group teachers for a total of eighty (80) teachers. 93% of the teachers self identified as white, 4% self identified as Black or African American while zero identified as Hispanic. 98% of the teachers were female. 99% of the teachers were certified by their state. 64% had Masters degrees and 33% had bachelors’ degrees as their highest degrees. 68% had been teaching for 6 or more years. 49% taught in Title1 funded schools. There were no significant differences between the control group and the treatment group on any of these variables.

Of the three thousand eighty-eight (3,088) students assigned to the originally recruited teachers, one thousand thirty-two (1,032) were discarded for reasons including: the exclusion of their teacher from the study: students weren’t confirmed to be in the 7th grade: students had multiple teachers: or students failed to complete at least 50% of the pre- and post-test instruments in vocabulary, reading comprehension and writing. One thousand two hundred twenty-five students (1,225) were left in the control group and eighty hundred thirty-one (831) in the treatment group for a total of two thousand fifty six (2,056). 75% of the students identified themselves as white, 6% Black or African American and 15% other races. 5% of students gave no racial information. 83% of students identified as non-Hispanic whites and 5% as Hispanic/ Latino. 95% of students reported English as their first language. 49% of the students were male and 51% were female. 91% of students reported having a computer in their homes; 40% reported using the computer a couple of times a week; 50% a couple of times a month and 10% a couple of times a year. There were no significant differences in the control and treatment groups on any of these variables.

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Results of Seventh Grade English Language Arts Trial

Teachers in the treatment group had higher pre-scores than teachers in the control group on teachers' content knowledge but those differences were not statistically significant. For most subjects, post test scores of both the treatment and control groups were higher than pre-test scores. Treatment group scores in reading comprehension and overall in language arts were higher than the control group scores.

In vocabulary and writing, the teacher control groups' pre-test scores were higher than the teacher treatment group's scores. However, in reading comprehension, the treatment group's pre-test scores were higher. Reading comprehension practices scores on the post-test for both the control group and treatment group were comparable.

For students, the control group's pre-test scores were higher than the treatment group on reading comprehension and vocabulary but not statistically significant. Standard gains, when looking at the pre-test/post-test size effect, were statistically significantly greater for the treatment group on reading comprehension and vocabulary. In terms of student practices, there was a significant difference between the treatment and control groups' pre-test scores in writing. There were no significant differences in reading comprehension practices between the student treatment and control groups. Post –test scores were higher in reading comprehension practices and writing practices or both the treatment and control groups. The standardized gains in both reading and writing practices were slightly higher for the treatment group than the control group. In conclusion, this English Language Arts trial demonstrated the online professional development had positive effects on both the teachers and the students in the treatment groups. While the courses had an overall statistically significant positive effect on vocabulary and overall English Language Arts, it did not have a statistically significant effect on writing and a small effect on reading comprehension. Scores for students changed in the same patterns as scores for their teachers. However, the differences in the performance of the treatment group and the control group were very small and almost negligible.

Brief Description of the Teacher and Student Sample in the Fifth Grade Mathematics Trial

The fifth grade mathematics workshops included in this trial were: “Using Models to Understand Fractions”; “Algebraic Thinking in Elementary School”; and, “The Complexities of Measurement”. Two hundred thirty-five teachers were recruited, one hundred forty-three teachers resigned from the study, leaving a total of seventy-nine teachers of whom forty-five were assigned to the control group and thirty-four to the treatment group. 89% of the teachers self identified as white, 6% identified themselves as Black or African American and 3% Latina. 90% of teachers were females, 91% were certified. 58% held Master's degree and 37% had Bachelors' degrees as their highest level of education. 73% of teachers taught in Title 1 schools. There were no statistically significant differences between the control and treatment groups on any of the aforementioned variables.

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Of the two hundred twenty (220) eligible students, one thousand three hundred five (1,0305) were in the control group and eighty hundred ninety-five (895) in the treatment group. After disqualifications due to various reasons, there were seven hundred ninety students (799) in the control group and six hundred forty-eight (648) in the treatment group for a total of one thousand four hundred thirty-eight (1,438) students. Of the students, 65% self-identified as white, 12% Black or African American, 13% other race, and 10% no racial information. Half of the students were male and half of the students were female. 92% of students indicated English is their first language. 87% of students reported having a computer in their home, 65% indicated using the computer a couple of times a week, 25% indicated using the computer a couple of times a month and 6% a couple of times a year.

Results of Fifth Grade Mathematics Trial

There were no significant differences in the pre- test scores of the control and treatment groups on overall mathematics scores. For the treatment group, the largest post-test effect difference was on measurement. Overall, the largest gains were for the treatment group. The scores for the treatment group increased while the scores for the control group decreased. The course had a small effect on teachers' knowledge of fractions, a medium effect on teachers' algebraic thinking knowledge and a large effect on measurement knowledge. Total mathematics knowledge also increased.

In terms of measurement practices scores, control group teachers had larger increases than treatment group teachers. However, there were no differences in pre-test scores in fractions and algebraic thinking. Other than measurement scores, control group's post-test scores were lower than their pre-test scores. The largest pre- to post- test gain was for the treatment group on the measurement practices test.

For the students, both control group and treatment group post test scores were higher than the pre-test scores. The greatest gains were recorded for the treatment group on all measures with the highest being on fractions. The online professional development had no impact on knowledge of fractions, algebraic thinking, measurement and overall mathematics. Post-test score variations were attributed to teacher differences and relatively small sample sizes. Although treatment group students were predicted to demonstrate the most gains (after substantial statistical controls), regression coefficients based on class and group membership were not reliable predictors of scores on fraction, algebraic equations and measurement scales.

Participation in online professional development positively impacted teachers who completed the coursework and their students. Instructional practices measures were higher for teachers in the treatment group than those in the control group. Student scores were positive only for the overall math scores, not the subsets.

Brief Description of the Teacher and Student Sample in the Eighth Grade Mathematics Trial

The three workshops in the 8th grade mathematics trial included: "Proportional reasoning"; "Functions"; and "Geometric Measurement". Although one hundred ninety-nine

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(199) teachers were recruited to include ninety-one (91) for the control group and one hundred eight (108) for the treatment group, the final number in the sample size was seventy-one (71) (43 and 28 in the control and treatment groups, respectively). Teachers were from thirteen states. 42% taught in Title 1 schools. 86% of the teachers were female and most self-identified as White. 49% of the control and 62% of the treatment groups taught for 10 years or less. All but one had certification and 63% held Master's degrees.

Of the students, 52% or one thousand eight hundred eighty-nine (1,889) were female. Students ranged in age from 12 to 16 years. 75% of the treatment group and 71% of the control group were White. Blacks made up 14% of the control group and 5% of the treatment group. For 4% of the student population, English was not their first language.

Results of Eighth Grade Mathematics Trial

The workshops had a positive effect on teachers and their students. Teachers in the treatment group had higher post-test scores than teachers in the control group. Greatest effects demonstrated in proportional reasoning and functions followed by geometric measurement. Students whose teachers completed the online teacher professional development had higher scores than students whose teachers did not. Treatment group students' scores were most significantly higher than the control group students for geometric measurement, functions and overall mathematics but not for proportional reasoning.

Summary of the Four Trials

All four trials demonstrate the benefits of online professional development for teachers and their students in different content areas at four different grade levels. Although listed as a limitation by the authors, the fact that some teachers took more than one course during the year in which the data was collected and did not get adequate time to incorporate the knowledge they gained into their practices, this would suggest even more positive effects had they done so. The linkages to student outcomes are very impressive and timely, since today, teacher evaluations are being tied more to student performance in key content areas. This series of trials demonstrate the effectiveness of the eLearning for Educators courses and serves as a model for subsequent research designs.



Year Three Comprehensive Report for the e-Learning for Educators Project prepared by Kara Smith, Cherlyn Dash, Lauren Chapman, Joseph Pedulla, Boston College, The Center for the Study of Testing, Evaluation and Educational Policy, October 2008.

Boston College conducted an extensive evaluation of the e-Learning for Educators (Fee) program, executed in eight states (Alabama, Delaware, Kentucky, Mississippi, Missouri, New Hampshire, Pennsylvania and West Virginia) by Alabama Public Television. The evaluation

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covered the extent of implementation in each state, how participation in the initiative impacts teacher content knowledge, beliefs about pedagogy and students' achievement, capacity building at the state level and sustainability over time. The report covers the timeframe from June 2006-June 2008 with an emphasis on Year 3 data.

Under the state agreement, the project design included a minimum of twenty-four (24) workshops for at least three hundred eighty-five (385) teachers for each of the first two program years. In Year Three, states were required to complete at a minimum, twenty-seven (27) workshops with a minimum of four hundred thirty (430) teachers. State enrollment data indicates that five (5) states exceeded the minimum requirements in the first year, seven (7) in the second year and four (4) in the third year.

It is noteworthy that West Virginia and Kentucky initiated a course sharing pilot initiative in the third year. Kentucky shared the workshops "Best Practices in the Digital Age: More than Just Power Point" and "The Connected Writer: using Blogs & Online Collaborative Tools to Enhance Student Writing". This appears to be a valid means for states to provide professional development in these cash strapped times.

Although seventeen thousand nine hundred thirty-four (17,934) individuals registered for the workshops across states, participants included other school personnel besides teachers. Attrition rates ranged from 4% to 53% across the states, so thirteen thousand nine hundred twenty-six (13,926) people completed workshops and of those, 64% or 8,957 actually completed both the pre- and post- workshops surveys.

The evaluators also looked at the participation of teachers from Title I schools, since that is one of the objectives of the eFE initiative and found that the percentage of Title I eligible schools for participating states ranged from 45% to 68%. The number of teachers from Title I eligible schools that completed both the pre-and post- surveys ranged from 36% in one state to 70% in another state. In 5 of the 8 states, Title I participation exceeded the percentage of Title I schools in the state.ⁱⁱⁱ

Demographics of Participants

Approximately 84% of participants were females and 15% were males.^{iv} 36% of participants were in the age category 26-35, more than any other group reporting age. The data for race/ethnicity indicate that 75% were white, 1% Hispanic or Latino with 24% Black or other race.^v

Of particular interest is the study on participants' actual cognitive gains. The cognitive study included participants who enrolled in 3 workshops: "Reading First: Supporting Early Reading Instruction with Technology"; "Differentiating Instruction to Accommodate Learning Styles"; and "Transforming the Classroom with Project Based learning". Participants scored statistically higher on the cognitive survey *after* taking the course than they had *prior* to taking the course.

Additional selected findings included:

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- significant gains in teachers' content knowledge;
- improvements in teachers' teaching practices;
- increases in teacher participants' students' achievement.

Another really interesting finding that resulted from researchers looking at the prevalence of workshop type by teacher background and experience characteristics found that:

- When workshops types are broken down by types (content, pedagogy, technology, other):
- The majority of respondents took workshops that emphasized specific content (41%) over pedagogy (28%) or other content like assessment and administration (8%)
- Teachers who identified as white were statistically significantly more likely to enroll in a technology workshop than teachers who identified as Black or teachers who identified as a race other than White or Black.
- Teachers who identified as Black were statistically more likely to enroll in workshops focused on pedagogy than were teachers who identified as White or as a race other than White or Black. The same statistical pattern held for content based workshops.
- Teachers who identified as male were statistically more likely to sign up for a technology workshop than participants who identified as female.
- Teachers who self identified as female were more likely to sign up for content workshops than teachers who were male.
- In terms of age, teachers who were under age 25 were statistically more likely to take workshops that were content-based.
- The teachers under age 25 were also more likely to take pedagogical workshops than any other group.
- Teachers over the age of 55 were least likely than any other group to take a workshop that was content, pedagogy or technology based.
- Teachers from high need schools were more likely to take technology based workshops than those who were from schools that were not high need.
- Teachers from non-high needs schools were most likely to take a content based workshop than teachers from high needs schools.

2.3 GPRA Reviews

The Annual GPRA Reviews

The Government Performance and Results Modernization Act of 2010 calls for the head of each agency to develop a strategic plan that includes a mission statement, outcomes oriented goals and objectives demonstrating how the work of the agency contribute to the federal government's priorities. This bill updates and supplements the *Government Performance and Results Act of 1993* which was the basis for annual strategic planning and budgets developed based on programs' accomplishments.

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The GPRA Process²⁵

The purpose of the GPRA review is to determine the effectiveness of the Ready to Teach Program through an assessment of randomly selected individual products developed by individual grantees. Products for General Programming grantees (A) are defined as a professional development course or a completed course prototype. Products for Digital Educational Programming (B) are defined as instructional video programming or a completed program prototype.

The assessment instrument, developed based on research and a rubric for online learning by the University of Wisconsin-Stout, takes a look at five elements: content; technology; design; dissemination and implementation; and, target audience.

Products meet the criteria for high quality with a mean score of 80 or more on a 105-point scale. The rationale for the scoring criteria was established in FY 2008 when Ready to Teach performance baselines was set at 80%.

The single panel of reviewers consisted of experts in their fields, specifically:

- A teacher who uses online instruction continually with K-12 classrooms.
- An evaluator with expertise in K-12 online instruction or in conducting quasi-experimental studies on online professional development courses.
- A coach/mentor who facilitates online professional development and/or K-12 online instruction.

The review process included:

- the exploration and hands-on assessment of the products by reviewers;
- Grantees' Face-to-Face Orientation to the Products & Review
- Independent Product Reviews & Completed Assessment Instruments by Reviewers
- Panel Discussion of Findings and Conclusions

²⁵ Ready to Teach FY 2010 and FY 2009 GPRA Review Plans

2.3.1 Findings on Products from the FY 2010 GPRA Review



Delaware Watersheds– Product Analysis
E-Learning for Educators
Alabama Educational Television Foundation Authority (AETFA)

This pilot course was developed by state content experts for use by all 7th grade science teachers in Delaware. The course was aligned with state science standards in support of student assessment goals.

Final Quality: High Quality

Strengths

Panelists agreed that the earth science content included subject knowledge from one of the core curricular areas, encourages skill development, is logical and intuitive with relevant learning objectives, has clear menus and paths to all information, and includes supplementary materials to enhance the online instruction. The content included clear support for the novice teacher which is so essential since schools sometimes don't offer such support. The content strongly supports pedagogy and curriculum delivery needs while acting as a blueprint for lesson planning. The content is built on investigations, assessments, differentiated instruction, and student journaling. Content is appropriate for science teachers and middle school through adult learners.

The technology standard was met through a user friendly product, clear menus and paths, ease of use of the technology, online prompts and an announcement page with clear up-to date communications on the glitches. Video vignettes demonstrate model lessons; teachers can access resources for their classrooms, and, blog personal reflections. There is a seamless integration with external links because navigation of the site is seamless. Videos were provided in different formats. The product includes “An Announcement” link, “Collaboration” link, “Messages” link, and “Voice Board” link and other devices.

The product design allows teachers to use the course and take students directly to a watershed as a field experience. One panelist believed the course could be applied to other environmental science programs. Information was provided on the use of formative data in the development of the course.

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The design included a facilitator who could provide direct support and feedback to participants. The developer has enabled users to disseminate materials and videos (stored as Word documents) through zip files. Two panelists indicated the materials could be used by other users outside of Delaware.

Weaknesses

While no weaknesses were indicated, one panelist indicated it would have been nice to see an actual class.

Recommendations

No recommendations were made.



E-Learning for Educators – Product Analysis **Alabama Educational Television Foundation Authority (AETFA)** *Creating A Language Rich Environment*

Creating A Language Rich Environment focuses on language development through intentional conversation and is designed for early learning educators. The product was developed with state partners to allow for the adaptation to state standards for language development in young children.

Final Quality: Above Average Quality

Strengths

The panelists indicated that the course is aligned with standards and objectives for developing knowledge in language skills, the additional readings complemented the development of language skills, and the selected video clips supported the course. Attention is paid to the alignment of developmentally appropriate practices for teaching young children. The course applies current early childhood learning theory to practice. This product provides a clear instructional approach to meet the need for language development in young learners.

The course would be particularly beneficial to teachers of young children who demonstrate low levels of language acquisition, including English Language Learners, students with IEPs and struggling students.

This course was created in Moodle but access for Blackboard and D2L users is provided. The course can be used on multiple platforms.

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Weaknesses

On the content standard, one reviewer indicated that some areas like “resources” “...may confuse the user since resources is used to designate different content and pages not actually resources.”

There were panel concerns about the ease of use of the technology. One reviewer suggested that a menu panel on each page would ease the problems with navigation. One reviewer noted a broken link which was repaired quickly.

The presenters did not include the formative data used to develop the product. During the on-site interview, the developers indicated that formative data was used in the product development but reviewers would have liked seeing the data. Developers described on site the pre- post and six month interview process that was used to collect data for product improvement.

Recommendations

The panel recommended:

- (1) the development of ways to better navigate the course;
- (2) use of materials as job-embedded study with peers and provide evidence of use through journaling;
- (3) linking all references, including *GeoCities*, *The Art of Story Telling* (not linked during gpra review) Also, Activity 1 in session 4 – exploring web sites;
- (4) making optional videos and reading a part of the course requirements;
- (5) adding more questions to capture data on reflection, feedback and discussion;
- (6) adding more applicability and use of content.



TeacherLine Peer Connection– Product Analysis Public Broadcasting Service (PBS)

Peer Connections/Real-World Linear Functions: The Cell Phone Problem

This course module was created for coaches and mathematics teachers of students in grades 6-8 and 9-12. The module is tied to NCTM standards and requirements and makes mathematics relevant to students through real word applications.

Final Quality: High Quality

Strengths

On the content standard, the panel agreed that the sequences of information were logical and intuitive, the learning objectives were easy to define and understand, the menus and paths

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are direct, and the content is based on mathematics, a core subject area. Instructional strategies are given for teachers and coaches. Each session builds upon the development of coaching skills. On the technology standards, the panel agreed that the technology was easy to access and functioned speedily, videos are embedded, the PDF format eases use, and there were no navigational problems.

The panel really liked the product design since it included both “quick suggestions” and “my suggestions” so that teachers could provide the coaches or facilitators with feedback directly. The panel also liked the use of focus groups to develop the product, thereby providing evidence that assessment is on-going to drive program design and development. The components of the module can be used with small and large groups. On the dissemination standard, the panel likes the use of the Moodle as well as the PBS platform and proposed expansion for use with mobile phones and hand held devices mentioned in the face-to-face sessions. On the target audience standard, the panel liked the fact that the coach could assist with differentiated instruction to best meet the needs of a particular student or groups of students. The videos with notes help teachers think about why certain decisions are made for certain students.

Weaknesses

The product is restricted for PBS use and there were small technical issues with downloading forms.

Recommendations

It was recommended that the developers embed formative data within the course introduction section of the module. (No information was provided on formative data until the face -to -face with developers session.)



**TeacherLine Peer Connection
Public Broadcasting Service (PBS)**

Developing Understanding with Dynamic Media and Digital Storytelling

This product was designed as a tool for teachers of elementary school children to supplement the curriculum with stories developed online by children with their teacher’s assistance for the development of critical thinking skills.

Final Quality: High Quality

Strengths

The panel agreed that the content is logical and intuitive, objectives are easy to understand, menus and paths are clear and direct and the content encourages skill development. The available resources can help build the teacher’s repertoire of materials for application to classrooms. The content can be adapted to different curricula, different grade levels, and can be

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used across different types of schools. The product is built on Blooms' Taxonomy and strives to develop higher level thinking skills in learners, using technology.

On the technology standard, the panel agreed that the product gives teachers many samples, rubrics, videos and links. According to the panel, the product helps close the technology gap for teachers. There are step by step processes to build the user's ability to understand the functions in a tech environment. Procedural processes are developed. There are opportunities for practice. There is deliberate intention to build and close the tech information gap for teachers and students. Discussion boards, virtual cafes and surveys are used for feedback. The toolbar at the top of each page made navigation really easy. The panel found the design standard above average. Lessons are designed to be comprehensive, a post course survey is used to collect data, and facilitators provide feedback from users to course developers. The product is aligned with the standards of the national Staff Development Council (NSDC). The product can be used by novice users as well as experienced users. The supplemental resources are in available in a number of modalities, making the product useful to students who have a preference for learning in a specific modality. On the single dissemination standard, the panel learned at the face-to-face meeting that the product will be further developed to be offered through different platforms like handhelds and smart phones. The product was developed to run on Moodle. Readers agreed that online storytelling is an incentive for learners and would benefit English Language Learners, students with disabilities and low performing students.

Weaknesses

Some of the videos in lesson 2 could not be loaded.

In the face-to-face session, panelists learned that there was limited alignment of the technology skill with a specific subject area, since the product was not developed with a specific content area in mind.

Recommendations

In the face-to-face session, the developers agreed with the panel that examples in different core content areas would demonstrate how digital storytelling within specific areas could be used by teachers to motivate children while developing skills in core content areas.

2.3.2 Findings on Products from the FY 2009 GPRA Review



Earth History
E-Learning for Educators
Alabama Educational Television Foundation Authority (AETFA)

The *Earth History* course, an historical geology course designed to promote in-service teacher content preparation, is designed to allow teachers to work through the FOSS kit in support of students learning about earth history. The FOSS Earth History kit promotes student geology content knowledge, including an understanding of how processes of weathering, erosion, and deposition are used to make inferences about changing environments.

Final Quality: High Quality

Strengths

The panel thought the product's layout of the website and course was logical and easy to follow, the objectives were well-defined. All information paths were deemed to be clear and direct. The panel agreed that the subject knowledge was evident and the content encouraged skill development. The use of journals and blogging for both students and teachers were deemed useful. One panel member felt this course added content as opposed to skills. Also, teachers learned how to blog and how to use it as a journal for students. The supplemental materials enhanced online instruction/professional development.

The technology included videos and other resources and complemented the content and provided a value-added component to the lesson. The product ran smoothly and efficiently and teachers' immediate feedback on understanding and mastery of the content were possible but not immediate in the sense that it occurs in real-time.

The product was designed so that teachers could demonstrate an understanding and mastery of the context. The panel agreed that formative data was used to guide the design of the product and that the product is consistent with current research about effective teacher professional development practices. The product can be delivered and utilized across multiple platforms.

Weaknesses

Experts felt the product would not be beneficial to most teachers in schools with high populations of students who are not performing on grade level in core curricular areas. The

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feeling was that the set of lessons was designed in concert with the Delaware Department of Education for use in all 6th grade classrooms. One panelist felt "...this was a "one size fits all" type design – but the project also showed how this could be used for remediation or outreach for struggling students."

Recommendations

The panel recommended that the grantee create a standard exit interview or survey that would help gather information about how students and teachers were using this product.



A Conceptual Introduction to Functions: Using Visual Models **E-Learning for Educators** **Alabama Educational Television Foundation Authority (AETFA)**

A Conceptual Introduction to Function: Using Visual Models was designed to help middle school teachers teach functions using visual models. Strategies were designed to help students develop a conceptual understand of functions and with tasks that allow them to explore situations of both linear and non-linear functions. Teachers were expected to create classroom tasks to help students make connections between multiple representations of functions. Participants were expected to be able to design a lesson plan to explore the concept of function.

Final Rating: High Quality

Strengths

Panel agreed that the course content contained logical and intuitive sequences of information and the menus and paths to all information were clear and direct. They also thought that the learning objectives were easy to understand. The overall goal of the course was to find different ways to assist students in understanding the concept of functions. The course content encouraged skill development and research provided a foundation for why certain activities were included. Accessible follow up materials and websites were also provided.

The smoothly running technology was the main focus, complemented the content and provided a value-added component to the lesson. Teachers could receive feedback on their understanding and mastery of the content through trained facilitators who would make "weekly" posts. Panelists recommended individual e-mails as a method for more immediate feedback, rather than through facilitators.

The product was designed for teachers to provide multiple opportunities to demonstrate their understanding and mastery of the content in a variety of conditions and contexts. The product's design included enhancements that permit end-users to provide feedback for improving the "product."

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Panelists were hesitant to strongly agree that formative data was used to guide the design of the product. One panelist tactfully indicated: “The team of reviewers from Boston College described an ongoing data collection process that would eventually yield data-based results – but to date the project had not reached the conclusion or integration phase. Because the timeline for data collection was unclear, it raised questions about the extent to which formative data could have been used to make real-time changes in the design of the product.”

The panel agreed that the product is consistent with current research about effective teacher professional development practices. Opportunities for sharing across multiple platforms and for delving more deeply to learn about content, process, and delivery were apparent.

Panelists felt this product is beneficial to teachers in schools that have high populations of students who are not performing on grade level because the product is visual and focuses on multiple intelligences and incorporates manipulatives. The product addresses differentiation, multiple intelligences, use of higher level thinking skills and cognitive-challenging instruction. Visual strategies with tactile dimensions, especially useful for special needs students, were particularly appreciated by panelists.

Weaknesses

Although teachers could receive and/or provide immediate feedback they did not think that the feedback was “truly immediate.” Panelists agreed that formative data was used to guide the design of the product, but thought that the issue of the time period for data collection and changes based on feedback needed to be addressed.

Recommendations

The panel recommended (1) modifying how those taking professional development can more easily signal that they are lost on the material; (2) create a way for teachers to submit video or lesson plans and get more instant feedback on material; and (3) incorporate frequent feedback as part of the product’s design.



Cultivating Communities of Practice (Peer Connection)
TeacherLine Peer Connection
Public Broadcasting Service (PBS)

The focus of this product is to help instructional coaches and mentors learn more about communities of practice formed by and for educators, including teachers, mentors, and instructional coaches.

Final Rating: High Quality

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Strengths

This product is beneficial to teachers in schools with high populations of low-performing students. In the presentation by PBS personnel, statistical data on users was mentioned; i.e., 73% are from NCLB failing schools. This product is not aimed at students although one PBS presenter indicated a strong correlation between the use of these materials and “at risk” or Title I communities. However, the distinction between correlation and causality was not made clear. The product can be delivered across multiple platforms.

The product is consistent with current research about effective teacher professional development practices and was designed to provide multiple opportunities for teachers to demonstrate an understanding and mastery of the content in a variety of conditions and contexts. The product is a newer version that incorporates and increases collaboration. Discussion groups and community managers kept in contact with the project team and relayed feedback. Formative data was used to guide the design of the product. The first version was tested with four hundred participants. The second version was based on that feedback. Version 2 will be tested again and changed.

The technology ran smoothly throughout the GPRA review and complemented the content while providing a value-added component to the lessons. The feedback is through facilitators which does not allow for “real-time” or immediate feedback. According to the product developers, the decision to take advantage of the value added by facilitators was a conscious and deliberate one, and does not represent an oversight or shortcoming.”

The content was of high quality, logical, and intuitive. The content fostered the development of technology skills. The learning objectives are well defined and the product includes subject knowledge from one of the core curricular areas. The product is a tool designed to help coaches and mentors train teachers. The menus and paths to all information were clear and direct and the supplemental materials enhanced online instruction.

Weaknesses

The panel found weaknesses in how feedback was provided to the teacher participants. The feedback could use upgrading and relies on group feedback and interactions. Discussion boards provide a means for feedback, but at the time of the review, was not immediate.

Recommendations

The facilitator/instructor should provide more feedback in both one-on-one and in communities’ interactions.

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Ready to Teach Program – Product Analysis *Communicate and Collaborate Online* **(TeacherLine) Peer Connection** **Public Broadcasting Service (PBS)**

This PBS TeacherLine’s product is a 30 hour course for K-12 teachers who are interested in learning about new ways to communicate and collaborate online. Using tools such as Wikis, blogs, social media sites, e-mail, discussion boards, and video conferencing, teachers can create meaningful educational experiences.

Final Rating: High Quality

Strengths

This product can be delivered across multiple platforms and is beneficial to teachers in schools with high populations of students who are performing below grade level. The emphasis is on mentoring and coaching for classroom teachers. Using this product allows teachers to bring resources to geographically isolated schools. However, there is no a specific strategy for implementing these materials in low performing schools – although PBS did show that their materials were being used in Title I schools.

The product design, developed based on formative data, provided opportunities for teachers to demonstrate their knowledge, permitted end users to provide feedback/suggestions for product improvement, and was consistent with current research about effective teacher professional development. The technology ran smoothly and complemented the content. The only issue regarding technology was the fact that feedback to teachers was not as immediate as it could be.

The course’s content contained logical and intuitive sequences of information; subject knowledge from one or more core curricular areas; encouraged skill development; and provided supplemental materials that enhanced the online instruction. The technology was created with clear menus and paths to all information. The learning objectives were clear and appropriate. One panelist noted, “Technology skills were at the root of this course. The designers went beyond the average scope introducing “avatars” and other social networking skills in addition to the basic set of classroom tools teachers need.”

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Weaknesses

The first weakness identified by the panel was that the skill development was dependent on the level of use the online instructor has. The second weakness was that the course's technology was not designed for immediate feedback.

Recommendations

The recommendations were: more feedback from the facilitator/instructor both in one-on-one and in communities; and, course updates in order to keep it current with the technology applications.

Ready to Teach Program – Product Analysis **Video in Teaching & Learning (VITAL) on Teacher's Domain** **Educational Broadcasting Corporation/WNET-13**

This instructional video program brings a collection of educational videos to the classroom that use expert-developed activities aligned to New York State standards in math and English/Language Arts for students in grades three through eight.

Final Rating: Not High Quality

Strengths

This product was not very highly rated. However, at least one panelist felt the content was logical and intuitive; the menus were clear and direct; and, aids or tools were included to assist students in completing tasks and assignments. The panel agreed that subject knowledge from one of the core curricular areas was included and the product targeted student academic achievement. The indexing and the table of contents provided all of the material in a way that was tied to standards. However, it was not always clear what the video had to do with the topic under the core curricular area.

The product ran smoothly and efficiently and the selected technology was a good fit for the content being taught. The product's design was rated very highly. The graphics and animation were visually appealing. Enhancements permitted end-users the opportunity for feedback/suggestions for product improvement. Formative and summative data was collected and involved two groups of 75 teachers. A study was completed that looked at the efficacy of instruction that included this tool verses a control group that did not use the tool.

The product could be delivered across multiple platforms and delivery system like Blackboard, D2L, Moodle, and QuickTime.

Weaknesses

The content did not encourage skill development. There were some worksheets but they were not a basal part of the tool. The teacher had to make decisions about skill reinforcement or

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connections to content. The short video segments were not interwoven into larger modules that taught skills but rather, were discrete building. It was not clear to the panel what skill sets were developed in teachers. Materials could not be used independently by students or away from the classroom. The panel did not think that immediate feedback was possible with this product. The panel recommended that a tool be developed to help students or teachers who get stuck along the way to address their needs and to get help.

The product was not beneficial to low-performing students or to teachers integrating the product in the classroom. One reviewer noted, "...there was 'no statistically significant impact' on student achievement as seen through test scores." The design team and reviewers talked about 'increased learning retention' but it was not readily evident how the efficacy of this product could be measured.

Recommendations

The panel recommended the following improvements:

- (1) develop a student interface and learning modules to help teachers deploy this product as a remediation and extended-learning tool (rather than forcing everyone to be on the same page at the same time);
- (2) inter- weave the short poignant video segments into larger modules that teach skills;
- (3) create more student-based interfaces, or encourage/add log-ins for students to use the videos;
- (4) make some of the groups public (so people can join and be used as a resource); and
- (5) give some attention to how teachers can use a video with different applications and extensions to serve the needs of students having difficulty with the content being taught.



Ready to Teach Program – Product Analysis
Teacher Support and Administrative System
Help with English Language Proficiency (HELP)
Rocky Mountain PBS

This product is a digital program with a supplemental curriculum for teaching Mathematics to English Language Learners (ELLs).

Final Rating: High Quality

Strengths

The panel believed this product was of high quality but not easy to use. The content included logical and intuitive sequences of information; encouraged skill development; and contained subject knowledge from one of the core curricular areas. Regarding skill development one panelist indicated the skills are not as specific as they could be. And while the menus and

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paths to all information were clear and direct at the student level, they were more difficult at the teacher level. Every panelist noted the same comment on this standard.

The panel agreed that the product includes aids and tools to assist the students in completing tasks and assignments and it enhances student learning and targets student academic achievement standards.

The panel rated the technology standards highly because:

- (1) the student/teacher could work independently through the product;
- (2) the product ran smoothly and efficiently;
- (3) the technology choice was appropriate for the content being taught; and
- (4) students/teacher could receive immediate feedback on their mastery of content.

Some of the lessons accelerate background knowledge so that skills can be reinforced. This product has the capacity of having the teacher create new materials for student use. Teachers can use assessment tools to design and plan new lessons for teaching and re-teaching.

The product can be delivered across multiple platforms and is beneficial to students who are not performing on grade level in one of the core curricular areas. Teachers can create individual instruction for each student.”

Weaknesses

In the Rocky Mountain PBS presentation, different tools and add-ons were displayed but were not easily accessible when each panelist tried to use them independently. It was felt that this tool was not yet fully functional and teachers could not yet click on the links that appeared when they indexed or searched via standard.

Although the panel thought that the product used formative data to guide the design and the product was designed with enhancements that permit end-users to provide feedback/suggestions for improving the product, they did not think that the graphics and animation were visually appealing.

Feedback was not immediate. The help area generated an email. However, developers did modify the product based on users’ recommendations. One panelist felt here an absence of a sophisticated data collection mechanism.

While different tools and ad-ons were displayed, it was not clear how to use them. More instructions were needed. Some of the menus and options were text-intensive with settings that required a manual or previous knowledge of the product.

Recommendations

Panelists recommended:

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- (1) creation of an online resource guide that provides a better explanation of how to use the tool more effectively as an alternative to the help button;
- (2) creation of an online tutorial;
- (3) upgrades for teachers for smoother use of the animation/graphics in the product;
- (4) more information on data collection methods and how the feedback and influences product revisions;
- (5) revise the teacher side of the product to include enhancements for ease of use;
- (6) include a “roll-over” or help button to explain the various options in the teacher tool;
- (7) include toolbar interface on the teacher tool; and
- (8) add more graphics.



Ready to Teach Program – Product Analysis
Place Value
Help with English Language Proficiency (HELP)
Rocky Mountain PBS

This product is a digital program with a supplemental curriculum that addresses Mathematics instruction for English Language Learners (ELLs).

Final Rating: High Quality

Strengths

The product contained logical and intuitive sequences of information; clear and direct menus and paths to all information; subject knowledge from one of the core curricular areas; aids and tools to assist the student in completing tasks and assignments. Content encouraged skill development and enhanced student learning while targeting student achievement. This product allows the teacher to customize the learning experience. The product allows students to build on their previous knowledge by reading notes and practicing a skill before taking a quiz.

The technology components were highly rated. The lessons could be viewed independently so the learner can progress through the product, the software ran smoothly. The technology was good for the content being taught. Feedback is immediate for both students and teachers.

The product was visually appealing in its use of graphics and animation. Designers responded to feedback and made some changes to address deficits in cartooning. One panelist indicated the cartoons would be appealing to younger children but not necessarily high school students. In the face-to-face session, the designer expressed a desire to update the graphics to make them more age-group neutral, and to remove any characters that may seem to lead to problems with stereotypes. The design was driven by formative data. One panelist was impressed

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that “1,200 students were involved in a multi-state effort to solicit feedback – including teacher observation/student surveys/ teacher surveys” and that “ New York, Texas, California, Oregon, and Iowa used evaluators, added 100 hours of additional programming, and redesigned interface to allow for additional sheltered instruction vocabulary.”

The product was designed with enhancements that permit end-users to provide feedback including suggestions for improving the product. Students could email teachers or the product developers and get a \$10 gift card if they found an error. The product was beneficial to English as a first language students or students who are not performing on grade level in one of the core curricular areas. The vocabulary reinforcement through visuals is very good.

Weaknesses

One concern was that the feedback tool was not sophisticated and did not collect any usage data or allow for a post-use survey. It was simply a text box.

Recommendations

Improve ways for communication and feedback, especially with students with exceptionalities.

2.3.3 GPRA Findings on Products from the FY 2008 GPRA Review



Ready to Teach Program – Product Analysis
Designing an Online Math Course
e-Learning for Educators
Alabama Educational Television Foundation Authority (AETFA)

Designing an Online Math Course is an online course for techniques to teach fractions for teachers of students in grades 3-5. The course was developed as part of the E-Learning for Educators Initiative.

Final Rating: **High Quality**

Strengths

The course was user-friendly and reinforced key mathematical skills and concepts. The curriculum reinforces mathematics standards and the methodology employed to deliver this knowledge ensures that the learner has ample time for practice and application. The content is logical with appropriate sequences of information. Learning objectives were clear. The content

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encourages skill development. The content helps teachers think about how they should be approaching mathematics instruction with students who find math challenging. The design allows teachers to build their own design in the teaching of mathematics. The ISTE standards were listed in the syllabus. The technology complements the content, provides value-added component to the lesson, and runs smoothly and efficiently. Teachers receive immediate feedback. The product is designed to provide multiple opportunities for teachers to demonstrate an understanding and mastery of the content in a variety of conditions and contexts and the product was consistent with current research about effective teacher professional development practices. Two of the panelists agreed that the formative data was used to guide the design of the product and that the product was designed with enhancements that permit end-users to provide feedback/suggestions for improving the “product.” One panelist remarked, “This was one of the most favorable elements. The local users paid close attention to the feedback of the participants in order to help them guide their thinking and product improvement.” The product is beneficial to teachers in schools that have a high population of students who are not performing on grade level in core curricular areas and the product could be delivered and utilized across multiple platforms. A panelist commented, “This product lends itself to multiple applications of technology. The coursework utilized other cost-friendly learning platforms to deliver the coursework. This allows users who may not be on BlackBoard to utilize other venues that may be available within their district.” Another comment about the product was, “the product is designed to develop and enhance teacher’s existing skills in mathematics. It also focuses on grade bands allowing teachers to target specific skills for those populations of math students. The teacher can customize the product.

Weaknesses

One panelist found that the e-mail link to provide suggestions for improving the product was broken at the time of use.

Recommendations

Repair the broken link so that users can provide suggestions.



Ready to Teach Program – Product Analysis
Developing an Online Course: A Road Map for the Process
E-Learning for Educators
Alabama Educational Television Foundation Authority (AETFA)

This is a six session online course giving teachers of children in grades 3-5 strategies for vocabulary instruction and development.

Final Rating: High Quality

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Strengths

The product contained logical and intuitive content based on subject knowledge from one of the core curricular areas. The learning objectives were clear and appropriate. The paths enhanced the online instruction. The sequence is logical for the learner. The curriculum covers fractions, then addresses what the research says and allows the learner to dissect and solve problems. The content offers other methods for teaching fractions. The content and strategies are based on state standards and research-based. The technology provided a value-added component to the lesson, ran smoothly, and allowed teachers/users to receive immediate feedback on mastery of the content. Feedback leads to both further reflection and refinement of thinking on part of participants.” The product was designed to provide multiple opportunities for teachers to demonstrate an understanding and mastery of the content in a variety of conditions and contexts. The panel thought that the product could be delivered and utilized across multiple platforms and that it is beneficial to teachers in schools that have a high population of students who are not performing on grade level in core curricular areas. The videos are of high quality and there was excellent communication of expectations for the discussion board participation through explicit listing of guidelines, and the functional links to the optional reading.

Weaknesses

One of the three panelists questioned whether changes would come from the feedback loops.

Recommendations

The panel made no recommendations for this product.



Ready to Teach Program – Product Analysis
The Data Coach: Facilitating Data Driven Instruction
TeacherLine Peer Connection
Public Broadcasting Service (PBS)

This online professional development instrument is designed for instructional coaches who work to help teachers use PBS TeacherLine’s professional development resources. The courses give coaches the opportunity to custom design and manage, their own initiatives, or use “coaching modules” designed by experts. *The Data Coach: Facilitating Data Driven Instruction* was one of the first modules developed to help instructional coaches and mentors learn about their roles and responsibilities.

Final Rating: High Quality

Strengths

The product was found to benefit teachers in schools with high populations of students not performing on grade level in core curricular areas but one reviewer felt these schools did not

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have resources to support the product. Only two panelists thought the product could be delivered across multiple platforms such as public broadcasting infrastructure, the Internet and school digital networks. The panelists agreed that the product met the content standard, contained logical and intuitive sequences of information and demonstrated subject knowledge in one of the core curricular areas. Panelists also agreed that there were clear and direct menus with paths to all information; easily defined learning objectives; skill development content; and supplemental or ancillary materials to enhance online professional development.

An individual panel member felt the software could become a toolbox for coaches. The product allows for on-line communities around topics through the discussion boards and coaching groups.

One panelist indicated teachers could practice pedagogical skills after reading the articles recommended by the coaches. Two panelists indicated that the product ran smoothly and efficiently. The accessibility of the product on the internet anywhere and anytime was seen as a value added to the lesson factor. Formative data was used to guide the design of the product. The product's design included enhancements that permit end-users to provide feedback for improvements. The product was consistent with current research about effective teacher professional development practices. One panelist indicated that the design led to better conversations about teaching and learning. The coach has flexibility in the use of the product and is assured that the practices espoused are in line with NCTM and Literacy Standards set by the IRA (International Reading Association). Two panelists thought the product was designed to provide multiple opportunities for teachers to demonstrate an understanding and mastery of the content in a variety of conditions and contexts. A panelist felt the product assists the coach in the role of resource provider. Another feature is the ability for the coach to form differentiated groups.

Weaknesses

Panelists found weaknesses in the content, technology, design, and dissemination and implementation. One panelists felt there were too may windows to open up to navigate through the resources. One panelist found that there were long wait times and a slow server, sometimes taking 30 seconds or more to load. Feedback isn't immediate like face-to-face observation and conferencing. Participants still have to wait for the facilitator and peer responses if they choose to post feedback. Since coaches are not evaluated on the product and there are no required assignments and no ratings, there is no way to determine what they gained from its use in a variety of conditions and contexts. There is no guarantee that participant suggestions will be analyzed and used for design improvements. The product worked better on the Internet as a platform than on some others. Similarly, it worked better with some browsers than on others. The product didn't like one panelist's version of Safari. The same reader had problems with plug-ins. There is no guarantee that all of the users have the same browsers. The panel felt this product was borderline and that some improvements are needed.

Recommendations

The panelists observed and recommended more active examples of coaches' use of the product during the review period. They also recommended they be provided with an executive summary

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of the formative data collected during pilot programs and very brief literature reviews of research on the design elements, course content, and methods of delivery/assignments specifically used in this product.



Ready to Teach Program – Product Analysis Supporting ELLs: Assessing Language Development TeacherLine Public Broadcasting Service (PBS)

This product is a 10-hour professional development course for Pre-K-3 teachers that provide them with an understanding of assessment in support of academic skill development in young children.

Final Rating: High Quality

Strengths

Supporting ELLs: Assessing Language Development provides multiple opportunities for teachers to demonstrate an understanding and mastery of the content through pre- and post tests. The product is also designed to collect recommendations for improvements from end-users. The product design is based on formative research and is consistent with current research about effective teacher professional development. The product design is tied to best practices and provides multiple entry points (video, print articles, scholarly journals) for the learner. The product can be delivered across multiple platforms and is beneficial to teachers of students who are not performing on grade level in core curricular areas. The panelists felt this course was a really good use of time, including best practices and resources. Panelists liked the possibility to have a cohort-based approach with multiple teachers working together in an on-line and face-to-face community.

The product contained logical and initiative content, appropriate learning objectives, clear menus and paths, subject knowledge from one of the core curricular areas, content that encourages skill development, and supplemental materials. The panel particularly commented on the value of the video, discussion, assignments, and skills development. Each facilitator can monitor and assess the learner's strengths and growth areas through assignments, discussion questions, etc. The technology complemented the content and provided a value-added component to the lessons.

Users received immediate feedback on their understanding and mastery of the content. The rubrics were communities centered on topics of need or interest. Reflection and calibrating applicability were used to help retain the information. User feedback is strongly encouraged and valued. Two panelists agreed the product ran smoothly and efficiently. One panelist experienced an access problem on the first visit to the site but no problems on subsequent visits.

Weaknesses

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Two of the panelists found issues with some of the menus and paths. While trying to access different pages, panelists would sometimes end up on a page that was clearly my 'homepage.' Under one panelist's courses, only the tutorial was listed and the panelist would have to log off and start over again. This action recurred almost every session and the panelist deducted points, but still considered the rest of the product to have clear menus and mostly clear paths.

Panelists found weaknesses with the efficiency of the product and the receipt of immediate feedback on content understanding and mastery. Feedback takes longer than face-to-face delivery because users must wait for the facilitator and peer response. The facilitator appeared to be involved and responding regularly. The panel was unsure if all facilitators would be that responsive. Panelists felt collaboration could have been done more effectively face-to-face.

A member of the panel found a weakness with the feedback mechanism and felt that participant suggestions may not be collected and analyzed, making this a major design flaw. A final weakness is the limited utilization of the product across multiple platforms. Some browsers didn't work. The concern is that teachers often have older equipment or limited access to certain platforms.

Recommendations

The following recommendations were made:

- (1) increase the product loading times and
- (2) change the discussion board so that it provides for data-driven instruction as taught in the course in addition to the reflective practice.

Ready to Teach Program – Product Analysis **Video in Teaching & Learning (VITAL) New York** **Educational Broadcasting Corporation/WNET-13**

Video in Teaching & Learning (VITAL) New York is an instructional video program that brings educational videos to classrooms through expert-developed activities aligned with New York State standards in Mathematics and English/Language Arts for grades three through eight.

Final Rating: High Quality

Strengths

The product contained clear, direct menus and paths to the information; subject knowledge from one of the core curricular areas; aids or tools to assist students in completing tasks and assignments; and logical and intuitive sequences of information. The product also encourages skill development and enhances student learning and targets student academic achievement standards. Comprehensive lesson plans in the numbered steps help teachers in completing tasks. Teachers are able to aid students in completing tasks and assignments. Videos are the main tool. Worksheets, graphic organizers, and other instructional supports were included in the lesson plan as hyperlinks. Lessons took into account the types of materials and supports

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that a teacher/student would need in order to reach the objectives of this lesson. The video component meets the needs of visual and auditory students. It can also be used for all levels of learners – from struggling to advance. The video component is tied into the content standard and can be used to meet numerous standards depending on how it is incorporated into the lesson design. The product was visually appealing in its use of graphics and/or animation. Formative data was used to guide the design. The enhancements permit end-users to provide feedback/suggestions for improving the product. The site was visually appealing. The product used focus groups and worked with NYC teachers to evolve the interface and the way in which the video components were broken up into small chunks in subsequent releases. The product can be delivered and utilized across multiple platforms and is beneficial to students who are not performing on grade level in one of the core curricular areas or to teachers integrating the product in the classroom. This tool was well designed to run on a remote server.

There were some issues around QuickTime as a sole delivery application, and one panelist wondered about Bandwidth. Another panelist did not see a tutorial feature. Another panelist remarked that the developers received feedback from teachers on a discussion board during the pilot study and held focus groups. Teachers of special education students provided anecdotal evidence that this product was beneficial for students with learning disabilities. The panelists agreed that the teacher can work with or view the lessons independently without intervention from others in order to use the product. They also thought that the product runs smoothly and efficiently and the product had strong search features. The panelists thought the teachers may need more instruction on how to integrate this product into PowerPoint or other delivery tools

Weaknesses

There were weaknesses with the content, technology, and design. The product was difficult to navigate. The development of ancillary resources was limited. State standards were not listed, but will be in the future. Many of the selected resources were not necessarily related to the content Standard that it had been paired with. For instance, a documentary on schools in Kenya and another on schooling in Japan were used to teach an elementary Language Arts lesson on how to compare and contrast in writing. The designers acknowledged that these resources were probably Social Science lessons, but that those tags would be added later.

In terms of the technology standard, the number of lessons and video items developed under the initial project was limited and, in some cases, one panelist had reservations about the ‘re-purposing’ of adult documentary content for elementary instruction. This problem is compounded by the fact that only in some cases did the subject of the video directly relate to the content being taught (i.e. science panda videos and social studies videos being used to teach an elementary language arts lesson on compare and contrast). Some lesson plans did not allow for assessment. The product was seen as a passive tool to provide resources to teachers. Another problem was the downloading of video clips for the right media player which may present technology challenges for teachers. Teachers can provide feedback to students and there are student assessments built into the lesson plans, there is no way for teachers to receive feedback on how the lesson was used and in what context. In the materials given to panelists by the grantee, it was indicated that it takes 48 hours for a response to a question. That doesn’t give the

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reviewers a sense that this information is used to influence the content or design of the product.

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Recommendations

The product should incorporate a function that allows teachers to rate the resources so that the makers of the product get an idea of which ones are of most value to the intended audience.

Ready to Teach Program – Product Analysis **Video in Teaching & Learning (VITAL) on Teacher’s Domain** **Educational Broadcasting Corporation/WNET-13**

This product is an instructional video program that brings a collection of educational videos to the classroom through expert-developed activities that are aligned to New York State standards in math and English/Language Arts for grades three through eight. The VITAL New York content was integrated onto the Teacher’s Domain website for continued support of the project.

Final Rating: Not High Quality

Strengths

The product is beneficial for students who are not performing on grade level in one of the core curricular areas or to teachers integrating the product into the classroom. This product includes ancillary materials that may help employ multiple intelligences or engage auditory or visual learners. The product could be delivered across multiple platforms. The content is mainly hosted on the site, but the worksheets and videos can be printed and downloaded. The product was designed using formative data and was inclusive of enhancements that permit end-users to provide suggestions for improving the product. Teachers were used to evaluate the product through feedback and focus groups. Attention was paid to video length and lesson plans are short, well developed and sequential per teachers’ request. (Teachers follow their district’s curriculum frameworks and can then use the video and lessons to integrate and supplement what exists locally.) Two panelists agreed that the graphics and animation made the product visually appealing. Stylistic revisions suggested by the target groups were incorporated into the design.

Weaknesses

There were some weaknesses with the content. The design and retooling of the original product shifted its focus from the content specialty. The navigation is not easily apparent. More searching was needed to locate the menus and paths. There were no tools to assist students in reading and watching the video, although there were content questions. The product was unfinished at the time of the gpra review, so the search features were not yet complete. The panel reviewed a prototypical BETA release – some features were not functioning – like the snail trail and the tagging of standards. In the redesign of this tool, the additional resources, or complete lesson plans were moved to the bottom of the page, and often out of sight or away from a navigation path. The topic of the video was not always related to the content standard it was paired with. “For instance, a documentary on schools in Kenya and another on schooling in

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Japan were used to teach an elementary Language Arts lesson on how to compare and contrast in writing. The designers acknowledge that these resources were probably Social Studies or Science lessons, but that those tags would be added later.”

Some weaknesses occurred in the technology. One panelist had reservations about the ‘re-purposing’ of adult documentary content for elementary instruction. Teachers with low comfort with technology may need assistance downloading video clips. There is no forum for teachers to receive feedback on reflection on how the lesson was used and what occurred. One panelist found the 48 hour response time a weakness with the design standard. During the post-review discussion, panelists talked about their view that VITAL seems more like a big repository of VHS tapes, without real production going on – no videos were being created for these lessons.

Recommendations

The panel made the following recommendations:

- (1) Create a function that allows teachers to rate the resources so the developers get an idea of which ones are of most value to the intended audience;
- (2) Include video length time on the initial list generated after the search so that teachers can easily search for a video by length; and,
- (3) Provide teachers with additional direction on how to integrate the lessons into PowerPoint or other smooth delivery tools.

Ready to Teach Program – Product Analysis Geometry Module Help with English Language Proficiency (HELP) Rocky Mountain PBS

This digital educational program includes a supplemental curriculum that addresses teaching Mathematics to English Language Learners (ELLs). The *HELP Geometry Module* engages students through interactive multimedia lessons that break down geometry terms and concepts.

Final Rating: High Quality

Strengths

The content contained logical and intuitive sequences of information; encouraged skill development; contained subject knowledge from one of the core curricular areas; included aids and tools to assist the students in completing tasks and assignments; had clear and direct menus and paths to all information; and enhanced student learning and targeted student academic achievement standards.

Students practice the skill until it is mastered, although a student could just randomly click until the page allowed them to advance. Panelists were impressed that the product has a well developed outline of basic math concepts that serve as an introduction or a review for a

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series of spiraling, scaffolding lessons. The basic math concepts are solid and advance to higher order math activities. There is a customization. The modification features are customized for ease of use. The Learning Object library provides flexibility and enables the teacher to drive any student's learning path.

The *geometry module* met all of the technology criteria: (1) The student can work with or view the lessons independently without intervention from others in order to progress through the product; (2) The product runs smoothly and efficiently; (3) The technology is a good fit with the content being taught; and (4) students can receive immediate feedback regarding their status in terms of their understanding and mastery of the content.

This product is marketed as supplemental and is, therefore, an excellent addition to the skill building needs of struggling students. Almost every click provides feedback or formative data of some kind for students and teachers. The product includes quizzes and other more formal assessment items.

The *geometry module* is a student-centered product and students can work at their own pace. The teacher eventually needs to intervene to re-direct the student when skills are missed. Panelists felt the graphics and animation were appealing with the exception of the cartoon character. The product has enhancements that permit end-users feedback for improvements. The HELP program relies on interdisciplinary teams to get the product just right. As a result, technical problems are resolved in a timely manner. The bookmark function for student navigation purposes as well as other supports attends to the students' needs. The product can be delivered and utilized across multiple platforms and is beneficial to students who are not performing on grade level. The product is flexible to use in many places and with different groups of students. The product can be accessed from a local server, cross-platform, and basically anywhere there is computer access.

Weaknesses

The product created a competitive atmosphere surrounding skill acquisition.

Recommendations

The panel's only recommendation for the program was to eliminate the current cartoon characters and replace them with more culturally sensitive characters.

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Ready to Teach Program – Product Analysis Algebra Module Help with English Language Proficiency (HELP) Rocky Mountain PBS

This digital educational program addresses specific issues of teaching Mathematics to English Language Learners (ELLs). The module engages students through interactive multimedia lessons that break down algebraic terms and concepts so that students can understand and retain the math content.

Final Rating: High Quality

Strengths

The product was of high quality and carefully crafted, with high ratings on all of the content standards. The product contained logical and intuitive sequences of information; clear and direct menus and paths; skill development encouragement; subject knowledge in one of the core curricular areas; aids to assist students in completing tasks and assignments; and enhancements for student learning. This product can be used in a linear fashion or broken into discrete modules that focus on specific standards or skills. The tools are fun and user friendly, and include a calculator. The product is designed to supplement basic math instruction and allows for differentiated instruction and remediation or acceleration for exceptional learners. The link to state standards seemed tenuous at the time of the gpra review, but will be improved in future versions, according to the developers. The technology standards also received very high ratings since students could work with the lessons independently; the product ran smoothly and efficiently; students could receive immediate feedback on their mastery of content, and the choice of technology was good for the content being taught. For middle level math, this tool does an excellent job of providing teachers and students with a competent curriculum delivered through a robust and user-friendly piece of software that provides ease-of-use and myriad supports to students and a variety of customization and ‘back end’ controls to the teacher.

The design was of high quality: the product was visually appealing, designed with enhancements to allow end-users to provide feedback, and utilized formative data in its design. There were a variety of incentive programs designed to solicit feedback and identify the areas in need of improvement including a Starbucks incentive and a 72-hour promise of repair. The panel thought that the product could be delivered and utilized using multiple platforms. They also found that the product was beneficial to students who were not performing on grade level in one of the core curricular areas or to teachers integrating the product in the classroom.

Weaknesses

The only weakness that the panel found with the program is the use of the cartoon characters. One of the character’s voices was found by the panel to be disturbing, and possibly

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even culturally offensive. The characters seemed age-inappropriate as well as ethnically or racially insensitive. They also seemed to create a competitive atmosphere surrounding skill acquisition. However, the panel did not rate the product lower, since they saw these as easy fixes.

Recommendations

The panel's only recommendation for the program was to eliminate the current cartoon characters and replace them with more culturally sensitive characters.

2.3.4 GPRA Findings on Products from the FY 2007 GPRA Review



Ready to Teach Program – Product Analysis E-Learning for Educators *Using Models to Understand Fractions*

“Using Models to Understand Fractions” is an online professional development course designed for teachers, curriculum specialists, professional development specialists, or other school personnel serving students in grades three to five. The course teaches a variety of mathematical models to develop a broader understanding of what fractions are. The course also investigates student difficulties with fractions through student interviews. Developers created classroom activities with fractions using the mathematical models in the course.

Final Rating: High Quality

Strengths

This product was described as a well-structured course with a good balance of activities and supports. The content was presented in a logical order, moving teachers from simple fractional concepts to more complex concepts. The objectives were stated in the introduction to the course and in each lesson. The menus and navigation were easy to follow. The rubrics, goals, and time expectations were clear. The goals of the workshops were clearly linked to standards. Introductory materials provided a good overview. The video segments were a perfect complement to the instruction and demonstrated both the content and the instruction modeling. The resources section was exceptional. Each teacher was required to post two substantial entries on the discussion board and provide feedback to other teachers' postings. The course was structured so that the teachers who are weak in mathematics content knowledge would not be embarrassed or made to feel incompetent. The material is presented through the student's eyes, allowing the teacher to learn the content along with the student, if necessary.

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Weaknesses

The resource section includes links to websites that have video transcripts but no video. The lag time between question and response on the discussion board often causes issues when teachers are struggling with new concepts. The product provides additional readings, but the panel noted that teachers sometimes do not have time to read more. A fourth weakness noted was that there was no place for teachers to suggest additional websites, videos, or readings that might be relevant. Lastly, one panelist noted that the link to the National Council of Teachers of Mathematics (NCTM) standards could have been more explicit.

Recommendations

The panel recommended:

- (1) Providing links to external websites in the “Resources Section” that offer video and interactive math games and simulations;
- (2) Giving a brief description of the content for each resource so that a teacher can quickly decide if he or she wants to use it;
- (3) Adding content for elementary teachers not particularly comfortable with math concepts;
- (4) Providing teachers with a suggested sequence/timeline to help them pace their work;
- (5) Adding links to fraction lessons that use applets and links to more modeling videos;
- (6) including a chat once a week that would allow teachers to demonstrate their understanding of the content in another way and that would allow them to resolve questions and get immediate feedback; and
- (7) Providing teachers with an alternative to the discussion board (i.e. emailing the instructor for immediate answers).



Ready to Teach Program – Product Analysis

E-Learning for Educators

Best Practices for Vocabulary Instruction in the Middle School Classroom

This online professional development course for teachers, curriculum specialists, professional development specialists, or other school personnel addresses instructional techniques that are effective in helping teachers assist students in grades six through eight expand their vocabularies.

Final Rating: High Quality

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Strengths

Best Practices for Vocabulary Instruction in the Middle School Classroom is a well-organized course that helps teachers improve their skills in teaching vocabulary concepts in middle school. The goals are coherent and appropriate and linked to standards used by the National Reading Panel. The discussion guidelines were excellent and rarely found in an online course. The required and additional reading resources were excellent. The template, rubric, and use of video were very well developed. The final project gave each teacher a lesson plan or action plan that they can use after they complete the course.

Weaknesses

The workshops did not adequately include the use of multimedia resources like embedded video, animations, etc. Some of the discussion board prompts could be improved, particularly the ones involving technology. There were only video transcripts in the “Resource Section” rather than links to online videos. The feedback from the instructor or other class members was not immediate. There was not an option for teachers to add materials to the course other than through the discussion board. The assignments in the course were not demanding. One panelist thought teachers would be intimidated with extremely long articles. There was concern about the assessment since it required teachers to be currently in a school setting while taking the professional development course.

Recommendations

The panel offered some recommendations including:

- (1) giving a brief description of the content for each resource so that a teacher can quickly decide if he or she wants to check it out;
- (2) allowing teachers to demonstrate their knowledge by submitting short video segments depicting a lesson, student work, or audio recordings of interviews;
- (3) including a chat once a week that would allow teachers to demonstrate their understanding of the content in another way and allow them to resolve questions and get immediate feedback;
- (4) providing students with an alternative to the discussion board like e-mails;
- (5) incorporating teachers’ suggestions for readings, websites, and videos under the “Resources” button when the class is complete;
- (6) making teacher materials more accessible;
- (7) creating an alternative to doing the assessment in a school setting; and
- (8) giving teachers a few choices in the required final project.

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Ready to Teach Program – Product Analysis TeacherLine *Peer Connection*

This online instrument for instructional coaches provides them with access to PBS TeacherLine’s professional development resources. *Peer Connection* is designed to help teachers use resources to maximize their potential to customize, manage, and deliver their own coaching initiatives, or take advantage of hundreds of “coaching modules” designed by leaders in their field.

Final Rating: Not High Quality

Strengths

The product was easy to navigate, the resources were searchable, and the diversity in the types of materials was impressive. Experienced educational coaches could create their own customized module. At the same time, there were prepackaged resource sets to serve as good models for what an instructional coach might want to have on hand. The product would be excellent for a school system that has an instructional coach who has dedicated time to coach teachers. Two of the panelists were torn about the quality of the resources. One thought that the product had a good distribution across grade and math/reading, while the other thought that the product was only strong in the middle school mathematics. Technological strengths included the use of a discussion board, access to PBS video content, and the user rating for each of the modules.

Weaknesses

Two panelists rated this product just below the high quality mark. Some searches yield links to ‘for pay’ websites such as Riverdeep, Curriculum Associates, Technology and 4Teachers. Pointing teachers to sites like this would require funding to use these websites.

The product was very weak in high school mathematics. There was only one resource for exponents for grades 9-12 and no resources for a congruent triangle search. The same list appeared on the search for polynomials and quadratics. There were disparate numbers of videos for different grade levels. There are 14 videos for grades 9-12 compared to 73 videos for grades 6-8. There are 22 activities for grades 9-12 compared to 85 for grades 6-8. More resources are needed at the high school level.

The product requires that an instructional coach to be in a school or schools and have release time to put together resources for teachers. The product makes the assumption that coaches will follow up with teachers in a face-to-face environment to answer questions and respond to concerns since feedback on the discussion board would not be immediate. Most of the resource sets addressed broad topics like teaching reading in mathematics, or using writing to teach mathematics and very few of the resource sets dealt directly with content topics.

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Recommendations

The panel's recommendations are to:

- (1) expand the resource sets;
- (2) include more targeted resource materials on certain topics;
- (3) include more resources at the high school level;
- (4) create greater discrimination in materials retrieved through the search engine; and
- (5) create a way to add or remove assets from the database, or suggest changes in grade band descriptors.

Ready to Teach Program Product Analysis Video in Teaching & Learning (VITAL)

This instructional video program brings a collection of educational videos to the classroom through expert-developed activities that are aligned to New York State standards in math and English/Language Arts for grades three through eight.

Final Rating: High Quality

Strengths

The panel commented that this product included excellent video-based instruction with short clips. The content within each video segment was logical and the search function was easy to navigate. The videos brought visuals to the classroom that otherwise would not exist. The video on the Cloud-Foal allowed students to observe a foal as it grows over time. The video motivated them to write about the foal. The transcripts and videos were combined and linked to the textbooks. The resources were good on some key topics and relevant for teachers who are learning to use videos and other technologies in the classroom.

Weaknesses

The overall design of topics and lessons was not clear. The videos seemed to direct the topics instead of the topics impacting the choice of videos. There were a limited number of videos and topics. The math videos are cartoons from *Cyberchase* and although they do have a plot, the videos are not nearly as interesting as the ELA videos. Some of the skills mirrored the video exactly instead of pushing the students to a higher level. There were no other tools that students could use in conjunction with the videos. Students cannot work independently with this product because it is viewed as a teacher-led activity for the entire class. If teachers use the worksheets and assessments, the students would not receive immediate feedback unless the teacher decided to evaluate the assessments and worksheets in the classroom setting at that time. The teacher might be able to give group feedback, but not individual feedback. At the time of the review, the teacher's guide was not yet produced. The textbook links did not seem to match the designated grade levels given.

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Recommendations

Recommendations include:

- (1) Providing more interactivity for students after clips;
- (2) Replacing traditional worksheets with interactive videos;
- (3) Creating more skill-based activities and including hands-on activities that might increase student skill levels;
- (4) showing videos in sequence;
- (5) suggesting that the teacher stop the video and use the image (if a smart board or other interactive projection device is available);
- (6) make math lessons independent of *Cyberchase*;
- (7) add more video segments to cover more of the curriculum; and
- (8) implement greater teacher orientation.



Ready to Teach Program – Product Analysis Geometry ModuleHelp with English Language Proficiency (HELP) Rocky Mountain PBS

This digital educational program includes a supplemental curriculum that addresses teaching Mathematics to English Language Learners (ELLs). The *HELP Geometry Module* engages students through interactive multimedia lessons that break down geometry terms and concepts.

Final Rating: High Quality

Strengths

The content contained logical and intuitive sequences of information; encouraged skill development; contained subject knowledge from one of the core curricular areas; included aids and tools to assist the students in completing tasks and assignments; had clear and direct menus and paths to all information; and enhanced student learning and targeted student academic achievement standards.

Students practice the skill until it is mastered, although a student could just randomly click until the page allowed them to advance. Panelists were impressed that the product has a well developed outline of basic math concepts that serve as an introduction or a review for a series of spiraling, scaffolding lessons. The basic math concepts are solid and advance to higher order math activities. There is a customization. The modification features are customized for ease of use. The Learning Object library provides flexibility and enables the teacher to drive any student's learning path.

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The *geometry module* met all of the technology criteria: (1) The student can work with or view the lessons independently without intervention from others in order to progress through the product; (2) The product runs smoothly and efficiently; (3) The technology is a good fit with the content being taught; and (4) students can receive immediate feedback regarding their status in terms of their understanding and mastery of the content.

This product is marketed as supplemental and is, therefore, an excellent addition to the skill building needs of struggling students. Almost every click provides feedback or formative data of some kind for students and teachers. The product includes quizzes and other more formal assessment items.

This is a student-centered product and students can work at their own pace. The teacher eventually needs to intervene to re-direct the student when skills are missed. Panelists felt the graphics and animation were appealing with the exception of the cartoon character. The product has enhancements that permit end-users feedback for improvements. The HELP program relies on interdisciplinary teams to get the product just right. As a result, technical problems are resolved in a timely manner. The bookmark function for student navigation purposes as well as other supports attends to the students' needs. The product can be delivered and utilized across multiple platforms and is beneficial to students who are not performing on grade level. The product is flexible to use in many places and with different groups of students. The product can be accessed from a local server, cross-platform, and basically anywhere there is computer access.

Weaknesses

The product created a competitive atmosphere surrounding skill acquisition.

Recommendations

The panel's only recommendation for the program was to eliminate the current cartoon characters and replace them with more culturally sensitive characters.



Ready to Teach Program – Product Analysis Algebra Module Help with English Language Proficiency (HELP) Rocky Mountain PBS

This digital educational program addresses specific issues of teaching Mathematics to English Language Learners (ELLs). The module engages students through interactive multimedia lessons that break down algebraic terms and concepts so that students can understand and retain the math content.

Final Rating: High Quality

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Strengths

The product was of high quality and carefully crafted, with high ratings on all of the content standards. The product contained logical and intuitive sequences of information; clear and direct menus and paths; skill development encouragement; subject knowledge in one of the core curricular areas; aids to assist students in completing tasks and assignments; and enhancements for student learning. This product can be used in a linear fashion or broken into discrete modules that focus on specific standards or skills. The tools are fun and user friendly, and include a calculator. The product is designed to supplement basic math instruction and allows for differentiated instruction and remediation or acceleration for exceptional learners. The link to state standards seemed tenuous at the time of the gpra review, but will be improved in future versions, according to the developers. The technology standards also received very high ratings since students could work with the lessons independently; the product ran smoothly and efficiently; students could receive immediate feedback on their mastery of content, and the choice of technology was good for the content being taught. For middle level math, this tool does an excellent job of providing teachers and students with a competent curriculum delivered through a robust and user-friendly piece of software that provides ease-of-use and myriad supports to students and a variety of customization and ‘back end’ controls to the teacher. The design was of high quality: the product was visually appealing, designed with enhancements to allow end-users to provide feedback, and utilized formative data in its design.

There were a variety of incentive programs designed to solicit feedback and identify the areas in need of improvement including a Starbucks incentive and a 72-hour promise of repair.

The panel thought that the product could be delivered and utilized using multiple platforms. They also found that the product was beneficial to students who were not performing on grade level in one of the core curricular areas or to teachers integrating the product in the classroom.

Weaknesses

The only weakness that the panel found with the program is the use of the cartoon characters. One of the character’s voices was found by the panel to be disturbing, and possibly even culturally offensive. The characters seemed age-inappropriate as well as ethnically or racially insensitive. They also seemed to create a competitive atmosphere surrounding skill acquisition. However, the panel did not rate the product lower, since they saw these as easy fixes.

Recommendations

The panel’s only recommendation for the program was to eliminate the current cartoon characters and replace them with more culturally sensitive characters.

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2.3.4.1 GPRA Process in 2007

Based on expert feedback from the previous year, in 2007, the Department changed the label for a score of four on the seven-point Likert scale from “undecided” to “agree.” Likewise, based on grantee feedback, the Department changed one of the questions on the instrument to be inclusive of students and teachers that may use the product. The Department of Education also added an expert panelist with experience coaching teachers in a K-12 setting.

During the FY 2007 GPRA review, the original plan was to randomly select one product from a list of products that each Ready to Teach project was expected to submit. However only one product per project was reviewed because every grantee, except *E-Learning for Educators*, submitted only one product.

The panel of experts convened in July 2007 for a one-day product review of three professional development courses and two instructional video programs. Panelists had an overview of the process and three 45-minute presentations and one 75-minute presentation from the project directors and staff. The purpose of the presentations was to establish the context for the panel about the professional development courses and instructional video programs and their intended use

Following the face-to-face presentations, panelists were given two weeks to explore and assess the products and submit their completed evaluations to ED staff. Afterwards, the panel reconvened via a teleconference to discuss the products. The panel of experts and the project directors submitted their GPRA Process Evaluation forms at the end of the review .

The following table compares FY 2007-2010 GPRA Scores for the Ready to Teach Program.

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Comparison of FY 2007 through FY 2010 Ready to Teach GPRA Scores

Ready to Teach Grantees	Product/Project	FY 2007 Score of 75 or better is high quality	FY 2008 Score of 80 or better is high quality	FY 2009 Score of 80 or better is high quality	FY 2010 Score of 80 or better is high quality
(Alabama ETFA) E-Learning for Educators	<i>Using Models to Understand Fractions</i>	91.67			
	<i>Best Practices for Vocabulary Instruction in the Middle School Classroom</i>	86.33			
	<i>Math: Designing an Online Math Course</i>		88.67		
	<i>ELA: Developing an Online Course: A Road Map for the Process</i>		89		
	<i>Earth History</i>			85.66	
	<i>A Conceptual Introduction to Functions: Using Visual Models</i>			88	
	<i>Creating A Language Rich Environment</i>				75.33
	<i>Delaware Watershed</i>				84.00
Public Broadcasting Service TeacherLine Peer Connection	<i>TeacherLine Peer Connection</i>	74.67			
	<i>The Data Coach: Facilitating Data Driven Instruction</i>		80.33		
	<i>Supporting ELLs: Assessing Language Development (Grades PK-3)</i>		88		
	<i>Cultivating Communities of Practices</i>			89.33	
	<i>Communicate and Collaborate Online</i>			90.33	
	<i>Developing Understanding with Dynamic Media and Digital Storytelling</i>				81.33

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	<i>Peer Connections/Real World Linear Functions: The Cell Phone Problem</i>				86.33
Video in Teaching & Learning (VITAL)(EBC/W NET-13)	<i>Video in Teaching & Learning (VITAL)</i>	81			
	<i>Video in Teaching & Learning (VITAL) New York</i>		81.67		
	<i>Video in Teaching & Learning (VITAL) on Teacher's Domain</i>		74.33		
	<i>Video in Teaching & Learning (VITAL) on Teacher's Domain</i>			72	
Help with English Language Proficiency (HELP) (Rocky Mountain PBS)	<i>Help with English Language Proficiency (HELP)</i>	75.33			
	<i>Geometry</i>		92.33		
	<i>Algebra</i>		92.33		
	<i>Teacher Support and Administrative System</i>			85	
	<i>Place Value</i>			93	
Overall Product Rating		81.84 Four out of Five or 80% of Products of High Quality	85.83 Seven out of Eight or 87% of Products of High Quality	86.19 Six out of Seven or 85% of Products of High Quality	81.75% Three out of Four or 75% of Products were of High Quality

Chapter 3: Review of the Literature

This literature review focuses on the available studies of online professional development for teachers and other educational leaders. The section highlights research by selected content areas, by special populations of learners, teacher practices, methods, behaviors and attitudes, technology methods, coaching and mentoring. Other sections deal with professional development broadly to include studies related to online teacher observations, professional development designs, communities of learning, teacher preparation and pre-service teachers, product validation through design studies, teacher competencies and assessments.

The last research section cited includes a single study of a virtual school. The virtual school concept brings together the community of practice with mutual supports towards a common goal that some of the studies singularly focus on.

The intent with this literature review is to demonstrate the sort of research that is underway in the area of online professional development for teachers. It should be noted that while focusing on studies in certain content or topical areas, there is content and topic overlap with other areas of concentration in the vast majority of the studies cited in each section.

The next chapter will emphasize the significant contributions to the literature made by researchers of and practitioners who implemented and studied the Ready to Teach Program. These contributions can best be judged within the context of the state of technology at the time of the Ready to Teach Program studies and evaluations.

3.1 Curriculum Content: Science

There have been numerous studies of online professional development for teachers of science that have very different emphases. The significant findings of some of the studies are highlighted below.

In a 2006 study by Annetta & Shymansky, three distance education strategies for science instruction was examined for effectiveness. Ninety-four (94) mid-western elementary school teachers were in a five year professional development cohort in which researchers taught and collected data on three strategies for science instruction: live presenters with interactive television; live discussion with videotaped presenters with in interactive television; and, web-based sessions with interaction through web - based boards. Data was collected on science content and pedagogy learning and teacher attitudes. Participants in the live presentations with interactive television significantly outperformed the other two strategies, suggesting that a mixed methods approach to professional development was best for this sample of mid-western elementary teachers.

In 2008, Sherman, G., Byers, A., & Rapp, S. wrote an article in the *Journal of Science Education and Technology* presenting pilot-test results for a science professional development

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program featuring online, on-demand materials developed by the National Science Teachers Association that were administered to forty-five (45) middle school teachers from three different school districts across the United States during the spring 2006 semester. The program was designed to facilitate teachers' content knowledge and skills in the areas of Newtonian force and motion.

Participants from one of the school districts experienced a full-day instructor-led workshop along with two web-based seminars with a content-area expert followed by a 4-week period of time in which they could access self-directed, online, on-demand instructional materials that included activities, information, simulations, examples, and practice with immediate feedback on the targeted outcomes. Participants from the other school districts only had access to the online materials. The researchers document positive gains in achievement and teachers' levels of confidence in teaching the material within all of the professional development groups. There were no significant differences with one approach over the other.

Niess, M. L., van Zee, E. H., & Gillow-Wiles, H. (2010) in "Knowledge Growth in Teaching Mathematics/Science with Spreadsheets: Moving PCK to TPACK through Online Professional Development" in the *Journal of Digital Learning in Teacher Education*, 27(2), 42-52, studied in-service K-12 teachers enrolled in a graduate course designed to integrate spreadsheets into mathematics and science instruction. With the lens of four TPACK components (Niess, 2005), the analysis describes teachers' development in pedagogy, content and online technology skills as they recognize, accept, adapt, and exploring TPACK levels for immersing spreadsheets as a teaching method into their instructional practice. While the study makes recommendations for the design of future professional development courses and includes recommendations for future research efforts, only the recommendations for integrating technology in science and mathematics instruction are included.

Marrero, M. E., Woodruff, K. A., Schuster, G. S., & Riccio, J. F. (2010) report on "Live, Online Short Courses: A Case Study of Innovative Teacher Professional Development" in the *International Review of Research in Open and Distance Learning*, 11(1), 81-95. Under a grant funded by NASA's (National Aeronautics and Space Administration) Office of Education and the NASA Explorer Schools Project, the U.S. Satellite Laboratory, Inc., a series of live, online, interactive short-courses were developed. Data was collected and analyzed on diverse educators from a variety of classroom contexts. Teachers viewed these short-courses as a useful professional development tool for their own professional growth and for their own classroom use. Teachers found the collaborative community of practice with other educators, instructors, and scientists from across the country especially worthwhile and useful. They found also found the flexible short-course design useful.

Another study of a NASA-sponsored series of courses was conducted by Thomas Gosselin and others. Findings were reported on this study of Laboratory Earth, a series of three NASA-Sponsored, on-line graduate courses for K-8 teachers, designed to help teachers improve their teaching. The graduate courses consisted of four modules containing two to four lessons. Pre- and post-course surveys of fifty-one (51) teachers indicated significant increases in teachers' content knowledge, science teaching efficacy beliefs, sense of community within the course and

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science teaching enjoyment. Qualitative data indicated teachers valued the cohort system, content aligned to teaching needs, and the instructor's responses to requested feedback. Results indicated that online courses can provide valuable professional development opportunities for K-12 science teachers to deepen their knowledge, sharpen their skills, and maintain their knowledge of science developments in this continuously changing field.

Fleming, M. L., & Easton, J. (2010) in "Building Environmental Educators' Evaluation Capacity through Distance Education" in *Evaluation and Program Planning*, 33(2), 172-177, report's findings from research on an online course, "Applied Environmental Education Program Evaluation" (AEEPE). AEEPE provides educators with an understanding of how evaluation can be used to improve their Environmental Education programs. The authors provide descriptions of key strategies for addressing challenges they face in teaching Applied Environmental Education Program Evaluation. Researchers report consistent problems with teacher attrition, developing and maintaining a proactive social learning environment online, and improving teachers' understanding of attribution and logic.

A 2009 article by Liu, W., Carr, R. L., & Strobel, J. entitled "Extending Teacher Professional Development through an Online Learning Community: A Case Study" for the Society of International Chinese in Educational Technology (SICET) grew out of the work of the Institute for P-12 Engineering Research and Learning (INSPIRE) at Purdue University. INSPIRE was established in 2006 to integrate engineering thinking and concepts into the Pre-Kindergarten -12th grade curriculum. The institute provides elementary teachers with professional development in engineering education through a week-long face-to-face Summer Academy and an online professional development program. This article describes the professional development, and presents a set of design principles to extend teacher professional development through an online learning community.

Another study was conducted in an online biology course that was designed to help Secondary teachers prepare for science certification. Lebec, M., & Luft, J. (2007), in "A Mixed Methods Analysis of Learning in Online Teacher Professional Development: A Case Report" for the *Association for the Advancement of Computing in Education*, used a mixed methodology design in which course participants learned how to use the online environment to both prepare for the certification exam and teach. Researchers conducted pre- and post- course examinations and used concept maps scored by two different methods to contrast representations of assimilated knowledge. Researchers also conducted unstructured interviews with course completers as they reflected on what they learned from the course. Findings indicate that participants experienced gains in declarative knowledge, but demonstrated little improvement on more complex levels of understanding. Qualitative examination of concept maps demonstrated gaps in participants' understandings of key course ideas. Engagement in the use of online resources varied according to participants' attitudes toward online learning. Subjects also reported a lack of motivation to fully engage in the course due to busy schedules, lack of extrinsic rewards, and the absence of personal accountability.

3.2 Curriculum Content: Mathematics

Cady & Rearden (2009) studied online professional development in mathematics for middle school teachers in a rural area and found that while teachers' mathematics content knowledge did not change significantly, pedagogical content knowledge did increase. They found that the design of the courses fostered communities of practice among teachers in the study.

McGraw, R., Lynch, K., Koc, Y., Budak, A., & Brown, C. A. (2007), studied the potential use of multimedia cases as tools for teacher professional development. Specifically, online and face-to-face discussions that occurred within groups composed of pre-service mathematics teachers, in-service mathematics teachers, mathematicians, and mathematics teacher educators were analyzed.

Discussions within these heterogeneous groups tended to focus on issues of classroom implementation of the multimedia tasks. Secondary discussion focused on task characteristics and appropriateness of tasks for engaging students in thinking about mathematical concepts and processes. The researchers' analysis of contributions to discussions across group member type revealed differences that suggest that diverse backgrounds and experiences of group members can blend to support rich and critical discussions of mathematics, teaching, and learning.

Russell, M., Carey, R., Kleiman, G., & Venable, J. D. (2009) in "Face-To-Face and Online Professional Development for Mathematics Teachers: a Comparative Study" in the *Journal of Asynchronous Learning Networks*, 13(2), 71-87, compared the effects of a professional development course delivered in an online and a face-to-face format. The effects examined included changes in teachers' pedagogical beliefs, instructional practices, and understanding of teaching number-sense and related mathematical concepts. The study randomly assigned participants to either the online or the face-to-face format and employed the same instructors, reading material, and instructional activities for both formats of the course. Both formats of the course were also delivered over the same eight-week period and required participants to invest approximately the same amount of time each week engaging in learning activities. Both formats of the course showed significant impacts on teachers' mathematical understanding, pedagogical beliefs, and instructional practices. Consistent with prior research on online versus face-to-face instruction, the positive outcomes were comparable across both formats. Teachers who participated in the online course reported that they were more willing to take courses in the future online than did teachers in the face-to-face course. The researchers indicate more study is needed to determine whether this finding is limited to self-selected teachers, the specifics of this course, or other factors.

Russell, M., Kleiman, G., Carey, R., & Douglas, J. (2009) in "Comparing Self-paced and Cohort-based Online Courses for Teachers" reported in the *Journal of Research on Technology in Education*, 41(4), 443-466, examined whether online professional development courses for middle school algebra teachers with different levels of support have different impacts on teacher outcomes. Variations of an online course were created for four experimental conditions. One was a highly supported condition, with a math education instructor, an online facilitator, and

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peer interactions among participants available as participants worked through the course together. Another was a self-paced condition, in which none of the supports were available. The other two conditions provided intermediate levels of support. All conditions showed significant impact on teachers' mathematical understanding, pedagogical beliefs, and instructional practices. The positive outcomes were comparable across all four conditions. Researchers believe further research is needed to determine whether this finding is limited to self-selected teachers, the specifics of this online course, or other factors.

Koc, Y., Peker, D., & Osmanoglu, A. (2009) in “ Supporting Teacher Professional Development through Online Video Case Study Discussions: An Assemblage of Pre-service and In-service Teachers and the Case Teacher” reported in *Teaching and Teacher Education: An International Journal of Research and Studies*, 25(8), 1158-1168 The purpose of this study was to explore the potential value of online video case discussions among pre-service and in-service teachers, and the video case teacher as a tool for the professional development of teachers. 26 pre-service and in-service mathematics teachers and a veteran teacher participated in the study. Researchers provided a thematic analysis of the teacher discussions, demonstrated the exchanges between the participating teachers and video case teacher. They assessed the overall effectiveness of the online forum used in the professional development of teachers. Results indicated that participant teachers were able to make theory-practice connections by articulating specific frameworks that guided this study. The inclusion of the video case teacher was beneficial for the other teachers in several ways. Researchers support the use of online forum discussions of video cases for the collective engagement of pre-service and in-service teachers as a means to strengthen professional development models.

3.3 Curriculum Content: Reading

Researchers Zygouris-Coe, V., Swan, B., & Ireland, J. (2009) in “Online Learning and Quality Assurance” in the *International Journal on E-Learning*, 8(1), 127-146, investigated the impact of an assessment process for monitoring a large-scale, statewide online professional development model: "Florida Online Reading Professional Development" (FOR-PD). Started in 2003, FOR-PD is Florida's first large-scale online reading professional development project, and has served 37,000 educators since its inception. Findings suggest that, although this implementation was expensive and time consuming, it was worth the effort. Researchers report the benefits of the program to include: reaffirmation of project goals; re-emphasis of major roles and responsibilities; and provision of a mechanism for communicating student progress on a broad-to-narrow scale. Other benefits included improved online teaching and learning; a significant increase in teachers' course-completion rates; and better communications among and between the project staff, facilitators, and students.

3.4 Curriculum Content: English Language Arts

In a 2010 article reporting findings from a study of 4th grade English Language Arts teachers, Masters, de Kramer, O'Dwyer, Dash, & Russell (“The Effects of Online Professional Development on Fourth Grade English Language Arts Teachers' Knowledge and Instructional Practices”, *Journal of Educational Computing Research*, 43(3), 355-375) present the results of a randomized control study exploring the effects of a series of three learning-community model

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Online Professional Development workshops on teachers' knowledge and instructional practices in the context of fourth grade English language arts. There were significant effects on positive changes in teachers' knowledge and instructional practices, as they related to the targeted goals in vocabulary, reading comprehension and writing instruction.

In a 2006 quasi-experimental study, Huai, Braden, White, & Elliott, (“Effect of an Internet-Based Professional Development Program on Teachers' Assessment Literacy for All Students”. *Teacher Education & Special Education*, 29(4), 244-260) examined the effectiveness of a Web-based teacher professional development program, Assessing One and All (AOA). AOA was designed to enhance teachers' assessment literacy and skills in and their educational assessment practices and was successful in doing so.

Fifty-five (55) teachers from Arizona, South Carolina, and Wisconsin participated in the study. Repeated-measure analysis, matched-pair t-tests, and qualitative analysis were used to examine whether (a) AOA effectively enhanced teachers' knowledge and self-efficacy in inclusive assessment practices, and (b) teachers accepted the online course as an alternative to traditional professional development programs. Despite some design limitations and execution of the study limitations, researchers' analysis indicated that AOA improved teachers' knowledge and self-efficacy of assessment issues and can serve as an efficient and effective professional development tool.

3.4.1 A Study of Language Teachers

The 2010 study by Shih-hsien Yang, “Teacher Evaluation: Teachers' Reflections and Actions on online Student Evaluations of Teaching” in the *International Journal of Learning*, 17(1), 133-141 examines and analyzes data on language teachers' online student evaluations of teaching (SETs). Researchers hoped to gain an understanding of the effectiveness of teachers' performances as they view them and as viewed by their students. Data was collected from both a questionnaire and face-to-face interviews. Twenty-five (25) language teachers were invited to complete the questionnaire. The questionnaire contained questions about the effectiveness and reliability of online SETs. Three teachers were selected to conduct a further interview. Results showed that online SETs could not really examine the effectiveness of a teacher's performance. Sources other than SETs must be provided for teachers to gain meaningful information about their performance to help them improve their online teaching.

3.5 Curriculum Content: History

In a 2009 study, “Assisting Teachers' Thinking and Participation Online”, reported in the *Journal of Educational Computing Research*, 41(3), 287-317., Kale, U., Brush, T., & Saye, J. examine online messages in a discussion forum that a group of K-12 history teachers used to discuss curriculum implementations as part of their professional development. This study examines online messages in a discussion forum composed of K-12 history teachers as part of their professional development. It focuses on identifying the types of assistances provided to the teachers in an online forum, teachers' cognitive thinking levels demonstrated in their online messages and the relationship between the assistance provided to teachers and their online

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thinking levels. The study presents data from interviews with forum users to help validate findings attained through examining the online messages. Findings show that various assistance types and forum users' perceptions of online communication may have influenced teachers' levels of thinking during online discussions.

3.6 English as a Second Language

Teemant, A., Smith, M. E., Pinnegar, S., & Egan, M. W. (2005) in “Modeling Socio-cultural Pedagogy in Distance Education”. in *Teachers College Record*, 107(8), 1675-1698, present findings from ProfessorsPlus, an online model developed at Brigham Young University that responds to the need of teachers of English as a second language (ESL) for professional development as a result of large increases of students. This program focuses on the need for a model for socio-cultural pedagogy delivered to collaborative teams of teachers at local school sites. The article describes an online bilingual/ESL endorsement program, ProfessorsPlus that meets teachers' needs for a socio-cultural pedagogy in distance education.

3.7 Special Education

T. J. Frey (2009) in “An Analysis of Online Professional Development and Outcomes for Students with Disabilities” published in *Teacher Education & Special Education*, 32(1), 83-96 describes professional development experiences for special education teachers that are designed to facilitate teacher learning and the implementation of evidence-based practices that will positively impact K-12 students with disabilities. Frey investigates the outcomes of the use of a project-based online professional development approach with in-service teachers of students with disabilities. The study focuses on the effects of the professional development on K-12 students with disabilities in the participating teachers' classrooms. The findings indicate that each of the four student participants improved in the area of performance that was targeted by the teachers' professional development. The analysis suggests that this approach positively affects participating teachers' instructional practices and the performance of K-12 students with disabilities.

3.8 Early Childhood

In “Early Childhood Educators as eLearners: Engaging Approaches to Teaching and Learning Online” published in *Young Children*, 62(4), 34-41, Donohue, Fox and Torrence (2007) explore teaching and learning online through the eyes of early childhood learners and teacher educators. The article explores appropriate uses of technology for this population, learning effectiveness and learner support.

Olsen, Donaldson, & Hudson, (2010) in “Online Professional Development: Choices for Early Childhood Educators” published in *Dimensions of Early Childhood*, 38(1), 12-18, explore issues of online professional development for early childhood teachers. Research on child care workers' education has shown that professional preparation makes a significant impact on children's cognitive and emotional development (National Association for the Education of Young Children [NAEYC], 2005; NACCRRA, 2006). Therefore, the need for high-quality early childhood professional development has expanded across the United States. An increasing number of early childhood professionals engage in professional development online. The article

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highlights possible barriers to professional development for early childhood educators, including time.

3.9 Teacher Practices

In the 2009 study by Herrington, A., Herrington, J., Hoban, G., & Reid, D. “Transfer of Online Professional Learning to Teachers' Classroom Practice” in the *Journal of Interactive Learning Research*, 20(2), 189-213, authors outline a research study conducted on behalf of a state- based Department of Education to evaluate the transfer of professional learning from online modules on the integration of ICT to the practices of K-12 classroom teachers. Professional learning is an important process in enabling teachers to update their pedagogical knowledge and practices. The use of online technologies to support professional learning has a number of benefits in terms of flexibility and scalability. However, it is not clear how well the approach impacts on teachers' classroom practices.

Another study of how well learning objectives from online courses translate to actual teacher practices in the classroom was conducted by Zhou, G., Varnhagen, S., Sears, M. R., Kasprzak, S., & Shervey, G. (2007). “Online professional development for in-service teachers in Information and Communication Technology: Potentials and Challenges” published in the *Canadian Journal of Learning & Technology*, 33(2), 123-143 evaluated an online professional development course for in- service teachers in the area of information and communication technology (ICT). The study also explored factors that influence online professional development. Study methods including survey, focus groups and interview were implemented during the course and nine months after the course was completed. Data demonstrate that the online delivery of ICT professional development for in-service teachers was successful. However, a learning community was difficult to initiate in an online learning environment. Teacher participants experienced great challenges when applying what they learned from the course into their teaching practices. The study suggests that further online professional development should enroll more than one teacher from the same school. Sessions should also used a mixed approach and incorporate face-to-face sessions. Professional development focusing on change should be supported and considered as an ongoing process.

In this 2008 study by Signer, (Online professional development: combining best practices from teacher, technology and distance education, *Journal of in-Service Education*, 34(2), 205-218) best practices in teacher education, technology staff development and online learning are used to develop a model around a graduate level course in mathematics education to exemplify core components and best practices in integrating online technology with math instruction. The model was used in the past to develop online courses to for teaching of children's literature, mathematics, science, social studies, multicultural education, parental involvement, literacy, inquiry-based learning and English as a second language. The researchers believe the model's components and pedagogical foundations are applicable for the design and implementation of online courses in other disciplines including those with field-based learning experiences.

Giordano has studied the long term effects of online teacher professional development on teacher practice. In a 2007 study, “A Professional Development Model to Promote Internet Integration into P-12 Teachers' Practice: A Mixed Methods Study” published in *Computers in the*

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Schools, 24(3), 111-123, he reports on the long-term effects of a staff development model on P-12 teachers' instructional practices and dispositions regarding internet integration into teaching. The model design was guided by participants' varying professional developmental levels and their values and beliefs about teaching and learning. A survey, administered at three checkpoints over a three-year period, yielded quantitative data regarding participants' concerns about the curricular innovation. Qualitative data, gathered through interviews conducted with a sample of the participants, contributed to understanding, from the participants' perspective, changes they perceived in their teaching practices as a result of the staff development. Elements of the model most instrumental in effecting changes were identified. Results support the recommendation for teacher-centered staff development that includes critical characteristics to effect and sustain change in teacher practice. These features must emanate from teacher practice and be supported by the system in which the teacher works.

3.9.1 Teacher Practice Related to Design

Teacher practice has been linked to activities design. Recker, M., Walker, A., Giersch, S., Mao, X., Halioris, S., Palmer, B., et al. (2007) in “A study of teachers' use of online learning resources to design classroom activities” in *New Review of Hypermedia & Multimedia*, 13(2), 117-134 explore how and why education digital library content and tools can support and enhance the activities of educators in their professional practice. A conceptual framework is presented that describes teachers' practices when using online learning resources (called 'teaching as design'). A professional development model to increase teachers' capacity for designing learning activities in the context of authentic practice is also presented. Findings from two workshop implementations showed positive impacts on teachers' knowledge, attitudes, and subsequent behaviors using online learning resources. An analysis of teacher created activities indicates a relationship between the form of design (offload, adaptation, or improvisation) and the learning objects selected for each activity.

Hebert, L. (2007), in “ Designing Online Professional Development for Teachers: Practice Related to Theory” published in the *International Journal of Learning*, 14(2), 205-214 says that professional development must be teacher driven, timely and collaborative. The author describes a framework for design of online professional development based couched in the design theories of Krippendorff and of Wenger. The framework is used to analyze three online programs based upon published design and implementation information in the literature. A case is made for the design of collaborative spaces for educators' professional growth.

In a 2007 study, “Sustaining Online Teacher Professional Development through Community Design” in *Campus-Wide Information Systems*, 24(3), 162-173, Henderson studied professional development design/ methodology as he researched groups of five teachers in Australia and four teachers in the UK. The two groups independently participated in an initial face-to-face training day and then completed the professional development course through an online learning environment using Blackboard. The course was designed to facilitate community of practice cohesion. Data collection methods included surveys, data mining of online activity, discussion forums and e-mails, and semi-structured interviews. While participants of both case studies demonstrated sustained engagement for more than twice the minimum requirement, the Australian case study was sustained through a community-defined regime of participation, the

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UK case study increasingly relied on the course facilitator to broker both practices and a community rhythm by which they could participate. Sustained participation in the Australian case study was supported by mutuality as seen in reciprocity of interaction and social engagement. Findings indicate that transformative professional development is dependent on a number of design principles, including that it needs to be sustained over time. The literature reveals that neither face-to-face nor online professional development, per se, sustains engagement. Teacher participation can be sustained by designing for community of practice cohesion, in a blended mode of delivery with small groups of participants.

Lock, J. V. (2006), in “A new image: Online communities to facilitate teacher professional development” in the *Journal of Technology and Teacher Education (JTATE)*, 14(4), 663-678 calls for educators to develop new images of ongoing opportunities for professional development, based on their needs within an online community of learners. This call emphasizes the involvement of individuals from local regions as well as from around the world who share mutual interests and goals. The author emphasizes the design of dynamic learning environments that foster a learning culture. To do this, a pedagogical framework that nurtures the establishment of relationships, intimacy, and trust, in which people share learning experiences through technology. Designing an online learning environment is about designing, building, and supporting a structure and a process that are purposeful and fluid in nature and in meeting the personal ongoing professional development needs of teachers.

Gu, X., Zhang, B., Lin, X., & Song, X. (2009), in “Evaluating online solutions for experiential support of distance learning by teachers in China” published in the *Journal of Computer Assisted Learning*, 25(2), 114-125 describes the development of an online solution for the support of distance learning by teachers. Three hundred and forty-eight (348) randomly assigned K-12 teachers participated in this pilot study using the online learning environment designed in this research. Teachers' products, surveys, and interviews were collected and analyzed. Results showed that the teacher-learners could learn as well as in face-to-face learning in an earlier implementation of the course. The learning support system included online learning communities as well as face-to-face supports. Researchers suggest ways to improve the design of the learning support system and to improve the pedagogy for experiential teacher learning.

Hull, D. M., & Saxon, T. F. (2009) in “Negotiation of meaning and co-construction of knowledge: An experimental analysis of asynchronous online instruction” in *Computers & Education*, 52(3), 624-639 studied the extent to which participants engaged in negotiating meaning related to instruction. The authors examined social interaction from controlled variation in instruction using a counter-balanced design in two professional development courses for teachers. Both courses were held at the same time, included the same content with the same instructor, and were held in the same online format. Twenty-four subjects were randomly assigned to the two courses. Instruction interventions, instruction frequency and questioning were intentionally manipulated during one-half of each course. The variations in instruction were hypothesized to promote negotiation of meaning and co-construction of knowledge within both groups. Transcript analysis was used to analyze 782 utterances of participants. Multiple comparisons revealed significant differences in the dependent measure in portions of the

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course where modified instructional strategies were implemented. The results show that relatively simple alterations in instructional practice (e.g., increasing instructional statements from once to twice per week and engaging participants in dialogue through open-ended questioning) yields a substantially enhanced learning outcome within this environment. Strong evidence suggests that online learning groups depend heavily on instruction to facilitate negotiation of meaning and co-construction of knowledge. This research raises concerns about whether or not instructors employ instructional strategies that influence social knowledge construction and subsequent learning outcomes from online courses. In addition, the study demonstrates the utility of a previously published measure for social interaction.

Chen, G., & Chiu, M. M. (2008) examined how the flow of information impacts what is transmitted in online professional development settings. They found that earlier messages affected later messages along the following transmissions: evaluations (agreement, disagreement, no comment); content of knowledge (contribution, repetition, null); social cues (positive, negative, none); personal information (number of visits) and elicitation (eliciting a response or not). Their results support the notion that teachers can use and manage online discussions in support of the development of critical thinking skills while reducing the effects of status in the group.

Macdonald, J., & Hills, L. (2005) in "Combining Reflective Logs with Electronic Networks for Professional Development Among Distance Education Tutors" published in *Distance Education*, 26(3), 325-339 describes the "Supporting Open Learners in A Changing Environment" project pilot of a reflective approach to professional development using a log to structure reflection. The log is then shared with others in the professional development course through a computer conference. Tutors' perspectives of the project indicated that all participants found the experience stimulating and helpful for identifying and sharing issues of student support. Some tutors, however, found the process time consuming. Researchers support this networked reflection among distance tutors as an alternative to traditional face to face tutor training, if the issue of tutor time is addressed.

Spicer, D. E., & Dede, C. (2006) in "Collaborative Design of Online Professional Development: Building the Milwaukee Professional Support Portal" reported in the *Journal of Technology & Teacher Education*, 14(4), 679-699, describes a pilot design of an interactive, web-based, district-wide "professional support portal" to support new teacher retention and professional development in the Milwaukee Public Schools. The study focuses on collaboration between the district and its institutional partners. Findings identify key factors that proved either to facilitate or impede distant collaboration. These principles are essential to consider when planning and implementing district-wide initiatives for in-service professional development that include multiple partners and new technologies.

3.9.2 Online Teacher Observations

Bennett & Barp (2008) studied online peer observation and cite specific challenges that may "include what is observable online, how the observation process is managed and structured online and how the experience relates to expectations. As online and blended learning continues to expand new peer observation guidelines will need to reflect such issues."

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Swinglehurst, D., Russell, J., & Greenhalgh, T. (2008), in "Peer Observation of Teaching in the Online Environment: An Action Research Approach" published in the *Journal of Computer Assisted Learning*, 24(5), 383-393 describe a study of peer observation of teaching (POT) in an online environment. Peer Observation of Teaching studies of face-to-face teaching contexts have been done but research has not been done of peer observation in online settings. Researchers implemented "Peer-to-peer Reflection on Pedagogical Practice" (PROPP) among tutors of a Web-based MSc in International Primary Health Care at University College London. 28 teachers were included in the study of peer observations of pedagogy in practice. Collaborative reflection on teaching practices, based on participants' specific examples of online teaching was used as the basis of focus groups in this action research project. The PROPP model is consistent with Quality Enhancement, which authors distinguish from Quality Assurance. Authors identify critical factors to the success of peer observation within online courses. Authors highlight examples of teaching practices that have been discussed within the PROPP program and offer suggestions of the kinds of evidence that could be incorporated into a portfolio to demonstrate the effectiveness of online peer observation.

3.10 Teacher Behavioral Control, Attitude and Satisfaction with Online Professional Development

Demir (2010) identified predictors of use of online professional development for teachers. Behavioral control and attitude were positively correlated with intention and use. This study included two hundred twenty one (221) teachers who completed self-reported measures of attitude, subjective norm, perceived behavioral control, intention, and behavior. The findings demonstrated that intention was predicted significantly by perceived behavioral control and attitude toward the behavior.

Lebec, M., & Luft, J. (2007) in "A Mixed Methods Analysis of Learning in Online Teacher Professional Development: A Case Report" for the Association for the Advancement of Computing in Education describes learning in an online biology course designed to help teachers prepare for science certification exams. A mixed methodology approach was utilized to analyze the manner in which course participants learned and how the online environment influenced this process. Concept maps scored by two different methods and objective pre- and post-course examinations were contrasted as representations of assimilated knowledge, while unstructured interviews reflected participants' perceptions of their experiences. Findings indicate that participants experienced gains in declarative knowledge, but little improvement with respect to more complex levels of understanding. Qualitative examination of concept maps demonstrated gaps in participants' understandings of key course ideas. Engagement in the use of online resources varied according to participants' attitudes toward online learning. Subjects also reported a lack of motivation to fully engage in the course due to busy schedules, lack of extrinsic rewards, and the absence of personal accountability. (Author's Note: Although this course relates to science, it is selected for inclusion here due to the teachers' attitudes towards online professional development that greatly influenced outcomes.)

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Kao, C., & Tsai, C. (2009) in “ Teachers' Attitudes toward Web-Based Professional Development, with Relation to Internet Self-Efficacy and Beliefs about Web-Based Learning” in *Computers & Education*, 53(1), 66-73, explores the relationships between teachers' internet self-efficacy, beliefs about web-based learning and attitudes toward web-based professional development. Four hundred twenty-one (421) 421 teachers, coming from 20 elementary schools in Taiwan were administered three instruments to assess their internet self-efficacy (ISS), beliefs about web-based learning (BWL), and attitudes toward web-based professional development (AWPD). Findings indicate teachers' internet self-efficacy and beliefs about web-based learning were important predictors of their attitudes toward web-based professional development. The belief for the positive consequences of web-based learning is very important for the favorable attitudes toward web-based professional development.

Holmes, A., Signer, B., & MacLeod, A. (2011) in “Professional Development at a Distance: A Mixed-Method Study Exploring In-service Teachers' Views on Presence Online” reported in the *Journal of Digital Learning in Teacher Education*, 27(2), 76-85 examines the efficacy of a 5-week distance learning model that offered 2-credit courses for K-12 in-service teachers as a form of professional development. The research examined the experiences of the in-service teachers across online professional development courses and analyzed participant surveys to gain a better sense of satisfaction, learning, and quality of interactions related to online professional development. The findings speak to the value of establishing a sense of "presence" online, the impact of online teacher professional development on the active classroom, and features that contribute to the enhancement of professional development online.

3.11 Teacher Professional Development

Rice, K., & Dawley, L. (2009), in “ The Status of Professional Development for K-12 Online Teachers: Insights and Implications” published in the *Journal of Technology & Teacher Education*, 17(4), 523-545 report on "Going Virtual! The Status of Professional Development for K-12 Online Teachers," a 2007 report supported by the North American Council for Online Learning (NACOL, now known as iNACOL). Authors completed a national survey of two hundred fifty-nine (259) K-12 online teachers, administrators, and professional development trainers to gain baseline data on the status of K-12 online teacher professional development. Insights from the study include: (a) the influence of evolving context on professional development; (b) the broad continuum of professional development practices and models; and (c) global and situation-specific professional development needs. It discusses implications for K-12 online teacher professional development practice, policy, and research.

Summerville, J., & Johnson, C. S. (2006), in “Rural Creativity: A Study of District Mandated Online Professional Development” in the *Journal of Technology & Teacher Education*, 14(2), 347-361, present findings from the implantation of an online staff development program in the spring of 2002 in a rural school district in the Midwest . As a part of this program, every educator at the middle and secondary education level was required to complete one online course of his or her choice. A survey was conducted to analyze the positive outcomes and considerations for further professional development. Rationale behind the need for such programs, successes/failures, and prescriptions for future research were presented.

3.11.1 Communities of Practice in Professional Development

In “Sustaining a community computing infrastructure for online teacher professional development: A case study of designing tapped in” in *Computer Supported Cooperative Work (CSCW)*, 16(4-5), 397-429 Farooq, U., Schank, P., Harris, A., Fusco, J., & Schlager, M. (2007) explore the effectiveness of community computing in support of cooperative in online communities of practice. The study found communities of practice sustainable if they meet end user requirements; maintain a critical mass of users over time; generate social capital to support contributions of members; and continue the necessary financial and human capital to maintain the infrastructure.

Kelly, P., Gale, K., Wheeler, S., & Tucker, V. (2007), in “ Taking a stance: promoting deliberate action through online postgraduate professional development” in *Technology, Pedagogy & Education*, 16(2), 153-176, describes six case studies in an online community of practice relating to a module in a university Master of Arts in Education program. During the module, the online community allowed students to immerse themselves in problems brought to the community by their tutor. Students continued to participate in the online community of practice following the module, bringing their own professional issues to the forum to be discussed, with some interactions facilitated by the tutor. Six participants' experiences in the community are explored, contrasted, and related to those of the rest of the cohort, and the success of the community in challenging and changing the stances teachers take towards professional issues in their day-to-day practice is described. Researchers found the link from particular example of positional exploration and change to long-term professional identity change to be complex and subject to many influences.

Clary & Wandersee (2009) determined that online courses could be offered both as a degree program and as a means of teacher professional development geared towards a cooperative community of teachers and other school staff members and work well.

Kirschner, P. A., & Lai, K. (2007) in “Online communities of practice in education” published in *Technology, Pedagogy and Education*, 16(2), 127-131, presents five articles to address some of the major issues in the design and implementation of online communities of practice. The findings from these articles provide some much-needed empirical evidence to document the nature of online communication in communities of practice, and describe some of the methods by which online interactions can be analyzed.

Downer, J. T., Locasale-Crouch, J., Hamre, B., & Pianta, R. (2009) conducted a follow-up study that took a look at the fidelity of implementation within the MTP consultancy condition over both years of implementation to learn more about the ingredients of professional development that may have contributed to the success of the intervention. They examined issues of practice or policy in the variation in teachers' responsiveness and exposure to the intervention with particular interest in the identification of teacher factors that may serve as supports or barriers to successfully implementing consultation supports and online professional development.

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Duncan-Howell, J. (2009) in “Online Professional Communities: Understanding the Effects of Membership on Teacher Practice” published in the *International Journal of Learning*, 16(5), 601-613, studied online communities of teacher forums for networking and professional discussions. The research focused on the electronic discussions of three online communities for teachers, two Australian-based communities and one UK-based community. The study analyzed the content of the messages in an attempt to determine if membership in the group had an impact on pedagogy. This study determined that membership in online communities provides genuine opportunities for the pedagogical growth of teachers.

Duncan-Howell, J. (2010) in “Teachers making connections: Online communities as a source of professional learning” in the *British Journal of Educational Technology*, 41(2), 324-340 explores three online communities used by teachers for professional support, guidance and inspiration that are organized around subject areas and offer teachers opportunities to develop personally and professionally. The research examined the nature of online community membership and offers some conclusions on these communities as a source of professional learning for teachers.

Vavasseur, C. B., & MacGregor, S. K. (2008), in “Extending Content-Focused Professional Development through Online Communities of Practice” published in the *Journal of Research on Technology in Education*, 40(4), 517-536, studied middle school teachers who participated in content-focused online communities of practice. A key finding from this research reveals that the online community provided teachers with enhanced opportunities to share ideas, to discuss issues, and to make new connections with colleagues as well as with their principal. In addition, teachers gained curriculum-based knowledge, developed enhanced self-efficacy with respect to implementing technology, and collaborated on the development of interdisciplinary curriculum units.

Waltonen-Moore, S., Stuart, D., Newton, E., Oswald, R., & Varonis, E. (2006), in “From Virtual Strangers to a Cohesive Learning Community: The Evolution of Online Group Development in a Professional Development Course” published in the *Journal of Technology and Teacher Education*, 14(2), 287- 311, present a case study centered on participants enrolled in a web-based, graduate level professional development course for educators at a large mid-western university. Researchers analyzed threaded discussion board transcripts, interviews with the instructors, and formative and summative course evaluations to code for themes and categories from which emerged a model for stages of online group development. Initially "virtual" strangers, participants became an interactive and cohesive learning community by the end of the five-week course. Five stages of online group development are identified: (a) Introduction, (b) Identification, (c) Interaction, (d) Involvement, and (e) Inquiry. These stages provide implications for teaching and learning online.

Romano, M. E. (2008), in “Online discussion as a potential professional development tool for first-year teachers” in *Technology, Pedagogy & Education*, 17(1), 53-65 explored the use of online discussion to engage beginning teachers in professional development. Discussions of ten beginning teachers were studied over the course of a year-long electronic discussion. Researchers studied how often and at what times of the year they tend to participate. Seven

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categories of discussion by first year teachers emerged from the transcripts. Patterns in what times of the year these topics arose and when beginning teachers tended to participate indicate when appropriate support might be given during the induction phase of teaching. Examination of the topics that generated the most activity provided evidence of cognitive development among the beginning teachers. Interviews with the first-year teacher participants acknowledged several benefits of the system and allowed for exploration of ways in which the online discussions might be adapted to better meet beginning teacher needs.

Jung, W. H., & Brush, T. A. (2009), in "Teacher Participation in Online Communities: Why Do Teachers Want to Participate in Self-Generated Online Communities of K-12 Teachers?" published in the *Journal of Research on Technology in Education*, 41(3), 279-303, interviewed twenty-three (23) teachers from three self-generated online communities and analyzed more than two thousand (2,000) postings in those communities. They found five reasons for teacher participation in online communities: (a) sharing emotions, (b) utilizing the advantages of online environments, (c) combating teacher isolation, (d) exploring ideas, and (e) experiencing a sense of camaraderie. Authors concluded that when designing teacher professional development programs, more emphasis needs to be placed on teachers' emotional sharing and promotion of self-esteem.

Edge, J. (2006), in "Computer-Mediated Cooperative Development: Non-Judgmental Discourse in Online Environments" published in *Language Teaching Research*, 10(2), 205-227, explores online "cooperative development". An example of each of "cooperative development" is analyzed in e-mails and instant messaging, highlighting the continuing importance of affective considerations in a teacher's continuing development.

Parr, J., & Ward, L. (2006), in "Building on Foundations: Creating an Online Community" published in the *Journal of Technology and Teacher Education*, 14(4), 775-793. Report findings of a study linking teachers in 10 isolated schools to collaborate in curriculum planning and delivery. The designers focused on a site for resource sharing and communication. According to the researchers, when data was viewed in terms of the extent, nature, and source of postings of resources; teacher readiness to produce material; accessing and using material from the site; related communication, and the dispositions of teachers and curriculum leaders regarding their role in a professional learning community, the project did not develop a functioning online community. The data indicate a need for teachers to participate and develop a view of what the practice of sharing online involves. The curriculum group that functioned well, used an existing community and the online site served to strengthen that community. The data also reinforce the idea that, to participate, teachers should perceive a need and recognize that the online community is a viable solution to that need.

Prestridge, S. (2010), in "ICT Professional Development for Teachers in Online Forums: Analyzing the Role of Discussion" published in *Teaching and Teacher Education: An International Journal of Research and Studies*, 26(2), 252-258 studied the participation of sixteen teachers across eight geographically removed schools in an online threaded discussion forum for a school year. Data reported in this paper are generated from the archived posts to a threaded discussion forum and are analyzed qualitatively for evidence of community and

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quantitatively for different forums of feedback. The findings suggest evidence of both collegial and critical forms of discussion. Collegial discussion was found to be important in developing and maintaining community while critical discussion was vital for its role in transforming teachers' beliefs. The data also revealed a number of practical aspects of online environments that inhibit constructive discussion.

Hew, K. F. (2009), in “Determinants of Success for Online Communities: An Analysis of Three Communities in Terms of Members' Perceived Professional Development” published in *Behavior & Information Technology*, 28(5), 433-445, explores the problem of factors that contribute to the success of online communities in terms of members' perceived professional development needs. A qualitative case study was adopted to gather naturalistic data. Online observation and interview data were gathered from nurses, web developers and literacy educators. Results reveal the following seven determinants of success:

- a willingness to share knowledge;
- high-quality content;
- diversity of views
- technology
- relevant discussions
- a respectful environment; and,
- rapid response to members' queries.

Hui, D., & Russell, D. L. (2007) in “Understanding innovative professional development for educators through the analysis of inter-subjectivity in online collaborative dialogues” in the *International Journal of Information and Communication Technology Education*, 3(3), 25-38, examine how online collaboration might influence teachers' decisions in their classrooms. This theoretical article extends principal socio-cultural approaches to a cognitive concept called inter-subjectivity through illustrations of empirical data. Part of a larger innovative professional development involving four classroom locations across Missouri, synchronous chat room dialogues comprising teachers and researchers, and pre- and post-unit interviews. Teachers purposefully used their dynamic inter-subjective spaces and strategies in the management of meaning-making negotiations within an online interactive environment. The findings reveal two novel variable forms of inter-subjectivity: (a) temporary suspension, and (b) resistance and disagreement. These findings inform teacher educators and practitioners of online learning about the cognitive and socio-cultural processes and tension of learning within advanced interactive learning environments.

3.11.2 Research on Product or Method Specific Type of Professional Development for Teachers

Todorova, A., & Osburg, T. H. (2009) in “Teacher Professional Development for the Knowledge Society: The Intel® Teach Advanced Online Program” in the *International Journal of Learning*, 16(11), 73-82 report on the Intel licensed Teach-Advanced Online program that purports to update teacher competencies to keep up with technology innovations in education. The Intel® Teach – Advanced Online program was designed to equip teachers with the

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necessary technical and methodological knowledge and skills to integrate technology in their classroom practice. In this study of the program, the impact of the training was assessed using external evaluations. Findings through teachers' self-assessment indicated the program improved their competencies for technology integration and for collaboration as well as their teaching practice and quality. They also reported improvement in their students' motivation and skills. The program is part of a larger undertaking for improving teaching through technology. The Intel® Teach program includes a portfolio of teacher training courses implemented through public-private partnerships in over 50 countries worldwide.

Lebrun, M., Docq, F., & Smidts, D. (2009) in “Claroline, an Internet Teaching and Learning Platform to Foster Teachers' Professional Development and Improve Teaching Quality: First Approaches” reported in the *AACE Journal*, 17(4), 347-362 describes findings from a survey of Higher Education teachers and students using the eLearning platform Claroline. This survey is enhanced by direct observation of the tools used by teachers. Claroline was initially developed in 2001-2002 to sustain and foster pedagogic innovation at the Universite Catholique de Louvain (UCL) in Belgium. It is now used worldwide. In Louvain-la-Neuve, Claroline is mostly used in hybrid configurations, mixing traditional lectures and online use of technological tools. The survey identified changes that teachers and students observe in their courses when they work with this platform. Findings indicate teachers who make most use of this virtual campus have evolved in their pedagogic practices towards more innovative or active learning methods. The more they use the platform, the more the richness of the pedagogic setup increases, and the more their perceptions of learning evolve. They also investigated the changes that students observe as their teachers use this platform. A significant proportion of students observe pedagogical changes, in particular an increase in interactions between students, in learning considered as a research process, and in the active engagement of students in their learning. The article also describes differences between teachers' and students' perceptions after using this platform.

Segrave, S., Holt, D., & Farmer, J. (2005) in “The Power of the 6³ Model for Enhancing Academic Teachers' Capacities for Effective Online Teaching and Learning: Benefits, Initiatives and Future Directions” published in the *Australasian Journal of Educational Technology*, 21(1), 118-135 proposed a 6³ model of Academic Professional Capacities Development for effective APD of online teaching and learning to help inform policy makers and other key decision makers on ways to promote a learning organization. This strategic, systems based approach to academic professional development (APD) is required. requires a clear view of the key areas of potential and enduring teaching and learning benefit which can be realized from online developments, including an understanding of the changing role of the academic teacher in higher education, the identification of the desired professional capacities to educate online, and the implementation of a number of coordinated initiatives to develop these professional capacities in order to engage constructively with the learning and technology opportunities.

3.11.3 Research Agenda for Online Teacher Professional Development

In 2006, Sprague proposes a research agenda for online professional development for teachers in a special edition of the *Journal of Technology & Teacher Education*, 14(4), 657-661.

In “Research Agenda for Online Teacher Professional Development” the author gives the rationale for a research agenda that grew out of a 2-day conference in 2005 at Harvard University to explore ten models of online teacher professional development. One of the conference outcomes was the need for more study on how effective online teacher professional development models are in influencing teacher education programs. By 2009, Dede, Ketelhut, Whitehouse, Breit, & McCloskey, wrote an article expanding on their views for the need for a research agenda for online teacher professional development. The article discusses a conference that included presentations of literature reviews focused on lessons learned with online courses that demonstrated a need for the identification of specific areas for more research.

3.11.4 Study of Librarians

Green, M., & Cifuentes, L. (2008) in “An Exploration of Online Environments Supporting Follow-Up to Face-to-Face Professional Development” published in the *Journal of Technology & Teacher Education*, 16(3), 283-306 examined the effects of online follow-up and online peer interaction following a face-to face professional development workshop for librarians on attitudes towards that professional development and completion of a professional development task. School librarians were invited to work online on a three page plan outlining interventions a library program would undertake to address student weaknesses on the state mandated test. The study used a posttest-only control group experimental design with randomly assigned self-selected participants. Three online environments were compared: (a) an environment that provided Follow-up with Peer Interaction, (b) one that provided Follow-up without Peer Interaction, and (c) a control environment that provided a traditional post workshop environment with Only Solicited Follow-up/No Peer Interaction.

Online follow-up with or without peer interaction positively affected attitudes towards the professional development program. In addition, online Follow-up with Peer Interaction increased the likelihood of completion of the professional development task. No difference was found between the completion rates for participants in the follow-up group that did not have peer interaction and those in the Only Solicited Follow-up/No Peer Interaction. environment. Our findings indicate that teacher educators are well advised to provide online Follow-up with Peer Interaction in their professional development programs.

3.12 Teacher Preparation

In “Teacher preparation without boundaries: A two-year study of an online teacher certification program” published in the *Journal of Technology and Teacher Education (JTATE)*, 14(4), 755-774, Harrell, P. E., & Harris, M. (2006) described “The Online Post Baccalaureate Program” with indicators of how well the program met its goals during two years of implementation. Faculty wanted to develop a program that would satisfy students, offer a more accessible path into teaching for post baccalaureate candidates with degrees in other areas and compare favorably in quality to its nationally accredited baccalaureate program for secondary teacher candidates. Research indicates success of the online program in (a) effecting statistically

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significant increases in the number of diverse candidates entering teaching, including career changer and minority candidates; (b) significantly increasing the number of candidates prepared by University of North Texas (UNT) in the critical shortage areas of science and mathematics; (c) achieving candidate performance at least equal to that of traditional program candidates on teacher quality indicators including GRE, state certification tests, and portfolio ratings; and (d) assuring candidate satisfaction with the online program.

Knapczyk, D. R., Frey, T. J., & Wall-Marencik, W. (2005) in “An Evaluation of Web Conferencing in Online Teacher Preparation” published in *Teacher Education and Special Education*, 28(2), 114-124 present results from a survey of 54 teachers who evaluated 6 design considerations for using web conferencing in an on-line introductory methods course in the area of emotional/behavioral disorders in special education. The design considerations were class and team size, learning activities, instructor’s role, feedback from classmates and instructors, building a sense of community, and technical support. Web conferencing was perceived as a very effective delivery format for offering coursework and other professional development experiences to mid-career changers and teachers on limited licenses.

Kayler, M., & Weller, K. (2007) in “Pedagogy, Self-Assessment, and Online Discussion Groups” published in *Educational Technology & Society*, 10(1), 136-147 reports findings of a study of online discussion groups. “One Master's Program, Initiatives in Educational Transformation”, integrated a computer management system (WebCT) into a learner-centered community of K-12 practicing teachers. Online discussions were an extension of instructional practices that supported dialogue, reflection, and self-assessment for the purpose of continuous professional improvement and facilitating independent learners. The research question that guided this study was, how can we develop self-monitoring and acceptance of online discussions so that students become independent learners? Online discussion postings and student self-assessment served as data sources. The following three dominant themes emerged.

- Community of Practice: Dialogue Supports Independent Learning, captures the components of Wenger's (2005) community of practice that enhance students' personal and professional experiences in shaping online discussions.
- Independent Learners: Making Sense of Theory, addresses how educational theory, classroom pedagogical practices, dialogue, and lived experiences support the transformation of practice.
- Self-Assessment Informs Understanding of Self and Discussion-Group Dynamics, conveys the ways in which self-assessment informs students of their strengths, and student-identified areas of improvement support independent learners as well as foster deepened understanding of participation within online discussion groups.

Researchers concluded that online communities of practice are a valuable support for students' professional sharing as they develop into independent learners. Faculty played an important role in structuring student reflection and self-assessment opportunities to enhance the learning experiences for students.

3.12.1 Online College and University Faculty Evaluation and Assessment

Villar, L. M., & Alegre, O. M. (2007) in “The Online Faculty Development and Assessment System’ reported in *ALT-J Research in Learning Technology*, 15(3), 217-230 evaluates the role of the Online Faculty Development and Assessment System (OFDAS), created at universities in the Canary Islands, Spain, for staff development. The evaluation indicates that the system helped staff in learning to teach curriculum and teaching capacities. The tasks, online resources and opportunities for discussions provided within the learning environment created for the system helped shape their attitudes towards learning curriculum and teaching capacities and enabled them to share their concerns about students' classroom learning environment assessment.

The same researchers, Villar, L. M., & Alegre, O. M. (2008) in “Measuring faculty learning in curriculum and teaching competence online courses” appearing in *Interactive Learning Environments*, 16(2), 169-181 discuss the purposes of online education in higher education. Two such purposes are improving performance over time and another is understanding professional development in the context of online teaching and learning. Using data from online staff development courses delivered in five Spanish universities, the article examines online faculty learning through staff development theory. This perspective emphasizes the universities' quality assurance contexts and offers an empirical examination of the ways in which faculty members learn curriculum and teaching competencies in online staff development programs. At the core of this analysis is the contention that faculty members understand and respond to quality teaching lessons and activities.

Weschke, B., & Canipe, S. (2010) in “The Faculty Evaluation Process: The First Step In Fostering Professional Development In An Online University” published in the *Journal of College Teaching & Learning*, 7(1), 45-57 traces the experiences of two program directors from Walden University and their examination of issues involved with faculty assessment in the development of a faculty assessment model. The model was developed using metrics such as student course evaluations, faculty self-assessments, checklists of activity, rubrics adherence, etc. The entire process begins with the premise that collegial interactions will provide the most sustainable changes. As an online university, assessment is important to Walden for accreditation as well as an indicator of faculty teaching quality controls.

3.12.2 Online Practicum Facilitation

Frey, T. (2008) in “Determining the Impact of Online Practicum Facilitation for In-service Teachers published in the *Journal of Technology and Teacher Education*, 16(2), 181-210 investigates the impact of a project-based online graduate practicum experience. The study was completed by:

- (a) using quantitative data to assess the learning and professional growth of the practicum participants in comparison to a group of teachers that did not participate in the practicum experience; and
- (b) identifying the qualitative components of the practicum experience that facilitated successful completion and implementation of best practice teaching skills of the practicum participants.

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Findings indicated that teachers did change instructional practices as a result of the practicum experience, and identified three critical components of the online practicum: (a) use of meaningful learning activities, (b) collaborative learning communities, (c) structure of the practicum project. Effective use of these components can facilitate significant professional growth for in-service teachers engaged in online practicum experiences.

3.12.3 Graduate Level Teachers as University Learners

Ding, A. (2009) explored the relationships of teacher-learners enrolled in a Master's of Art level English Language Teaching course. The pedagogical approach for the development of the module was to promote collaborative teacher-learner autonomy for professional development using collaboration on different tasks. Interview data revealed tensions between participants that hindered their opportunities to collaborate and engage with the course. This research also explored the tensions between the teacher educator's pedagogical aspirations, expectations and assumptions about participants and participants' own perspectives of themselves and others. This tension prompted another look at the importance of inter-subjective relationships in education and the emergence of the teacher as communal agent.

3.13 Technology Methods

Burns, K., & Polman, J. (2006) studied how middle school teachers introduced wireless laptops for instructional purposes. They found that administrative expectations, knowledge acquisition, methods of teaching, teacher/student relationships, and teacher/teacher relationships determined how and when wireless laptops would be introduced.

Schulte, M. (2009) in "Efficient Evaluation of Online Course Facilitation: The "Quick Check" Policy Measure" published in the *Journal of Continuing Higher Education*, 57(2), 110-116 explores how faculty who teach online are evaluated. The author discusses the need to evaluate a large number of instructors in a short time and then use the completed evaluations to promote professional development. The author describes Park University's College for Distance Learning (CDL) implementation of a Quick Check evaluation mechanism to gauge online instructors' performance. The Quick Check is an elemental online course facilitation measure that objectively evaluates online instructors within their online classroom environment. The author reviews the literature on online faculty evaluation, describes the Quick Check process, and presents research demonstrating its effectiveness in increasing faculty facilitation of online courses.

Chew & Seow (2007) examined teacher competencies for online testing. The authors found that the age group factor impacted teacher competencies for online testing. They also found that professional development sessions promoted teachers' IT competency for online testing.

Kabilan, M. K. (2005) in "Online Professional Development: A Literature Analysis of Teacher Competency" published in the *Journal of Computing in Teacher Education*, 21(2), 51-57 indicate that teachers participating in online professional development activities and programs

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have gained in teacher competency. According to Kabilan, no research has been undertaken to systematically identify and acknowledge the types of teacher competencies that are frequently associated with and attributed to online professional development. This article cites findings from other studies and literature reviews, to categorize the types or aspects of teacher competencies that were evident. The results indicate five major aspects: (1) motivation; (2) skills, knowledge and ideas; (3) self-directed learning; (4) interactive competence; and (5) computer technology awareness and skills.

Sprague, D. (2007) in "Online Professional Development for Teachers: Emerging Models and Methods" published in the *Journal of Technology & Teacher Education*, 15(1), 145-149 reviews the book "Online Professional Development for Teachers: Emerging Models and Methods," edited by Chris Dede.

3.13.1 Technology Methods Related to Resources

Ravitz, J., & Hoadley, C. (2005). In "Supporting change and scholarship through review of online resources in professional development settings" published in the *British Journal of Educational Technology*, 36(6), 957-974 advocates strategies that systematically link online professional development with the research, development and diffusion cycle. The systemic approach described can advance knowledge and help manage change by improving communication among teachers, trainers, developers and researchers. The examples that are provided are set within two funded projects in the United States that led to the development of two distinct but related strategies--the Online Site Evaluation Form for educators and a six-week online course on technology-supported assessments. Both strategies make it easier to give feedback to developers and offer incentives to do so in ways that help teachers to learn about online resources individually and with colleagues. Strengths and weaknesses of different examples in supporting different modes of interaction are described with implications for instructional development, professional development, research and knowledge management in online communities.

3.14 Coaching and Mentoring

Roney, K., & Davies, M. (2007) in "Coaching and Mentoring on the Internet Highway" in *Innovate: Journal of Online Education*, 3(5), report on the use of TaskStream, a Web-based tool to supervise interns and develop reflective practices in a university teacher training program. Examples from the internship/student teaching semester are provided. Authors discuss the use of the tool to support professional development both during the coaching cycle and in the development of e-portfolios. Examples of the tool's use during pre-observation conferencing illustrate its potential to guide and deepen reflection, promote awareness of standards, provide retrievable samples of a candidate's work, and map the connection between that work and a candidate's thinking.

Hew, K. F., & Knapczyk, D. (2007) in "Analysis of ill-structured problem solving, mentoring functions, and perceptions of practicum teachers and mentors toward online mentoring in a field-based practicum" published in *Instructional Science*, 35(1), 1-40, describe an exploratory study of question prompts and online mentoring (specifically a lateral or peer

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mentoring experience) in a field-based practicum that focused on teaching ill-structured problem solving of classroom discipline.

Data were gathered on twenty-six (26) in-service practicum teachers through online observations, online journal reports, questionnaires, and reflection logs. Results showed that the practicum teachers were successful in using the approach to plan and implement effective interventions for their students and that they perceived the online mentoring approach as being beneficial in supporting their learning. An analysis of seven (7) practicum teachers and their mentors indicated that their mentors engaged in eight types of online mentoring functions; the most frequently used were asking practicum teachers to elaborate, and valuing the practicum teachers' contributions. The study offers evidence that online mentoring and question prompts can enhance the professional development of both practicum teachers and mentors by helping them learn about and apply intervention strategies in solving real-world teaching problems.

Atkinson & O'Connor (2007) studied professional development partnerships that focused on veteran teachers who provided earlier in career reading teachers with coaching and feedback as a part of the Reading CEU Module Project. Teachers cited benefits of the partnerships to include: ease of implementation; student academic gains; teacher participant growth and reflection; teachers' assumption of leadership roles; availability of resources; online accessibility; and, interactive design.

Brooks (2010) examines the research on online communities of practice to determine The potential for online forums for professional development. Brooks advocates online forums for collegial interaction and believes they are viable and culturally sensitive complements to traditional face-to-face faculty support and mentoring programs.

Graves, S. M., Abbitt, J., Klett, M. D., & Wang, C. (2009) in "A Mentoring Model for Interactive Online Learning in Support of a Technology Innovation Challenge Grant" published in the *Journal of Computing in Teacher Education*, 26(1), 5-16 cite findings from a study of the Lewis & Clark Rediscovery Project, an online professional development program designed to help teachers restructure teaching and learning practices in their classrooms. The 5-year program (extended into a 6th) was funded in 1999 with a grant from the U.S. Department of Education: Technology Innovation Challenge Grant and immersed fifty-one (51) K-12 teachers in eight states along the Lewis and Clark Trail in activities designed to increase technology efficacy and facilitate the infusion of inquiry-based learning projects into their own classrooms. The teachers were Lewis & Clark Rediscovery Project fellows who were successfully mentored through online courses and in summer workshops. The program developed an online mentoring model for teachers. The program also helped facilitate outreach and peer mentoring for technology infusion across many districts. This is another example of a federally funded success story for online professional development and marks a breakthrough in a mentoring program model.

3.14 A Virtual School

Oliver, K., Kellogg, S., Townsend, L., & Brady, K. (2010) in "Needs of Elementary and Middle School Teachers Developing Online Courses for a Virtual School" published in *Distance Education*, 31(1), 55-75 describe how eight teams of elementary and middle school teachers

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developed pilot online courses for the North Carolina Virtual Public School (NCVPS). A qualitative case study with focus groups and a follow-up survey helped identify needs of these non-traditional course designers. Findings suggest virtual schools can better support non-traditional course designers by providing technical expertise, regular feedback, and clear expectations coupled with an understanding of the target students. Findings further suggest designers need a range of short focused professional development activity centered on replicating model courses, using course management systems, assessing learners online, designing with copyright and safety issues in mind, integrating Web tools, and developing course documentation for deployment.

Chapter 4. The Ready to Teach Findings in the Context of the Literature Review

In many ways, the history of the federally funded Ready to Teach Program parallels the history of teacher and educator professional development using educational technology in America. The program started with video streaming.

While the findings from this study by The Education Coalition collected and analyzed data from partners, facilitators, and teachers undergoing module completion in mathematics and technology offers early indications of teacher satisfaction variables, they also provide the reader with a glimpse of how classrooms have changed since 2001. Computer labs were prevalent then with really lucky teachers having an access to a single computer in their classrooms.

4.1 Research Methods Context

The fact that the Ready to Teach Program grantees work with teachers and other educators in multiple states sets these grantees apart from many other programs that are more locally focused because the research methods must account for this national scope, for any limitations due to cultural, geographical or regional differences, including definitions of descriptors in surveys and questionnaires. At the same time, the Ready to Teach Program grantees have the advantage of scale. For instance, PBS TeacherLine has a national following of consumers who recognize and value the research and high quality of the courses and are assured of high standards when they see the trademark logo. Another grantee's project design leads to capacity building at the state education level. (While this has not yet been a topic of research, it certainly could be. The funded research focus for the Ready to Teach program grantees has been the quality of the online professional development, its effect on teachers and students rather than capacity building.)

Alabama Public Television's Ready to Teach Program design model, which pairs a local television station with the state department of education, assists the state department of education in building capacity through:

- Working with local television stations that have the capacity to assist in the development of appealing courses and in marketing strategies that work.
- Providing current research studies and descriptions that keeps busy personnel from state departments of education abreast of best practices and/or what works in online professional development;

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- Networking opportunities that allow for the possibility of states sharing the expenses for the development and implementation of courses in these times of limited expertise in the sciences and mathematics, particularly in more rural settings or those with less dense populations;
- Access to expert researchers who may also assist with project implementation issues.

Ready to Teach Program evaluations reflect the highest standards in assessment and use experts in the field to objectively analyze data from multiple sources, including pre-and post course surveys and questionnaires administered to educational professionals who are mostly teachers, completing the courses. In depth interviews with program completers have shed light on the views of course completers and led to substantive explanations of findings. Similarly, researchers and program administrators pay attention to anecdotal information from facilitators and course completers that is used in course refinements.

By requiring evaluations by third parties who are experts in the field, the U. S. Department of Education was able to secure unbiased evidence of what works. Federally funded programs with a research and/or evaluation component provide extra guarantees for the quality of the work and for the effective use of taxpayer's dollars.

The statistical treatment of the data sets is impressive in all of the research completed under the Ready to Teach Program and reflect the highest standards of applied scientific principles and methods to real life programs that impact teachers and students. Researchers of the Ready to Teach Program have done an extraordinary job of statistical analysis in all of the research but particularly the in the four randomized trials by O'Dwyer and others that support the effects of online professional development on the students of teachers who completed the courses across subject content and grade levels. (Grantee: Alabama Public Television.)

Most of the evaluations have been the basis for further research, conference presentations, state reports and publications in refereed journals. Many of the experts involved in these projects hold faculty and other positions at some of the most prestigious research universities in the country. Colleges and universities like Harvard University, Boston College, New York University, and the University of Pennsylvania to name a few, have faculty who use the findings of these studies to teach the next crop of teachers and schools administrators who are attending these higher education institutions at both the undergraduate and graduate levels. They articulate the research methods to actual programs and connect the links to appropriate sampling techniques for various studies, appropriate statistics to control for certain variables, appropriate methods for action research, and data analysis interpretations with limitations for data sets, statistical applications and for the analysis of previous research.

Findings from the Ready to Teach Program evaluations and reports demonstrate grantees pay attention to the design of the courses and to those individuals who are responsible for administering them. The research on facilitators can be used to not only evaluate the facilitators who were the reference points for the studies but to also indicate the qualities of facilitators that add dimension, scope, meaning and relevance to the courses, as teachers apply what they've

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learned to the classrooms. The facilitator studies use survey analysis methods that can be replicated, as other researchers explore online teaching methods.

There is no question that the grantees use the data from the evaluations and research studies to either develop, improve or eliminate the courses. PBS TeacherLine's course catalog reflects offerings that are continued or changed, depending on feedback from the teacher completers and non-completer data, registrations that demonstrate demand, gpra reviews, and changes in needs based on the most recent information available on proposed or actual curriculum standards revisions and teacher certification requirements. PBS offers selected partner college or university credits that allow completers to receive transferrable credits towards degrees as well as continuing education units for courses, often to satisfy teacher continuing certification requirements, depending on the state the teacher is certified in.

Findings from the gpra reviews demonstrate the proven method of assessments of online professional development courses by expert reviewers who sample from 3-5 products (courses) by using randomly selected online courses submitted by grantees. The process involves face-to-face meetings with grantees to clarify questions reviewers may have about the products. At the conclusion of the gpra reviews, grantees are provided with both product scores and reviewers' comments so that they can improve products for teacher use.

4.2 Similarities and Differences in Research Focus and Findings in the Ready to Teach Program and the Literature Review

Some of the research of the Ready to Teach Program, like some of the studies in the literature review, focuses on course alignment with pedagogy as well as course efficacy and impact on teacher and student outcomes. The Final Report of Hezel Associates, "Testing the Efficacy and Impact of a Selected PBS Teacher Line Course"²⁶ like the 2009 Lebrun study in the AACE Journal²⁷ tests efficacy and impact of a particular platform, Claroline, on higher education faculty and their students' perception of platform use to strengthen teacher pedagogy. Two major differences with this comparison are that the population in the Ready to Teach Program study was K-12 teachers and their students and the Lebrun study population was college faculty and their students. A 2009 study by Ding examined a pedagogical approach to promote a collaborative teacher learner autonomy model for a practicum experience for graduate students enrolled in a Master' of Art level English Language Teaching course that focused more exclusively on process than the Ready to Teach Program studies . Similarly, the 2007 Kayler study of graduate students focused more on pedagogy in self-assessment in preparation for a community of practice and for reflection as independent learners. While the 2010 study by Niess

²⁶ "Testing the Efficacy and Impact of a Selected PBS TeacherLine Course". Final Report, Prepared for PBS TeacherLine by Hezel Associates, LLC, Syracuse, N.Y., December 23, 2010.

²⁷ Lebrun, M., Docq, F & Smidts, D. (2009)

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and others²⁸ covered teachers' pedagogy, it did not extend to whether students benefitted from the teachers' content knowledge and improved pedagogical alignment. The 2008 study by Sherman and others in the area of science looked at pedagogy and science content but used three different formats for professional development, only one of which was completely online. All three methods demonstrated gains in content knowledge and pedagogy with no clear benefit of one method over the other.

Another PBS TeacherLine study²⁹, reported in 2010, examined teachers' perceptions of changes in their content knowledge, skills, practice and pedagogy looking primarily at pre- and post- survey data. Some of the literature cited in this report on teacher practices, content knowledge, teacher control and attitudes parallel some of the findings from this PBS TeacherLine study. The same study also examined facilitators, impact by types of courses, satisfaction and characteristics of repeat learners.

Another study by ALTA Solutions Group³⁰ conducted for PBS TeacherLine and reported in 2010, examines facilitation in PBS TeacherLine courses to include facilitators' academic achievement level attainment, level of online facilitator courses completed, supports for facilitators, performance and similarities and differences between national and local facilitators. Another PBS study, the PBS TeacherLine Peer Connection Pilot Study Report by Hezel Associates in September 2007 addresses some of the resources and discussion boards used for networking and collaboration. Some of the coaching and mentoring research cited in this report support the findings on facilitators and for teacher support, collaboration and networking. Another PBS study, PBS TeacherLine National Survey of Teacher Development 2005-2006, Report by Hezel Associates, LLC, November 16, 2006, The PBS Facilitator/Coach Study is another report that clearly relates to facilitation, coaching and mentoring. The PBS TeacherLine National Survey of Teacher Professional Development 2005-2006 Report by Hezel Associates, LLC expands to cover superintendents' reports of the use of coaching for professional development in their districts.

The 2007 Hew and Knapczyk study demonstrates the influence of mentoring on problem solving for mentees, in this case practicum teachers just as facilitators influence student enrolled in their courses.

Related to the PBS TeacherLine study are the online prompts for discussions and the 8 online mentoring functions which parallel to the facilitators' role in PBS TeacherLine courses. Similar coaching and feedback mechanisms are described in articles by Atkinson & O'Connor (2007); Brooks (2010); Graves, Abbitt, Klett, & Wang (2009); Hur & Brush (2009); Jung (2009); and, Edge (2006). Individually and collectively, these studies reflect teachers' need for online social connections and networking

²⁸ Niess, M.L., van Zee, E.H., & Gillow-Wiles, H. (2010). "Knowledge Growth in Teaching mathematics/Science with Spreadsheets: Moving PCK to TPACK through Online Professional Development", *Journal of Digital Learning in Teacher Education*, 27(2), 42-52.

²⁹ "PBS TeacherLine Pre-Survey and Post-Survey Evaluation Report" prepared by Jonathan Margolin, Debbie Davidson-Gibbs, and Natalie Tucker with Jiuping Chen, Data Analyst, Learning Point Associates, Chicago, Illinois, June 2010.

³⁰ "A Study of TeacherLine Online Course Facilitation", Prepared for PBS TeacherLine, September 30, 2010, by Alta Solutions Group LLC, Plattsburgh, New York.

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opportunities with mentors, coaches, facilitators to help them bridge the gap between classroom isolation, real world teaching learning dilemmas that require solutions, and positive human interaction skills sets with other adults. The theoretical 2009 Hui article describing collaborative dialogue online that may impact the classroom runs somewhat parallel to the themes in facilitation in PBS TeacherLine courses. The articles that describe and expand on why teachers take online courses and the needs the courses meet parallel findings about PBS TeacherLine course completers and non-completers. So, there is no doubt that the PBS TeacherLine studies are contributing to the body of literature on course facilitation, mentoring and coaching online.

Overbaugh and Lu reported findings in separate studies in on 2008 and 2008-2009³¹ that demonstrate teachers' concerns for implementing technology in their classrooms. Both studies used the same population of teachers but the first focused on their opinions after taking introductory technology courses designed for them to increase their student's use of technology in their classes by making technology an acquired teaching strategy. The first study focused on teachers self efficacy including confidence, standards and process against demographic factors. The second study used the Concerns-Based Adoption model as the template for the conceptual framework and charted teachers moving from self concern to task concerns to impact concerns as they gained experience using the technology. These findings parallel those of: the 2006 Summerville and Johnson study; the 2009 Todorava & Osburg study; and, the 2008 Giordano study.

“Predictors of Teacher Satisfaction with online professional development: evidence from the USA's eLearning for Educators Initiative” 2011 study by Todd D. Reeves and Joseph J. Pedulla, based on data from pre- and post- course surveys is unparalleled in the literature found to date in addressing non-completers in terms of online course satisfaction.

“e-Learning for Educators: Effects of Online Professional Development for Teaches and Their Students: Findings from Four Randomized Trials” by Laura M. O'Dwyer and others (2010) examine the impact of online teacher professional development on student learning at four different grade levels in two different content areas. Another study that looks at student outcomes based on their teachers' online course completion is the “Year Three Comprehensive Report for the e-Learning for Educators Project” prepared by Kara Smith, Sheralyn Dash, Lauren Chapman and Joseph Pedulla. Indeed, there is a paucity of research on online professional development that relates student learning to the concepts covered in classes completed online by these students' teachers. Other than the Ready to Teach research in this report, none of the articles found to date and included in this report relate directly to student outcomes on teachers' skill attainment in online course completion.

4.3 Conclusions and Future Directions

While it was funded, the Ready to Teach Program contributed greatly to the literature documenting successes and challenges to online professional development in the form of course work, collaborative sites, coaching and mentoring and facilitation. Recent research findings from the Ready to Teach Program have demonstrated the impact of a high quality teacher on student learning. The body of

³¹ “The Impact of a NCLB-EETT Funded Professional Development Program on Teacher Self-Efficacy and Resultant Implementation” by Richard Overbaugh and Ruiling Lu of Old Dominion University, *Journal of Research on Technology in Education*, 41(1), 43-61, Fall 2008 and “the Impact of a Federally Funded Grant on a Professional Development Program: Teachers' Stages of Concern Toward Technology Integration by Richard Overbaugh and Ruiling Lu, *Journal of Computing in Teacher Education*, Vol 24/Number 2 Winter 2008-2009.

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work related to online instruction as another teaching strategy, as a free standing choice for teacher and student use, as another quick access to resources have added to the best practices literature. With so many partners, consultants and experts who are also faculty members, many at research institutions, the program will continue to impact teacher preparation programs at the graduate levels.

Chris Dede of Harvard University and others have called for a rigorous research agenda. I, like them, would be interested in seeing more research related to online learning for teachers to improve their K-12 content knowledge, better align it with pedagogy, and enable them to locate online resources to benefit students in their classrooms at all grade levels. Not surprising, much of the literature for online learning for teachers is at the university level where the faculty members are the researchers with readily available graduate and undergraduate students enrolled in their courses. While this research greatly expands the technology methods research, more is needed on teacher preparation programs, their requirements and students' acceptance of online alternatives for practicum experiences and field work.

Future directions for online coursework include teacher preparation programs at the undergraduate level. Many of our colleges of teacher education have not prepared teachers to use online teaching strategies or resources with their students. If colleges of teacher education are to change, so, too must accrediting agencies. They need to expand their criteria to include online coursework for pre-service teachers both as teaching strategies and methods and as actual courses.

In this time of economic hardship for many districts and localities, online teacher professional development has the potential for very real and substantive changes, as states and districts seek to reduce costs overall while increasing teacher quality. We are hopeful that the New England states follow the lead of the Ready to Teach Program New Hampshire State Department of Education eLearning administrator to forge partnerships with neighboring Vermont and other small states to capitalize on lessons learned from the Ready to Teach Program and share online courses, implementation strategies and costs based on their knowledge, experience and findings.

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Appendix A

Descriptions of the Ready to Teach Projects by Funding Cycle from ED Archives

Ready to Teach 2006 Awards

Project Name: TeacherLine

Project Contact: [Melinda George](#)

PBS TeacherLine is advancing educational theory and practice by developing a new type of model for online professional and organizational learning. Going beyond "online courses," the project will embed online professional development in comprehensive local initiatives for teacher quality, student achievement of rigorous academic standards, and the school reform. Expected project outcomes include improved student achievement with a particular focus on math, reading, and language arts; improved teacher content knowledge and practice; and increased coherence of local professional development planning, particularly in Title I and high-need settings. Working with nearly 80 local stations and other organizations, the project will reach 40,000 educators per year nationwide by Year Five of the grant term, PBS looks forward to working with partners Hezel Associates, Indiana University, and Learning Point Associates to advance the field of online learning for educators and improve teaching and learning in America's classrooms.

Project Name: e-Learning for Educators Initiative

Project Contact: [Lynn Meeks](#)

e-Learning for Educators (efe) is a collaborative effort among eight state departments of education and their public broadcast station partners to provide high-quality online professional development training (OPD) that will result in improved student academic achievement.

efe's primary focus is to build state capacity to organize, plan, develop, and provide high-quality OPD courses that are state-determined needs related to the improvement of student performance. This capacity was built, beginning in year one, through the systematic training of state leadership to steer the initiative in their state, and through facilitator and course developer training provided to state-recruited efe personnel. In this second year, the initiative is set to begin randomized large-scale research trials to determine the effectiveness of OPD in improving student performance while providing additional facilitator and course developer training and online-courses for teachers. An overview of the project goals, collaboration, training, research project and early program results are presented.

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Project Name: HELP: Help with English Language Proficiency

Project Contact: [Marybeth Susman](#)

Colorado's statewide public broadcasting network, Rocky Mountain PBS, the Colorado Department of Education, Responsive Research and Consultation, and Digital Directions, Inc., an educational multimedia company, have partnered to further develop and scale up delivery of an advanced, technology-based, sheltered-instruction math intervention program targeting limited English proficient (LEP) students and other students. Major components include:

- Increased student achievement (in math and English language acquisition) of LEP students; using an experimental model, the project looks for gains in math and language proficiency by students using a specific technology-based math intervention
- Expand and enhance the Help with English Language Proficiency Program (HELP Program), an advanced, technology-based math intervention that applies techniques to make content comprehensible to LEP students, address the cultural and linguistic instructional differentiation necessary for LEP students, and increase participant engagement in math through the use of technology, targeting delivery of high-needs middle schools that are highly impacted by LEP students, low socio-economic status, and low achievement in math
- Create a system of professional development that supports and enhances the HELP Program; employing a variety of research-based delivery methods and accurately measuring the effectiveness of those delivery methods and
- Establish the replicability and sustainability of the HELP Program, by establishing a technology-based system of delivery and professional development systems.

Project Name: Video in Teaching and Learning (VITAL)

Project Contact: [Sandy Goldberg](#)

The Educational Broadcasting Corporation (d.b.a. Thirteen/WNET), one of the nation's leading public television stations, will be working with three distinguished partner organizations to -

- Identify and develop innovative educational and instructional digital video materials from our vast archive;
- Embed the materials in a digitally-delivered statewide student assessment reporting systems being created with support from the New York State Education Department to provide teachers with the data and resources they need to improve achievement in math and English Language Arts for students in grades 3-8;
- Develop and deliver training to help teachers learn to utilize these resources, especially teachers in schools where there is a high percentage of Title 1 children;
- Develop and deliver training that moves the effective use of these resources into teacher preparation programs; and
- Use scientifically based evaluation to determine the effectiveness of the resources in producing meaningful effects on teacher performance and student achievement.

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2005 Awards from <http://www2.ed.gov/programs/readyteach/2005awards.html>

Project Name: e-Learning for Educators Initiative

Project Contact: [Nancy Hill](#)

Telephone: (205) 451-0120

Mailing Address: Alabama Public Television
2112 11th Avenue South
Suite 400
Birmingham, AL 35205

The central goal of this initiative is the establishment, within each of the eight partner states (AL, DE, MS, MO, NH, PA, SC and WV), of a successful, sustainable, e-Learning for Educators program that will help address state-wide teacher quality needs and have impact on student achievement. This goal will be met by state teams comprised of the staff from the state department of education, a public broadcasting station, and other relevant organizations, supported by central resources, guidance, and consulting services made available through the overall initiative. Within each state, cadres of e-Learning instructors and e-Learning course developers will be trained and e-Learning courses will be developed to meet high priority state needs. Substantial numbers of teachers in each state will receive professional development via e-Learning, with a particular emphasis on teachers from Title I eligible schools and districts. An independent evaluation will focus on goals, benchmarks, and outcomes for each project activity. The evaluation results will be used to inform ongoing improvement of the program within each state and the initiative as a whole. The initiative plan also includes six randomized design research studies to explore the impact of e-Learning for Educators courses on teachers' content knowledge and classroom practices, as well as on the achievement of their students. This series of research studies will provide replications across content areas, grade levels, and states to provide the first large-scale, replicated studies of the effect of e-learning on student achievement.

Project Name: PBS TeacherLine

Project Contact: [Mary Kadera](#)

Telephone: (703) 739-5785

Mailing Address: Public Broadcasting Service
1320 Braddock Place
Alexandria, VA 22314

School districts grappling with achievement gaps, increasing student diversity, teacher shortages and attrition, and constantly changing instructional technology need professional development that delivers results—and online professional development support can help. PBS has the necessary expertise to create and deliver successful online learning. Its current Ready To Teach-funded TeacherLine service has engaged nearly 10,000 educators in the last

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year alone, and experimental research suggests TeacherLine's positive contribution to improved student achievement.

PBS also understands the need and necessary steps to improve online professional development. Recent research suggests that it will be most effective when developed with the deliberate intent to integrate it with specific, research-based local models such as coaching, mentoring and communities of practice.

PBS is seeking Ready To Teach funding to build upon its record of accomplishment with PBS TeacherLine, advancing educational theory and practice by developing a new type of model for online professional and organizational learning. Going beyond online courses, the project will embed online professional development in comprehensive local initiatives for teacher quality, student achievement of rigorous academic standards, and school reform. Expected project outcomes include improved student achievement with a particular focus on math, reading, and language arts; improved teacher content knowledge and practice; and increased coherence of local professional development planning, particularly in Title I and high-need settings. PBS will dedicate implementation assistance to high-need districts and will involve them in all phases of the project evaluation: at least 50 percent of total program participants will work in Title I or high-need settings. Working with nearly 80 local stations and other organizations, the project will reach 40,000 educators per year nationwide by year five of the grant term. PBS looks forward to working with partners Hezel Associates, Indiana University, and Learning Point Associates to advance the field of online learning for educators and improve teaching and learning in America's classrooms.

Project Name: VITAL (Video in Teaching and Learning)
Project Contact: [Ronald Thorpe](#)
Telephone: 212-560-2882
Mailing Address: Educational Broadcasting
450 West 33rd Street
New York, NY 10001

The Educational Broadcasting Corporation (d.b.a. Thirteen/WNET), one of the nation's leading public television stations, is pleased to submit the following proposal for consideration for a three-year grant to support VIT AL (Video in Teaching and Learning) within the Ready to Teach 84.286 (Part B) program. Working with three distinguished partner organizations, we intend to:

- Identify and develop innovative educational and instructional digital video materials from our vast archive;
- Embed the materials in a digitally-delivered statewide student assessment reporting system being created with support from the New York State Education Department to provide teachers with the data and resources they need to improve achievement in math and English Language Arts for students in grades three through eight;

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- Develop and deliver training to help teachers learn to utilize these resources, especially teachers in schools where there is a high percentage of Title I children;
- Develop and deliver training that moves the effective use of these resources into teacher preparation programs; and
- Use scientifically-based evaluation to determine the effectiveness of the resources in producing meaningful effects on teacher performance and student achievement.

Project Name: Help with English Language Proficiency

Project Contact: [Dr. Marybeth Susman](#)

Telephone: (303) 620-5685

Mailing Address: Rocky Mountain Public Broadcasting Station
1089 Bannock
Denver, CO 80204

Colorado's statewide public broadcasting network, Rocky Mountain PBS, the Colorado Department of Education, Responsive Research and Consultation, and Digital Directions, Inc., an educational multimedia company, have partnered to further develop and scale up delivery of an advanced, technology-based, sheltered-instruction, math intervention program targeting limited English proficient (LEP) students and other students. Major components include:

1. Increasing student achievement (in math and English language acquisition) of LEP students; using an experimental model, the project looks for gains in math and language proficiency by students using a specific technology-based math intervention;
2. Expanding and enhancing the Help with English Language Proficiency Program (HELP Program), an advanced, technology-based, math intervention that applies techniques to make content comprehensible to LEP students; addressing the cultural and linguistic instructional differentiation necessary for LEP students, and increasing participant engagement in math through the use of technology, targeting delivery to high- need middle schools that are highly impacted by LEP students, low socio-economic status, and low achievement in math;
3. Creating a system of professional development that supports and enhances the HELP Program; employing a variety of research-based delivery methods and accurately measuring the effectiveness of those delivery methods; and
4. Establishing the sustainability of the HELP Program and its ability to be replicated, by establishing a technology-based system of delivery and professional development systems.

Appendix B: Examples of Funded Program Abstracts

from <http://www2.ed.gov/programs/readyteach/exabstracts.html>
The Seeing Math Telecommunications Project at the Concord Consortium

The Seeing Math Telecommunications Project is developing a specific effective model for the use of online video case studies as a professional development tool for elementary and middle school math teachers. The model is based on the case method, a powerful learning model. By examining critical moments in a case, participants enter vividly into the events and can carry the lessons learned into their professional lives.

The Seeing Math Telecommunications Project has added the force of audio, video, and interactive computer tools to the already powerful case study method. These case studies use both real-life video narratives and guided inquiry to craft a unique learning experience. By going into real teachers' classrooms and presenting the problems they face and the solutions that grow from imperfect situations, Seeing Math provides a rich source of insight that all teachers can use to develop their own practice. Each Seeing Math case study focuses on specific math content that is widely recognized as difficult to teach.

The Seeing Math Telecommunications project video case studies are produced in partnership with Teachscape Inc., a private company that also disseminates the cases as part of their teacher professional development offerings. The teachers featured in the case studies make exemplary use of NTCM 2000 standards-based curriculum materials. Five video case studies are currently available through Teachscape. Four new video case studies will be included in the portfolio of cases by the fall.

An independent evaluator, Edcentric, is currently conducting formative studies with teacher professional developers, math coordinators, and educators to determine the perceived course quality, usability (implementation), and replicability of Seeing Math to its targeted audience base. As the video case studies and online courses become available in pilot form, the formative evaluation is addressing how effectively the materials serve participants and if these materials are high quality and useful for participants. The evaluation will also attempt to determine if any student achievement gains in math can be attributed to teacher participation in Seeing Math video case study-based professional development.

Seeing Math with TeacherLine - the sister project at PBS - will undertake a joint effort to increase the number of certified secondary math teachers in the remaining years of the project.

PBS TeacherLine

PBS TeacherLine provides high-quality professional development for K-12 teachers with the goal of both improving teacher quality and increasing student achievement. PBS TeacherLine's

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online professional development programs focus on reading, mathematics, science, curriculum and instruction, and the integration of technology to enhance student learning.

Through PBS TeacherLine, educators have access to more than 68 online, facilitated courses in reading, mathematics, science, curriculum and instruction, and technology integration.

TeacherLine's courses are developed with input from K-12 education leaders and research experts in target areas where a high percentage of teachers lack content knowledge or teaching skills. The multimedia courses reflect current research on effective professional development that includes:

- providing sustained, intensive professional development;
- aligning content to local, state, and national standards;
- offering anytime, anyplace access;
- translating research into practice;
- modeling appropriate uses of technology; and
- supporting teachers as learners in a community of learners.

TeacherLine is currently implemented through partnerships with 32 PBS member stations and will become available nationally in the fall of 2003. Each of TeacherLine's partner stations collaborates with a local education agency (LEA). This unique partnership allows TeacherLine's course content to be customized to meet state and local standards. In addition, TeacherLine supports local station outreach services, including workshops for teachers that introduce online learning and TeacherLine's free educational resources.

Along with innovative online courses, PBS TeacherLine's web site provides free online professional development resources such as a self-paced mathematics academy, community discussion boards, and online chats with experts, and links to educational web sites.

Maryland Public Television

Most students learn to read in the primary grades, but some do not. They enter the upper elementary and middle grades without the reading skills they need to master the subject matter that is covered in the higher grades. Increasingly, Maryland middle schools have found the need to focus on reading, and for most, improving reading is a top priority. Thus, teachers in all content areas are being called upon to provide instruction that will build reading skills while simultaneously covering the subject matter of the curriculum.

Maryland Public Television proposes to build a set of rich Web-based resources in core content areas such as social studies, language arts, and science. These resources will contain embedded reading supports, offer explicit instruction in reading strategies, and engage students in learning activities that build reading skills. Working with our partners, we will build on the current model for Web-based electronic field trips (EFT) exemplified by the recently developed *Pathways to Freedom*, which focuses on the Underground Railroad and its operation in Maryland. MPT will add elements specifically designed to improve students' reading skills. These enhanced EFTs are called **Developmental Electronic Field Trips** and are referred to as the DEFT Reader Project. Initially, MPT will develop a model for embedding supports, explicit instruction, and learning activities in EFTs and will modify the existing resource, *Pathways to Freedom*. Once the model

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is tested and refined, MPT will adapt another EFT, now nearing completion, which focuses on the life, times, and literature of Edgar Allen Poe. This adaptation of existing resources will allow the project to start up quickly. Four additional EFTs will be developed in Year 2 and 3. All EFTs will be made available through Thinkport, MPT's new Web supersite for educators and families. As the digital broadcasting efforts progress, MPT intends to use data casting technology to make all of the resources on Thinkport available to schools without the need for the high-cost T-1 connections that many Maryland schools are currently using.

Each EFT will include student assessment tools and other resources for teachers, such as lesson plans that explicitly show how the EFTs and associated classroom activities can be used to build phonemic awareness, phonics skills, fluency, vocabulary, and comprehension. MPT will also develop three online courses to help teachers learn more about using content area resources to improve students' reading. These courses may include segments from the professional development videos focused on reading and literature that MPT has developed over the past several years. MPT will also make these video resources available to Maryland educators through its K-12 Educational Video Service.

For the DEFT Reader Project, MPT is partnering with experts from the Center for Reading Excellence at Johns Hopkins University, the Maryland State Department of Education, and schools in two Maryland districts. The evaluation of the DEFT Reader Project will be conducted by ORC Macro International. Evaluation will include both a process study that will provide the background for replication and an outcome study to measure the effects of the new instructional resources on students' reading performance. The student outcome study will take place in the two partner schools.

Hacienda La Puente

The partners in the project have come together to develop, produce, and distribute standards based and assessment driven digital instructional programming for teachers, students, and caregivers that is both broadcast and streamed across the Internet. This collaboration brings together the powerful production and distribution capabilities of the Los Angeles County Office of Education; the content experts and students of the Hacienda La Puente Unified School District, along with its high-speed broadband network for additional distribution; and the Teacher Education Department and content resources of California Polytechnic University-Pomona. Through ETN's broadcast and upload capabilities, this programming has the potential to reach not only the school districts in Los Angeles County, but also school districts and universities throughout California and the nation.

The goal of the D.I.G.I.T.A.L. project is to produce a standards based, assessment driven series of digital modules designed to help raise student achievement in the areas of middle school (grades 6-8) algebra and pre-algebra. The centerpiece of each module will include a video vignette aimed at providing direct instruction to students in a specifically identified math concept. Each module will also include instructional objectives, hands-on activities, online support materials, pre- and post- assessments, and teacher guides. In order to ensure that teachers will utilize this material, professional development videos will also be produced and will be

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available. These professional development videos will provide specific strategies to help the teacher with each identified math skill, along with more general videos covering topics such as using assessment to drive instruction, working with middle school students in a differentiated classroom, models of classroom management in the area of math instruction, and effective strategies for using instructional programming in the classroom.

Twin Cities Public Television

Twin Cities Public Television will develop, produce, and distribute digital instructional programming to assist teachers in implementing research-based mathematics instruction in fractions for students in grades 4 through 6. All content will be fully aligned with the relevant national and state performance and graduation standards in mathematics, and focused on proven, research-based curricula and strategies. Many urban and rural Minnesota students are performing poorly by standard measures of success, particularly in math, and many of these schools have a significant achievement gap between students of color, English language learners, and students in poverty, and their middle-class, English-speaking peers. A key reason students aren't achieving to expectations is that many of the state's teachers lack the skills and knowledge they need to meet the instructional challenges of diverse school populations, to assess student math skills, and to provide effective math instruction.

This project will focus on teaching fractions and is designed to: 1) increase the school readiness skills of students, preparing them for grade-level instruction in math; 2) increase students' level of math skills; 3) improve teachers' content and pedagogical knowledge and skills in math; 4) improve teachers' capability to assess students' strengths and weaknesses in math and to provide effective grade-level math instruction; and 5) increase the capacity of schools and school districts to provide effective math education by creating a cadre of well-trained teachers. This project will also determine whether professional development workshops delivered digitally are as effective as face-to-face workshops in improving teacher performance in the classroom and, ultimately, improving student achievement.

ⁱ Report, PBS TeacherLine National Survey of Teacher Professional Development 2005-2006, Hezel Associates, LLC, Executive Summary.

ⁱⁱ Report, PBS TeacherLine National Survey of Teacher Professional Development 2005-2006, Hezel Associates, LLC, Executive Summary.

ⁱⁱⁱ Care should be given with the term Title I eligible schools as opposed to actual Title I schools in reporting these statistics.

^{iv} Percentages are rounded to whole numbers, hence they don't equal 100%

^v Although summary data for race was not given and the Black and other races figure was computed, by looking at the tables, it was clear that state #1 had 36 or 3% of participants who were Black, state #2 had 1653 or 52% Black, state #3 had no Blacks, state #4 had 32 or 14% Black, state #5 had 16 or 1% black, state #6 had 15 or 4% Black, state #7 had 33 or 8 % Black and state #8 had 96 or 9% black participants.