

Innovative Web-based Professional Development for Teachers of At-Risk Preschool Children

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ABSTRACT

Research suggests the importance of professional development for teachers of at-risk children, and while educational technologies can be harnessed to help support teaching practice in innovative ways, such programs are often limited in scale. *My Teaching Partner (MTP)* was designed to deliver a targeted program of professional development for teaching quality, integrated with early childhood curricula, to large numbers of teachers. It has been used by 235 teachers of at-risk preschool children across the commonwealth of Virginia. MTP links curricula with layers of web-based support, including an on-line consultant--a teaching expert who regularly observes, de-briefs, and extends teachers' educational practice. The research-based curricula support the needs of at-risk Pre-K students in language, literacy, and social relationships; numerous video clips demonstrate effective teaching practice. In this paper, we describe the user-centered design process used and the support services and curricula delivered. The dynamic nature of the website is emphasized, including development practices which enable non-developers to easily contribute and maintain website contents. We discuss the strengths and weaknesses of this approach, and describe the field trial now underway, which includes examination of child outcomes, teaching quality, and teacher reflectivity. Evaluation data from the project are also summarized.

Keywords

Teacher professional development, Dynamic web design, Early childhood education, At-risk children

Introduction & Background

Needs of Early Childhood Teachers Working with At-Risk Students

By the age of five, children growing up in poverty or related social disadvantage are often lacking in the language, literacy, and social relationship skills that are critical to school success (Pianta, 1999; Snow, Hemphill, & Barnes, 1991; Vernon-Feagans, 1996). Although increasing numbers of state-supported pre-kindergarten programs have been funded over the past decade, to meet the educational needs of these children (Blank, Shulman, & Ewen, 1999), many Pre-K teachers are in need of training in language and literacy development and ways to form positive relationships with children, foster emotional and social competence and self-regulation (Bowman, Donovan & Burns, 2001). In addition, large scale studies suggest overall mediocrity and high variability in classroom quality and practices, even when experienced, credentialed teachers use the same curriculum (Bryant, Clifford, Pianta, Howes, & Burchinal, 2002). As a result, a key factor in ensuring program quality, particularly at large scale, is the training and support of teachers in their implementation of scientifically-based classroom practices.

Need for Innovation with Educational Technologies at Scale

Innovative applications of technology to support teaching and learning are not uncommon. Further, evaluation outcomes for some of these initiatives have suggested their utility for supporting the learning and professional development of teachers. Few of these projects, however, are undertaken "at scale," with the potential of addressing the needs of larger numbers of teachers and of making a significant impact on the practice of teaching and learning.

Clifford and Maxwell (2002) have suggested that if a voluntary Pre-K program were offered to all four-year-olds across the United States, over 200,000 teachers would be required, significantly more than the 27,000 qualified teachers estimated as practicing in 2002. It is clear that if educational technologies are to help meet the training and professional development needs of these teachers, these efforts must be at scale.

Innovative Technologies, At Scale, to Meet Teacher Needs

To address the professional development needs of a large number of Pre-K teachers working with at-risk students, a team of five principal investigators at the University of Virginia’s Curry School of Education designed and developed *MyTeachingPartner (MTP)*. MTP is an innovative, technology-assisted program that provides teachers with support from their own on-line consultant, a teaching expert who assists teachers by regularly (about twice each month) observing, de-briefing, and extending teachers’ educational practice. MTP also provides a set of web-based resources to support high quality teaching, including research-based educational curricula designed specifically to support the development of early language, literacy and social relationships in Pre-K students. The curricula are presented on the Web and illustrated with numerous video demonstrations of effective practice taken from actual Pre-K classrooms. At present, 235 teachers across the commonwealth of Virginia are participating in a two-year field trial of MTP, using our curricula every day in their classrooms. Among our outcome measures is a two-year follow-up on the effects of MTP on children’s language, literacy, and social development.

In this paper we describe the user-centered design process which led to the development of MTP, including needs assessment and the design of on-line professional development support services and teaching curricula. We demonstrate our methods for dynamically generating all pages within this website, a development practice that enables non-developer content experts and administrative staff to quickly and easily contribute and update website content. Next, we describe the current research underway as part of our field trial, including examination of child outcomes (from baseline to two year follow-up for each child studied), effects on teaching quality, and development of teacher reflectivity as a function of consultation. Finally, we will discuss the completed and on-going evaluations of MTP, and some of the implications.

User-Centered Design Process

Needs Assessment & Iterative Prototype Development & Testing

From its inception, MTP has focused on the development of high quality Pre-K teaching practices and, through them, on developing children’s early language, literacy, and social/emotional competence. This approach is supported in naturalistic studies of child care and Pre-Kindergarten settings (Howe, et al., in press; NICHD ECCRN, 2002). The design of its methods and materials has evolved over time.

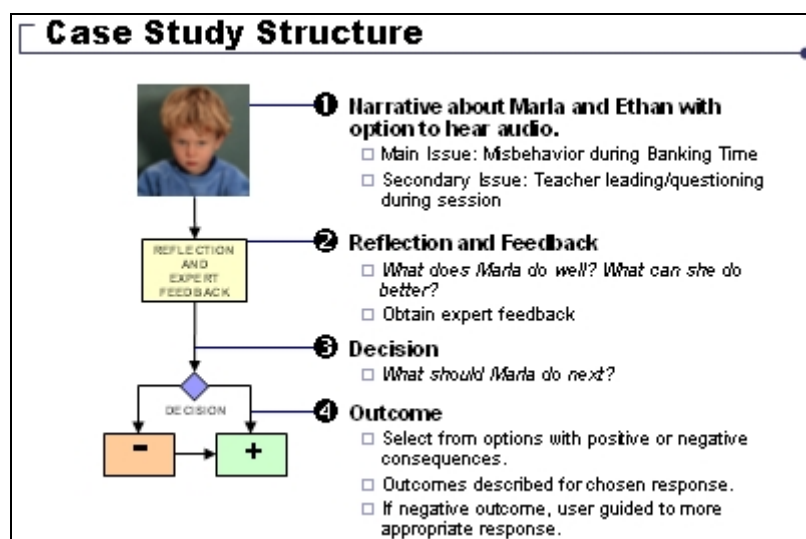
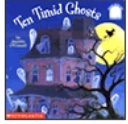


Figure 1. Prototypic Website Flow Document

Although this work is based on a strong foundation of prior research and theory building, the design process still began with a needs assessment. Ten graduate students spent seven weeks in an advanced instructional design course conducting this assessment. They began by consulting with teachers, educational experts, and specialists in emerging Internet-based communications technologies, among others. They went on to review models of consultancy and literature on Pre-K education and child development. Project goals were then articulated to describe outcomes for the Pre-K teachers, and a website prototype and initial design for the Internet-based Consultancy for teachers were mocked up. Although the prototypes were early ones, their form predicted many of the features of current MTP products. See Figure 1 for an example.



Ten Timid Ghosts

by Jennifer O'Connell

Book Benefits

Book How Tos

OPTION 1

SAMPLE WEEK OF ACTIVITIES

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Read the Book <i>Ten Timid Ghosts</i> PC	Ten Timid Ghosts Letter or Number? PC Ten Timid Ghosts Rhyming PA	Ten Timid Ghosts Place Words VLC Where Are You? PSL	Let's Act Out Ten Timid Ghosts First, Second, Third... N	PATHS PATHS Does Your Letter Look Like Mine? AK

*Adjust to meet your own schedule

📺 VIDEO = this activity has video(s): activity demonstration, teaching tips, activity extensions

OPTION 2

BUILD YOUR OWN WEEK OF ACTIVITIES

Required Activities of the Week

PATHS	PATHS	
	PATHS	Continue with your weekly PATHS Lesson
PC	Print Concepts	
	📺 Read the Book <i>Ten Timid Ghosts</i>	Read <i>Ten Timid Ghosts</i> , highlighting key components
PSL	Pragmatics and Social Language	
	📺 Where Are You?	Children use "place" words (next to, in front of, behind, etc.) to tell where they are
Choose ONE Activity From Each Area		
VLC	Vocabulary Linguistic Concepts	
	Ten Timid Ghosts Place Words	Discuss where the ghosts are located in the book using "place" words
	Ten Timid Ghosts Adjectives	Children use adjectives to describe the scary objects in the book
N	Narrative	
	📺 Ten Timid Ghosts Story Order	Use picture cards to review the sequence of events in the story
	Let's Act Out Ten Timid Ghosts First, Second, Third...	Using picture cards, students discuss story order and "act out" order of events in the book
PC	Print Concepts	
	Ten Timid Ghosts Letter or Number?	Discuss the difference between letters and numbers and ask children to help identify letters and numbers in the book
	Ten Timid Ghosts Word Hunt	Look through <i>Ten Timid Ghosts</i> searching for words that are not part of the story text, and discuss their meaning
PA	Phonological Awareness	
	📺 Ten Timid Ghosts Rhyming	Discuss rhyming words and identify rhyming words in <i>Ten Timid Ghosts</i>
	📺 Ten Timid Ghosts Rhyming Numbers	Discuss rhyming words, identify words in <i>Ten Timid Ghosts</i> that rhyme with numbers, and think of other words that rhyme with numbers
AK	Alphabet Knowledge	
	Does Your Letter Look Like Mine?	Children identify letters and find their partner with the matching letter
	Let's Look at Our Names	Using name cards, children identify letters in their own name and each others' names

Figure 2. Weekly Lesson Plan Options

The prototypes, along with early drafts of the curriculum design, were evaluated by four Pre-K teachers in three rounds of prototype testing, and the prototypes were revised.

Curriculum Design

MTP instructional activities focus upon language and literacy as well as social and emotional competence. The *MTP Language and Literacy Curriculum* (Justice, Pullen, Hall, & Pianta, 2003) draws upon scientifically-supported practices for teaching phonological and written language awareness skills. The curriculum integrates a child-driven, highly-contextualized approach with a concentrated teacher-guided and explicitly targeted methodology for development of key language concepts. This is a model of best practice for early childhood language intervention programs (Justice & Kaderavek, 2004). There are six targeted skill areas within the *MTP Language and Literacy Curriculum*, which teachers address during 30 minute lessons, four times each week: Alphabet Knowledge, Narrative, Phonological Awareness, Pragmatics and Social Language, Print Concepts, and Vocabulary Linguistic Concepts. Teachers can either follow our sample weekly lesson plans or build their own weekly plans in response to the specific needs of children in their classrooms (see Figure 2).

In its current field trial, MTP is also designed to support implementation of the *PATHS (Promoting Alternative THinking Strategies)*; Greenberg, Kusche, Cook, & Quamma, 1995) curriculum, which focuses on development of healthy child-teacher relationships and classroom management. Teachers devote at least one 30 minute lesson to *PATHS* each week. Other methods for building teacher-child relationships are also employed, such as *Banking Time* (Pianta & Hamre, 2001). Thus, the MTP approach addresses major skill needs of Pre-K children, to encourage school readiness (Pianta, 1999).

myTeachingPartner
Building language, literacy, and social relationships.

Home About Activities Quality Teaching Help Consultancy
Integrating with Other Curricula Language and Literacy PATHS Banking Time Ask Allison (FAQs)

Home > Activities > Language and Literacy > Activity & Video Search > Read the Book *Ten Timid Ghosts*

Video Demonstrations for: Read the Book *Ten Timid Ghosts*

Activity Demonstration



Read the Book *Ten Timid Ghosts*

Note how the teacher is encouraging the children to actively participate in the storybook reading rather than having them passively listen to her read. She pauses to allow the children to provide the missing part(s) of the repetitive text or number countdown. The children clearly enjoy helping to "read" the story and high engagement is sustained.

What is an Activity Demonstration ?

Video Activity Demonstrations are examples of high quality implementation of MyTeachingPartner activities.

6 Videos are available for this lesson:
(You are currently viewing >>>)

	Activity Demo	Read the Book <i>Ten Timid Ghosts</i>
	Activity Demo	Read the Book <i>Ten Timid Ghosts</i>
	Book Benefits	Ten Timid Ghosts
	Book How To	Ten Timid Ghosts
	Teacher Sensitivity	Responding to Children's Individual Abilities
	Literacy Focus	Explicit Literacy Instruction during Book Reading

[Go To this Activity Page](#) [Back To Activity & Video Search](#)

Figure 3. Video Demonstration

Website Design

The MTP website (www.myteachingpartner.net) offers a variety of supporting materials, including video demonstrations of the activities and of quality teaching practice, sample weekly lesson plans, professional development materials related to Quality Teaching (La Paro, Pianta, & Stuhlman, 2004) and Banking Time techniques. Examples of the demonstration videos and professional development resources are given in Figures 3 and 4. As the website was being developed, we subjected it to two additional rounds of user testing with twelve pre-service teachers, with accompanying revisions. In its final form, the MTP website provides both a set of comprehensive instructional activities and resources to support high quality implementation of those activities.



Figure 4. Professional Development Resources for Quality Teaching

Consultancy Design

The purpose of the MTP Consultancy is to provide teachers with a more intense, individualized form of support for high quality implementation--direct feedback on their teaching and opportunities to reflect on their practice. It is based on a collaborative professional development relationship between a teacher and an MTP consultant, in which systematic observation of classroom practice forms the basis of a partnership that works to support teachers' high quality implementation of MTP activities and promote quality teacher-child interactions. The MTP consultancy process provides opportunities for weekly collaboration through a combination of technologies that enable regular communication. One form of communication occurs through videoconferencing (and/or telephone conversations, in the event of technical difficulties). Videoconferencing allows the consultant to see and hear the teacher in real time. The consultant and the teacher view video clips and share insights about the implementation of the activities. Another form of communication occurs through use of online journals and email. Figure 5 displays a consultant-teacher conference, and Figure 6 depicts the consultancy process.



Figure 5. Teacher-Consultant Video Conference



Figure 6. The Consultancy Cycle

Dynamic Web Design

A key to our success with a limited staff and budget was to create a dynamic web infrastructure for the entire project. Once we determined the functions that were needed, we crafted a framework for the project built upon a PHP/MySQL server. This has allowed contents to be created and entered by various staff members, and has enabled content to be updated quickly and easily at any time.

Access Portals Created for Project Development by Non-Programmers

We developed password-protected web interfaces for each type of MTP staff member, to assist them in contributing contents and managing their branch of operations. We describe some of these access portals in Table 1. Similar interfaces have been created for:

- Project Managers, to integrate all aspects of the project (e.g., when new teachers join the project, their data automatically populates all databases)

- Researchers, for review and coding videos from participating classrooms, and to review student assessment data
- Development/Technical Team, for production and review of demonstration videos (see Neesen, et al., 2005) and for review of web usage statistics.

Table 1. Access Portals for Project Staff

Activities List				
Enter a new activity				
Area	Season	Title	Edit Book Benefits / Features to Highlight	Edit Activity
AK	Fall	The Letters in My Name (20)	Edit Info	Edit Info
AK	Fall	Where Is Your Name? (22)	Edit Info	Edit Info
AK	Fall	ABC Line Up (42)	Edit Info	Edit Info
AK	Fall	Does Your Letter Look Like Mine? (43)	Edit Info	Edit Info

Curriculum Developers use this interface for:

- Entering activity contents via a structured interface that prompts for each needed component (e.g., title, curricular area, materials, etc.)
- Formatting the activity display and linking to related materials
- Editing descriptions of existing materials

myTeachingPartner consultancy site
Sunday, 14 August 2005 3:41 pm

Barbara's Teacher List

Click a link to work with cycle steps
or click "MAP information" or "Login history" for more information about a teacher

	Pep Ventura Richland County pventura@richland.k12.va.us Spring Green Elementary School (555) 222-2222	<ul style="list-style-type: none"> Log video filename Provide and code prompts Review responses and video Summarize and code iChat Email teacher 	Archived Cycles MAP page for Linda Login history new cycle
	Justin Credible Richland County jcredible@richland.k12.va.us Rush Creek Elementary School (555) 333-3333	No cycles on record for this teacher. Please start a new cycle.	Archived Cycles MAP page for Cathy Login history new cycle

Consultants have their own website through which, they can:

- Select a teacher to work with
- Identify and upload a video clip for that teacher's current consulting cycle
- Provide prompts for teacher reflection
- Review teacher responses to those prompts
- Summarize and code their on-line chat discussion
- E-mail teachers any follow-ups

mtp **MTP Administrative Panel**

Teacher User Information
Get information about teacher's usernames and passwords, contact information, and status reports on their technical issues.

View Teachers by Category: All Groups

Search for Teachers by last name:

Frequently Asked Questions:
Find a FAQ for a teacher:
Search by category for a question/answer that may help a teacher with
select one

Submitting Information

<p>Submit a Technical Issue Please submit problems that a teacher may be having with equipment, website, passwords</p> <p>Step 1. Select the teacher you want to report a technical issue for:</p> <p>Search by Last Name Initial</p> <p>P <input type="button" value="View"/></p> <p>OR...Enter the last name here and hit search</p> <p><input type="text"/> <input type="button" value="Search"/></p>	<p>Submit a possible FAQ Please submit question that arise which are not technical (i.e. paths, assessment)</p> <p>Question:</p> <p><input type="text"/></p> <p>Submitted by (Optional):</p> <p><input type="text"/></p> <p>Comments/Suggested Answer:</p> <p><input type="text"/></p> <p><input type="button" value="Add Now"/></p> <p>View a full list of questions submitted</p>
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The Administrative website allows project managers, consultants, and the development/technical team to:

- Access teacher information, including any technical support issues they have/had
- Submit a new technical issue for a given teacher
- Search the Frequently Asked Questions (FAQs) database to assist a teacher
- Suggest a new possible FAQ
- Get a quick calculation of the average time required to address technical issues

A similar interface was developed to support the research functions of the project, including delivery of measures to teachers for data collection and systems for data export.

Benefits & Limitations of Dynamic Web Design

As noted in Table 1, a dynamic approach to our interface has a variety of benefits:

- Quick updating of the contents of our teaching activities,
- Easy modification of the interface (only the template needs to be modified, not every page displaying a teaching activity),

- Flexibly linking of materials throughout the website, without reproducing materials or re-coding for their display (for instance, we use video clips extensively, both to demonstrate how to implement particular activities and, packaged differently with related commentary, as examples of Quality Teaching practice),
- Easier backup of site contents: each database is stored in just one file,
- “Ownership” and responsibility for site contents is shared across a wider array of individuals (MTP is made up of 11 full-time and 10 part-time faculty and staff, plus 6-8 graduate students at any point in time), lessening the work load for the development team and speeding the development and maintenance processes,
- Different types of permissions assigned to different individuals, allowing some to have administrative access to databases (e.g., the ability to create or delete records), and others to have “view only” access.

However, dynamic design does have attendant limitations:

- Initial setup of website and database is time-consuming and required more sophisticated development expertise than static web page creation. We estimate spending six months total time of a systems developer to build all of the structures needed, in addition to the time normally required to design a web site.
- While editing the contents of the website and revising the layout are greatly simplified with a dynamic approach, it is less easy to *add categories* of information, as both the web page template *and* the database need to be revised.

MTP Project Implementation & Outcomes

Current Research Design

In our current field trial, we are comparing the relative effects of different versions of the MTP professional development model. Participating teachers attended a one-day summer workshop on MTP, during which they received a laptop computer they have used to review MTP teaching materials. Teachers in each of the three treatment groups also received:

- **Materials Group:** The 66 teachers in the Materials group received the MTP language and literacy curriculum. The curriculum was provided via a “limited features” version of the MTP website.
- **Web Group:** The 89 teachers in the Web group received access to the full-featured MTP website, including the curricula described above, plus video demonstrations, sample lesson plans, and professional development activities, among other things.
- **Consultancy Group:** The 80 teachers in the Consultancy group received all of the above features and also collaborated with an MTP consultant to improve their teaching practice (via online chat and by using the MTP website to review their videos and respond to consultant-driven prompts)

Multidimensional data are being collected on the effects of MTP, including child, teacher, and classroom quality outcomes.

Child Outcomes

In each of the two intervention years of our project, four children were randomly selected from each teacher’s classroom and assessed (pre and post) on language and literacy. (With attrition due in large part to families moving away from participating school districts, we are now following a total of 1,659 children.) Pre-K teachers and videotaped classroom observations are providing information on children’s social relationships and self-regulation, in addition to literacy and language development. All children are being followed into kindergarten and first grade with teacher questionnaires assessing language, literacy, and social relationships/regulation.

We hypothesize an additive effect for the Web and Consultancy treatments, when combined with the MTP teaching materials, and anticipate that children will show progressively greater growth in child outcomes through first grade.

Teacher & Classroom Quality Outcomes

Observations of teaching practice and classroom quality were collected via videotape during the two intervention years and are now being collected in a third non-intervention follow-up year. Observations are coded using the Classroom Assessment Scoring System (CLASS), a coding system for the 14 different dimensions of teaching

quality that are the focus of the MTP web-based resources. Studies involving over 2,000 pre-kindergarten and K-1 classrooms have shown that higher ratings on the dimensions assessed by the CLASS predict higher performance of children on standardized assessments of academic achievement and better social adjustment in the early grades of school (La Paro, Pianta, & Stuhlman, 2004). The relationship between the different aspects of this model is described in Figure 7.

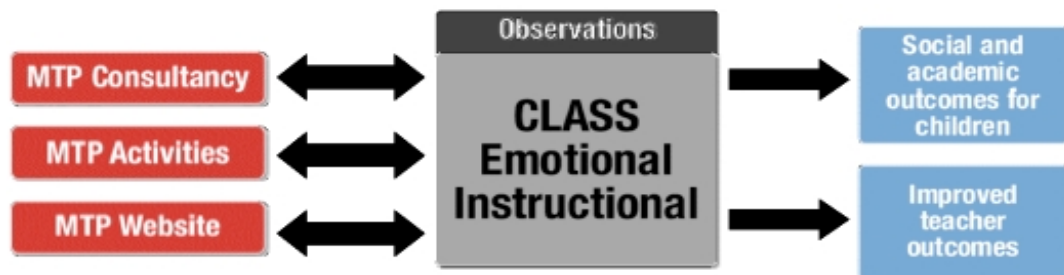


Figure 7. Linking Professional Development with teacher and child outcomes through standardized observations of classroom processes (Pianta, et al., 2004)

The child and teacher outcomes from this project will be the subject of forthcoming papers. In addition, we are developing a methodology for evaluating the reflectiveness of teachers participating in the consultancy, and expect to examine the evolution of teacher reflections over time concurrently with teaching quality.

Evaluation Outcomes

It should be noted that even with the best of design and implementation methods (we provided a 1.5 day introductory teacher workshop, along with extensive on-line technical reference materials and FAQs), teachers still require substantial technical support, and since teachers were from many different districts with different computer skills, their problems tended to be diverse. Our approaches to technical support evolved over the first year of the project, as support shifted away from being provided by teaching consultants to the technical staff using a structured support system (see Kelly, Whitaker, Neesen, Kinzie, & Pianta, 2005, for an overview). This resulted in a greater amount of support provided to teachers in the same amount of time, high levels of teacher satisfaction, and no dropouts due to technical challenges.

There are obvious advantages to our technology-assisted process for content development and content review. For instance, drawing upon video submitted from participating teachers and employing an on-line video production and quality review process has meant that we can produce between five and ten demonstration videos in as little as six hours, a significant advantage for MTP when we have hundreds of teaching activities we would like to demonstrate (see Neesen, et al., 2005, for more on this approach to video production).

Our user-centered design process has yielded a website perceived to be easy to use and worthwhile, judging from the feedback we received from teachers in our first implementation year: Overall, 92.7% of the 110 MTP teachers who responded to our mid-year evaluation survey “agreed” or “strongly agreed” that the MTP website was easy to use; 88.2% “felt that the site added value to their professional practice, and 87.2% indicated that using the MTP website was worth the time spent on it. With data from the end-of-year survey of 203 participating teachers, we conducted analyses by treatment group (Materials [$n = 45$], Web [$n = 79$], Consultancy [$n = 79$]). Teachers in the Web and Consultancy groups, who received higher “doses” of MTP, reported higher perceptions of value and usefulness, and felt more strongly that MTP was worthwhile, than did the Materials group teachers (Whitaker, Kinzie, Kraft-Sayre, Mashburn, & Pianta, 2005). Teachers receiving different amounts of support also evidenced differing levels of participation (Whitaker, et al., 2005).

According to server log analysis of the on-line behavior of teachers in the first implementation year, teachers in the Materials group [$n = 50$], whose version of the website contains only the curricula, visited the MTP site an average of only 6.4 times during the school year, but they spent significantly more time during each visit (average length of 10.9 minutes each time), perhaps because these teachers needed to print out the MTP activities they wanted to use. These Materials group teachers also reported spending the least amount of time preparing and delivering MTP activities. Web-group teachers [$n = 79$] accessed the site an average of 10 times each, with an average length of 4.2 minutes per visit. Consultancy teachers [$n = 84$] accessed the site

significantly more often than the other two groups, an average of 40.8 times each, and they spent longer than teachers in the Web group, with a mean visit of 7.62 minutes (Whitaker, et al., 2005).

Overall, teachers have been enthusiastic in their support of the program, making comments such as:

- “I would say this is the best professional development opportunity that I have had in my 23 years of teaching.”
- “My children’s assessment scores have never been higher...this year I have seen scores in many cases triple!”

When asked about their favorite aspect of MyTeachingPartner, many teachers mentioned MTP professional development features:

- “Ease of using the lesson plans on the Internet.”
- “My favorite part of MTP is the activities and suggestions given on the website.”
- “I like viewing the videos for presenting the books and using the MTP activities.”
- “Having a consultant made me more reflective and focused on what I need to do each day.”

These results support the adage: if you build it, they will come: Teachers voluntarily spent additional time preparing to deliver a new curriculum and participating in the professional development that MTP provides, and that they found it of significant value. With MTP, we were able to employ effective and efficient development methods, in order to provide teaching materials and professional support that 235 teachers valued and spent time using. Our future research will show the degree to which these efforts influence the development and school readiness of children who are at-risk.

Acknowledgements

This research was supported by a grant from the National Institute of Child Health and Human Development (NICHD), National Institutes of Health (NIH). A special thanks to the hard-working and talented staff of *My Teaching Partner* and our participating Pre-Kindergarten teachers across the commonwealth of Virginia, who make a very important difference to at-risk children.

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