Minnesota STAR Project:
Meeting the Needs of Struggling Adult Readers

Kimberly A. Johnson, Ph.D. and Margaret M. Frank

ABSTRACT

This paper reports on findings and implications from a two-year evaluation of the Minnesota STudent Achievement in Reading (STAR) Project. This long-term, job-embedded, professional development activity is provided for Minnesota Adult Basic Education (ABE) practitioners serving intermediate-level adult students reading between 4.0 to 8.9 grade level equivalency. A combined qualitative and quantitative approach to data collection and analysis confirms that participation in STAR positively influences: 1) teacher knowledge and confidence about teaching reading, 2) student confidence in reading skills, 3) student level completion as measured by the Test of Adult Basic Education (TABE) Reading, and 4) student persistence with classes and instruction. This convincing evidence inspires our ABE system to continue support and expansion of STAR and evidence-based reading instruction across Minnesota.

INTRODUCTION

The national need for changes in adult reading instruction is as critical as ever: 80% of students in adult education programs have demonstrated prose literacy skills below the minimal level "required to function successfully in society" (Tamassia, Lennon, Yamamoto, & Kirsch, 2007, p. 68). Yet there is limited, rigorous research on reading and adult learners useful to the design of effective instructional approaches to improve outcomes.

To identify reading interventions for adult learners, Kruidenier (2002) reviewed findings from approximately 70 research studies from adult education. In addition to identifying trends based on multiple non-experimental studies, Kruidenier focused on 18 "emerging" principles based on two or more experimental studies and any number of non-experimental studies. These emerging principles form the foundation of McShane (2005), which drew from existing adult as well as K-12 reading research and is intended for teachers with little knowledge of reading research or evidence-based reading instructional practices. It is not presented as a definitive resource but rather as a starting point for improving knowledge and skills related to adult reading instruction.

Building on this base, Kruidenier, MacArthur, and Wrigley (2010) identified scientifically-based adult education research, prioritized research in terms of relevance to adult literacy instruction, determined gaps in the research, and filled in those gaps with research findings from other adult populations as well as adolescent reading, K-12 reading, K-12 second language, and K-12 reading-writing. Findings are presented as

"stronger or weaker" for each major component of reading instruction.

The stronger findings from this review form the foundational principles of effective research-based reading instruction for adult learners. These include recognition that adult students, including adult English language learners, have very diverse reading strengths and challenges, and they conclude that diagnostic reading assessments are critical to identify individual education needs. Also, there is an acknowledged need to focus on the four components of reading—including alphabetics, fluency, and vocabulary—to improve overall reading achievement. Finally, the authors argue, "integrating adult-oriented, contextually relevant material into literacy programs may lead to increased reading achievement" (p. 25).

Adults reading at 4th–8th grade level equivalency form the largest group in need of reading intervention, identified in a multi-state study of adult learners assessing reading levels and educational needs (Strucker & Davidson, 2003). Over a three-year period, nearly 1,000 adult students from seven states were interviewed and assessed with a battery of language and reading tests. In the Adult Basic Education (ABE) population (older than 16, not high school graduates and/or in need of basic skills instruction) ten clusters of students with similar reading profiles were identified. The majority (56%) fell into the category of *Intermediate Students*, generally reading between 4th and 8th grade levels. Their primary needs were in fluency and academic vocabulary with a slightly lesser need for alphabetics.

STudent Achievement in Reading (STAR)

Thus, recognizing the critical need for reading interventions for intermediate-level readers, and with a more complete understanding of effective reading instruction, adult reading experts sought to create a more systematic approach to disseminating evidence-based reading instructional (EBRI) practices through a reading reform initiative called STAR, funded by the U.S. Department of Education's Office of Vocational and Adult Education (OVAE). OVAE contracts with the National STAR Training Network to provide professional development (PD) packages that include trainings, online and print resources, and technical assistance support purchased by individual states intended to result in "systemic and instructional changes required to improve the reading achievement of intermediate-level adult learners [grade level equivalents between approximately 4th–8th grades] in ABE" (STAR Toolkit, n.d.). STAR reading reforms include:

1. *Managing enrollment.* STAR requires establishment of managed enrollment (regular terms and dates for beginning and ending of classes) as well as attendance policies to support STAR classes.

2. *Tailoring instruction through diagnostic assessment.* Intermediate level students have different strengths and weaknesses in the four components of reading: alphabetics, comprehension, fluency, and vocabulary. STAR requires that diagnostic reading assessments be conducted to determine their strengths and educational needs, and then individual reading profiles are created for learners.

3. *Differentiating instruction around the four components of reading.* Once assessed, STAR students are grouped according to needs in order to receive targeted, evidence-based, and explicit reading instruction that addresses their reading challenges.

4. *Organizing reading routines.* It is important to organize instructional routines within

ongoing STAR classes. This means providing regularly scheduled lessons (15–30 minutes in length) based on students' needs. Class routines maximize the intensity and frequency of instruction and ultimately, reduce teacher planning and preparation time.

There are tremendous challenges associated with making such complex changes in ABE program structures, reading assessment, and delivery of reading instruction. To help, STAR training packages offer national trainers, state trainer certification, coaching, and a variety of resources intended to support and sustain implementation of STAR ("STAR Toolkit," n.d.). By 2011, nineteen states were part of the National STAR Project, including Minnesota.

Minnesota STAR Project

Like many other states, Minnesota has struggled to meet the needs of intermediate level ABE students reading between 4th–8th grade level equivalency. Across Minnesota, fewer than 50% of enrolled intermediate-level students were making gains in educational levels after 45–60 hours of instruction (Minnesota ABE NRS Core Performance Targets and Results, n.d.); many left programs before advancing to higher levels.

MN ABE has a well-educated workforce, with approximately 80% of teachers holding current teaching licenses and close to 50% who have or are working towards a Master's degree in some field. However, very few hold reading licenses or graduate degrees in reading (Marchwick, 2010), and many teachers do not have any background in reading instruction. In addition, the structure of MN ABE programs has traditionally included open enrollment and/or one-on-one work in open labs. And while professional development (PD) for effective reading instruction has been around

for a long time (typically 1–2 hour workshops), previous training did not necessarily include the four components of reading or the use of diagnostic reading assessments to identify student needs. No PD was focused specifically on instruction for intermediate level learners.

Looking for a way to meet the needs of this population, MN ABE began its partnership with STAR in school year 2008–2009. The MN STAR Project is a job-embedded PD activity that includes seven full-day trainings over a school year and requires the participation of an administrator and at least two teachers from each program. MN STAR is coordinated through the ABE Teaching and Learning Advancement System (ATLAS), a PD center for MN ABE housed at Hamline University in St. Paul, Minnesota. During our first year, national STAR trainers provided trainings and support. In 2009–2010, three MN STAR teachers completed STAR trainer certification and currently provide trainings and support within the state. By 2011, nineteen MN ABE programs had sent over 100 administrators and teachers through STAR trainings. Trainers provide electronic and/ or face-to-face consultation and assistance to address issues related to STAR implementation programs and classrooms.

Reading instruction that is not specifically STAR continues in programs across the state, but STAR practices are different in a variety of important ways. First, STAR is only available to students with Test of Adult Basic Education (TABE) scores that place them between 4.0–8.9 grade level equivalency, whereas a broader range of students may have previously been placed together for reading instruction. Next, STAR students run through a battery of diagnostic assessments in all four components of reading, and instruction is tailored to individual need based on those

assessments. Finally, STAR instruction must be structured and regular, meaning that programs must have managed enrollment structures in place to establish STAR classes or STAR time within other classes.

MN STAR requires considerable funding each year for state trainers, training expenses, and continued support in the form of follow-up trainings and assistance for continuing STAR programs. Given this level of investment, MN STAR state leadership made evaluation a priority in 2010 and 2011 and sought to answer one overarching question:

> *How has intermediate-level reading instruction changed as a result of participation in MN STAR?*

Professional Development Evaluation

From the beginning, evaluation activities integrated into MN STAR were guided by a framework adopted from Guskey (2002) and comprised of five levels of PD evaluation:

- *Level 1: Participants' Reactions*, measures satisfaction typically found in end-of-training evaluations.
- *Level 2: Participants' Learning* can be assessed with end of training quizzes to track participants' learning.
- *Level 3: Organization Support and Change* gauges the value and nature of supports necessary for complex instructional changes to occur.
- *Level 4: Participants' Use of New Knowledge and Skills* assesses the degree and quality of teachers' use of knowledge and skills learned in training. In fact, some argue that it is often enough to stop here, recognizing that the immediate goal of PD "is improved teacher knowledge, skills and practice" (Haslam,

2010, p. 17).
- *Level 5: Student Learning Outcomes* can be difficult to measure and demonstrate, but it is vital to seek to make the connections between teacher PD and student learning (Guskey, 2000; Lowden, 2005).

MN STAR Evaluation

Evaluation measures of PD effectiveness were designed to correspond to each of the levels in the framework. This paper will share data and findings relevant for Levels Four and Five, since these are typically more difficult and time-consuming to evaluate (Guskey, 2000). The specific research questions guiding this study are:

1. What is the impact of STAR professional development on teachers' use of new knowledge and skills around reading instruction for low and high intermediate ABE students?

2. What is the impact of STAR professional development on level completions and persistence of low and high intermediate ABE students in reading classes led by STAR-trained teachers?

Methods and Design

This study is an internal, in-house program evaluation (Killion, 2008). Thus, with an audience of state decision makers, potential changes in PD project as an outcome, and research principles to guide us, this project is what Bogdan and Biklen (2007) refer to as applied evaluation research.

For this study, the researchers chose to employ a non-experimental mixed-method approach using both quantitative and qualitative data and analyses to triangulate (Frechtling & Westat, 1997; McMillan & Schumacher, 2006). There are many variables in classrooms that make it difficult

to clearly link teacher PD to teacher change and especially to student outcomes. Collecting multiple forms of data and triangulating our analyses is a way to assemble "evidence" rather than proof (Guskey, 2002). This mixed-method approach, and the evidence assembled should provide a more complete picture of the impact of STAR PD on ABE reading instruction in Minnesota.

It is important to briefly clarify the role of the researchers for this study. The authors know all of the participants and programs, and one of the authors has trained many of the participants and conducted multiple classroom observations. This study, however, is not an evaluation of individual teachers or programs. Data were aggregated to provide a better understanding of the STAR project as a whole, so there is no risk to individual teachers or programs as a result of participation in this study.

Data Collection and Analysis

Guskey (2000) notes that "teachers almost always gain better results the second year of implementation" because of the learning and experimenting involved with new ideas (p. 10), so we did not collect data from the first year of STAR implementation. To document changes in practice, data were collected over the course of two program years, 2009–2010 and 2010–2011.

Because this evaluation was also formative, data were reviewed throughout the study by STAR leadership to identify additional data or program changes needed to improve STAR training or support. For example, the analysis of notes collected from STAR teacher observations provided critically important documentation of new skills and quality of implementation, which proved useful not only for this research but identified additional needed supports for STAR teachers as well.

Quantitative and qualitative data were collected from multiple sources and cover the two-year period from 2009–2011. Details of the tools and processes for data collection and analysis are provided in the discussion of findings below. Data sources included:

- Pre and post STAR training surveys of 52 teachers
- Observation notes of 25 STAR teachers in their 2nd or 3rd year of implementation
- TABE reading scores of intermediate-level STAR students and intermediate-level non-STAR students in seven STAR programs
- Intermediate-level student contact hours for five STAR programs
- 200 STAR student surveys
- 64 STAR teacher and administrators' *Stories of Success*

Simple statistics and counts were used to analyze data from surveys and to track student level gains. Student data were also analyzed using an approach known as *survival analysis*, also known as *time to event analysis* (Statsoft, 2011), to determine if there was any difference in student persistence (whether they continued in the ABE program or did not) between students receiving STAR reading instruction and students who were not. To best gauge teacher use of new knowledge and skills, a rubric was created to analyze observation notes and trends were noted relevant to the degree and quality of implementation of instructional strategies. Finally, analysis of teacher stories included a process of identification of patterns and themes. Multiple individuals were involved in the collection, analysis, and/or interpretation of data to enhance validity (Johnson & Christensen, 2000), including the STAR Coordinator, STAR Trainers, a local ABE accountability and database consultant, and state ABE PD leaders.

The presentation of findings below will include data drawn from multiple sources relevant to each of the research questions.

RESULTS
Impact on Teacher Knowledge and Skills

1) *What is the impact of STAR professional development on teachers' use of new knowledge and skills around reading instruction for low and high intermediate ABE students?*

Two primary data sources were used to assess the degree and quality of implementation of teachers' new knowledge and skills gained from participating in STAR PD: pre- and post- training surveys and observation notes of 25 STAR-trained teachers. Review of these data confirm that participation in MN STAR: 1) increases teacher knowledge and skills related to delivery of evidence-based reading instruction (EBRI), and 2) implementation of STAR practices is mostly faithful to the specific expectations of STAR reading reform.

Increased teacher knowledge and skills. Pre- and post-training surveys were an important source of self-reports on teacher learning and use of new skills following STAR training. Fifty-two participants completed pre- and post-surveys for 2009–2010 and 2010–2011 (see Appendix A for Teacher Survey questions). Two survey questions allowed teachers to address their ability to use knowledge and skills acquired during STAR training. Specifically, they were asked to respond *yes* or *no* to their ability to: 1) understand and interpret diagnostic reading assessments to determine reading strengths and needs, and 2) differentiate instruction for students based on interpretation of diagnostic reading assessments.

Table 1 shows the percentages of teachers who reported the ability to use new knowledge

and skills prior to beginning STAR training and nine months later at the conclusion of training. In 2009–2010, there is a 73% increase from pre- to post-test in the number of teachers who report the ability to interpret diagnostic reading assessments to determine students' strengths and needs; there is an increase of 54% in 2010–2011. In addition, there is a 40% increase in the number of teachers who report the ability to differentiate reading instruction to meet student needs prior to and following STAR training in 2009–2010 and an increase of 33% in 2010–2011.

Over both years, nearly all of the participants report an increase in knowledge and skills at the conclusion of the year-long STAR training, although a higher number of teachers report their ability to use diagnostic assessments and differentiate instruction in the pre-survey for 2010–2011. At least 90% of the teachers each year reported an ability to interpret diagnostic reading assessments and organize reading lessons based on the results of those assessments in the post-survey following the training.

High quality implementation and use of new knowledge and skills. Observations of teachers in their 2nd or 3rd year following STAR training are built into the PD as a way to determine additional training or support needed to sustain STAR practices. Thus, the purposes of the observations are primarily formative, and observation tools were not designed to evaluate the PD activity or to link PD to student achievement (Henry, Murray & Phillips, 2007). However, we realized that the detailed notes kept during observations could be helpful to build a broader understanding of the quality of teacher use of the knowledge and skills learned through STAR training.

Twenty-five teachers were observed during 45-60 minutes of STAR reading instruction,

Table 1—*Percentage of participants reporting the ability to use knowledge and skills learned at STAR Institutes, 2009–2010 & 2010–2011*

Pre and Post Training Survey Statements	2009-2010 N=25			2010-2011 N=27		
	% Pre	% Post	+/-	% Pre	% Post	+/-
I can interpret diagnostic reading assessments and determine strengths of my intermediate ABE students.	22	95	+73%	46	100	+54%
I organize my reading lessons based on the strengths and needs of my intermediate ABE students.	50	90	+40%	67	100	+33%

and notes were collected for analysis. Nineteen observations were completed onsite by STAR trainers; six were digitally recorded and submitted for review by the STAR Coordinator. All observers used the STAR Teacher Observation Record (Appendix B) to keep notes focused on implementation of eight STAR practices. Six of these are relevant for assessing teachers' use of knowledge and skills, specifically: the use of diagnostic reading assessment results to plan instruction; four steps of an explicit instruction model which includes explanation, modeling, guided practice, and teacher mentoring of student application of learned skills; and the presence of organized instructional routines. Observers followed up with face-to-face, email, or phone discussions to more completely understand what they observed and the rationale behind teacher choices and activities.

To delve more deeply into the quality of implementation, we chose to review the observation data in both quantitative and qualitative ways. For quantitative analysis, a rubric was developed creating three numbered categories to make a judgment as to the *Complete, Partial,* or *Insufficient* implementation of required STAR instructional strategies. STAR trainers assigned a "3" (complete) to mean that teachers needed

no additional support for specific instructional practices. The category of *Not Applicable* was included if the specific strategy was not observed for reasons unrelated to a teacher's ability to demonstrate that practice: perhaps this had been done earlier in the class, or was not needed given the learners present that day (Appendix C). Four raters, including the STAR Coordinator, two state STAR trainers, and one trainer in training independently reviewed the observation notes and judged the quality of implementation for each practice for each teacher.

Because these were STAR teachers teaching STAR classes, being observed by STAR trainers, we expected to see implementation of practices and assumed that most teachers would be at least partially implementing practices learned at training. So, for this evaluation, we sought to identify the teachers judged to be *completely* implementing specific STAR practices. The raters themselves represent a continuum of experience, so we chose to acknowledge this range by focusing on determinations of complete implementation by two or more raters as seen in Table 2.

The findings in Table 2 indicate that a majority of the observed teachers were rated as completely implementing STAR practices by at least two of the STAR trainers. Research by Smith et al. (2003)

Table 2—*STAR teachers completely implementing STAR instructional practices as judged by 2 or more raters.* N=25

STAR Implementation Practices	Number of Teachers N=25	Percentage of Teachers
1. Reading instruction is prioritized and planned according to diagnostic reading assessment results.	14	56%
2. Reading skills or concepts are explained by the teacher.	17	68%
3. Reading skills or concepts are modeled by the teacher.	15	60%
4. Ample guided activities are provided by the teacher.	22	88%
5. Teacher was monitoring students' application of taught reading skills or concepts.	17	68%
6. An organized instructional routine is in place based on students reader profiles.	21	84%

makes clear that teacher change and the integration of new ideas and practices following PD is a slow, complicated process strongly influenced by individual as well as program factors. We believe it is meaningful that, one to two years following training, over half of the observed teachers were completely implementing six critical practices learned at STAR training. Some teaching practices, such as practices four and six, have percentages of over 80% complete implementation. It is critical to remember, of course, that there is no way of proving that teachers were not doing these things prior to participation in STAR PD; however, this does provide additional evidence for STAR's effectiveness.

These numbers encouraged a return to the observation notes for continued analysis, especially for those practices with lower percentages that may indicate a need for more training and support. For example, observation notes for practice one indicate a struggle with prioritizing instruction according to diagnostic reading assessment results. Practice three, with only 60% complete

implementation, may indicate a need to revisit the important role of modeling in explicit instruction.

Impact on Student Outcomes

2.) *What is the impact of STAR professional development on level completions and persistence of low and high intermediate ABE students in reading classes led by STAR-trained teachers?*

All ABE programs must keep records of attendance and standardized pre- and post-assessments, and funding is tied to contact hours and student completions. To facilitate data collection, programs were encouraged to keep separate records for STAR students, enabling the researchers to track their level completions and persistence.

In addition to the student data collected from program databases, two additional sources of data provide supplementary information as to the value of STAR instruction. The first is a survey of the students themselves to track their perceptions of

STAR class, and the second are anecdotal *Stories of Success* shared by practitioners at the end of the training or program year.

The combination of quantitative and qualitative data reveal the following: 1) intermediate students in STAR classes have a higher percentage of level changes than non-STAR students, 2) students in STAR programs stay longer in their programs than non-STAR students, and 3) STAR instruction results in increased student confidence and outcomes as reported by participating administrators, teachers, and students.

Increases in level changes. The expectations and required structural changes for STAR have been easier for some programs than for others, resulting in a continuum of more to less successful implementation. For this research, programs considered most successful were selected for a closer analysis of student level gains and persistence. Each program included:

1. Managed enrollment structures for STAR class
2. Diagnostic reading assessment processes
3. Explicit instruction in alphabetics, fluency, vocabulary, and comprehension (as needed)
4. Established reading routines based on students' reader profiles

To date, 19 programs have participated in STAR training, and ten programs were identified as being successful in the implementation of required reading reforms; unfortunately, only six met the additional qualification of separate tracking of STAR students. It is also important to note that students chose to participate in STAR classes or were placed in STAR classes according to program structures and policies. Either way, a commitment to attendance was expected.

It is nearly impossible to empirically establish a causal link between teacher PD and changes in student outcomes (Guskey, 2002; Haslam, 2010).

Still, we sought to eliminate as many variables as possible for this analysis: only student data for intermediate level students who had completed a minimum of 12 hours of STAR instruction, and who had the initial TABE assessment of 4.0-8.9 grade level equivalency less than 30 days before entry into STAR classes, were considered. We were not interested in evaluating individual teachers, so programs with multiple STAR teachers were figured as totals rather than separating students and completion by teachers. Data for the two program years were collected and analyzed with assistance of an ABE accountability and database consultant. We chose to look at NRS level completion as our measure because of its critical importance for ABE. Numbers of STAR students who had made level completion (as determined by a TABE post test following at least 12 hours of instruction) were compared to the total program population of intermediate-level students who had made level completion after post-testing.

All six programs showed a higher percentage of STAR students completing a level and making gains as compared to learners in the general population of low and high intermediate students. Five programs saw level completion rates rise to over 50% for learners receiving STAR instruction; none of the programs analyzed had level completion rates of over 50% for their general population of adult learners testing at 4th–8th grade reading levels.

In a state where level completions for ABE intermediate level learners was 48% and 38% respectively in 2009 and 2010 (Minnesota ABE NRS Core Performance Targets and Results, 2012), it is meaningful that a higher percentage of intermediate level students receiving STAR instruction completed level changes than intermediate-level students not receiving STAR instruction. Five of the six programs had level

Table 3—*STAR students' level completion as compared to general population of low and high intermediate students' completion*

Program	Total STAR students	Total STAR completers	% STAR completers	% Completers all intermediate students
A–rural	4	3	75	26.9
B–suburban	66	42	63.6	23.6
C–urban	105	59	56.2	37.4
D–rural	9	5	55.6	40.9
E–urban	65	35	53.8	43.2
F–urban	52	18	34.6	30.7

Note. Totals are from program years 2009–2010 & 2010–2011

completion rates for STAR students that exceeded the statewide percentages.

Increased learner persistence. Learner persistence is an important concern in MN ABE programs. Unlike K-12 education, publicly funded instruction is provided for ABE learners without a mandate that students attend. Program funding is tied to the numbers of students enrolled in programs and their educational gains as measured by standardized tests, so programs have a critical interest in students persisting long enough to make gains. The nature of the reading reforms required by STAR include many of the same drivers identified as critical to boost adult learner persistence, such as scheduled classes and routine (Nash & Kallenbach, 2009). This led us to hypothesize that STAR instruction may lead to increases in student persistence.

Multiple databases are used in MN programs to track student attendance and NRS levels as required by state and federal law. One widely used database proved to be an easier system from which to pull relevant data, largely because this database tracks individual student hours for each class rather than general attendance over each month (which may not distinguish between STAR and non-STAR classes). Of the six programs analyzed above, five used this database.

Attendance data of those five programs were analyzed using a statistical approach known as *survival analysis*, used when persistence (usually a human life) extends beyond the end of the study for part of the population. Student "lifetimes" were estimated by taking the difference in days between their first class hours and their last. Because student lifetimes are more complex than actual lifetimes (students can come and go), some constraints were added to the data in an attempt to make the student populations relevant to each other:

1. Students had to last at least a day beyond intake (to eliminate the inclusion of students who only appear once and do not return).
2. Students had to have an average of one class event per 10 calendar days (since STAR requires regular attendance, we wanted to make sure we were including non-STAR students who came with some regularity).

Table 4—*Persistence based on student attendance at five MN ABE programs: STAR vs. non-STAR*

Program	Survdiff x^2 p-value	Star Coefficient	Coefficient p-value	Star Median (days)	95% CI (days) Lower	95% CI (days) Upper	Non-STAR Median Days	95% CI (days) Lower	95% CI (days) Upper
B-suburban	<0.01	-1.0344	<0.01	335	191	1043	71	65	86
F-urban	<0.01	-0.3192	<0.01	254	183	357	147	133	168
C-urban	<0.01	-0.5855	<0.01	267	197	377	97	90	106
E-urban	<0.01	0.6995	<0.01	125	95	203	336	296	380
D-rural	0.83	0.1038	0.82	77	38	NA	78	56	616

Note. A smaller *p-value* indicates a decrease in the likelihood that survival rates are the same.

3. All students had to have TABE score grade level equivalents between 4.0 and 8.9.

Student persistence at the five ABE programs was analyzed using a Cox regression model fitted to the attendance data of students over the program years 2009–2010 and 2010–2011. Table 4 shows the difference in persistence rates between STAR and non-STAR students for the five MN program data analyzed.

Four of the five ABE programs analyzed showed a difference between STAR and non-STAR persistence rates. Programs B, F and C indicate that STAR students continue longer with classes than non-STAR intermediate students. Program E shows the opposite: non-STAR students persist longer than STAR students. While this program does present a high level of overall student persistence, there was no obvious explanation for this finding. Program D, the smallest program in the group, did not show any statistically significant difference between STAR and non-STAR student persistence. This data indicates that in most cases, STAR instruction has a neutral or positive effect on student persistence.

Increased student confidence and learning. We were also interested in hearing from STAR students about their perceptions of the value and impact of these new reading classes. Students enrolled in STAR classes across various programs and for varying amounts of time were surveyed about their experiences. The survey included six statements; five were aligned with the four components of reading and the sixth asked about improved confidence. 200 surveys were received and results tallied as shown in Table 5.

The results indicate student-reported improvement in word reading, spelling, fluent oral reading, vocabulary knowledge, and comprehension of text. In response to the final statement: "I feel better and more confident about my reading skills," 92% of the students said yes, indicating improved attitudes and confidence about reading skills.

Table 5—*Student perceptions of changes in reading skills as a result of participating in a STAR class.*

Statements	%Yes	%No
1. I can sound out words more easily.	94	6
2. I can spell words more easily.	81	19
3. I can read out loud more correctly and smoothly.	88	12
4. I know and understand more words when I read orally and silently.	92	8
5. I better understand the meanings of sentences and paragraphs.	91	9
6. I feel better and more confident about my reading skills.	92	8

Note. N=200

We are cautious about reading too much into this data. The teachers reported that the survey seemed challenging for some students to complete accurately: they had difficulty deciding between just *yes* or *no* or rating themselves as readers, and some seemed to want to please the teacher. Still, with 200 students surveyed, we feel it is feedback that provides additional evidence demonstrating that STAR instruction positively impacts student confidence and skills.

Teachers' *Stories of Success* complemented student self-reports. Sixty-four stories were collected from teachers and administrators at the final STAR training or at an end-of-the-year refresher workshop for STAR teachers in their 2nd or 3rd year of implementation. The collected stories and comments were reviewed and coded by emerging themes, specifically: 1) improved teacher confidence, 2) increased student enthusiasm, and 3) evidence of student learning. These last two provide additional anecdotal evidence to support our finding that STAR instruction results in increased student confidence and learning.

Increased student enthusiasm. In general, many of these students have experienced educational failures prior to coming to ABE, and confidence in their ability to learn is a significant issue. For that reason, it is powerful for teachers to see students' enthusiasm grow as a result of STAR instruction. Comments such as the following were common in the *Stories of Success*:

- *At first, students were reluctant and hesitant to read aloud during fluency instruction. Now they want to read aloud each day. They also want to take their books home to catch up or read ahead.*

- *Many of my offender students [from a STAR program in a correctional facility] were reluctant to read aloud. Now they want to keep reading aloud rather than pass to someone else.*

- *I overheard a student tell another: "You need to get into this class. The words we learn are the words I hear on the news."*

Evidence of student learning. For STAR teachers, the observed impact and improvements in student learning have been a powerful affirmation of the value of following through with the substantive and often time-consuming reading reforms required by STAR.

- *A student read in a monotone voice and spoke in a run-on way. After fluency instruction, she now chunks words, uses intonation, and has improved her rate.*
- *During collaborative oral reading, a student tended to rush or read hesitantly. Now he enjoys reading with the group and his fluency has improved greatly.*
- *Students truly appreciate diagnostic reading assessment. They want to know their weaknesses because they want to improve.*

Even more powerful, teachers shared specific stories of learner gains on TABE or movement into high-level classes as a result of improved reading outcomes:

- *A student came to STAR class with a very negative attitude and lots of test anxiety. He began to feel more at ease and worked hard. He was finally able to finish a TABE Reading test, improved his score from GLE 0.4 to 8.0, and moved into an adult diploma program.*
- *A reluctant and discouraged reader attended a five-day a week STAR class for six weeks. He improved his TABE Reading from 5.2 to 8.4 GLE.*
- *A fall-session STAR student who attended regularly and asked for extra homework [is now] enrolled in a spring medical terminology class.*

CONCLUSIONS

ABE professionals in Minnesota are committed to meeting the needs of struggling adult readers at 4.0–8.9 grade level equivalency. This reading level is far below what is needed to participate successfully in society (Tamassia et al., 2007) or to move into employment and postsecondary educational opportunities so critical for today's economy (Carnevale, Smith, & Strohl, 2010; Prince

& Jenkins, 2005). The MN STAR Project, providing extensive job-embedded PD in evidence-based reading practices for adult students and requiring complex programmatic changes in structure and delivery of those practices, represents a significant investment in attempting to meet the needs of these struggling readers.

Our evaluation of MN STAR was undertaken in part to determine the impact that this PD is having on teacher use of new knowledge and skills for effective reading instruction. We've noted positive changes in teacher confidence as well as an enthusiasm for teaching as students increase reading skills. Data also show that teachers are mostly successful at implementing the new reading reforms and the design and delivery of evidence-based reading practices appropriate for adult students, such as the individual diagnostic reading assessments and grouping students with like needs for targeted instruction. As a formative tool, the evaluation of observation notes has been useful. For example, analyzing the notes and comments of trainers indicates some confusion that modeling is not an overuse of "teacher talk" but purposeful, crucial, and frequent demonstration of proficiency. As a result of this finding, training around this practice will be reviewed in order to ensure that STAR teachers have a clearer understanding of the definition and importance of modeling.

We also sought to determine the impact of STAR PD on student outcomes. It is important to note that we have not set out to prove that MN STAR PD is the single factor that results in increases in student reading gains. Instead, we are looking for "very good 'evidence' about whether or not PD is contributing to specific gains in student learning" (Guskey, 2000, p. 87).

The variety of data collected and our findings provide sufficient evidence to argue that this PD

activity is making a positive difference for students and programs. We have data that show adult students at 4th–8th grade reading levels are staying in their classes longer, becoming more capable readers, and demonstrate increased confidence and enthusiasm for reading. This underscores the value in making the effort to link PD to both teacher learning and student outcomes and to consider a composite of multiple data sources as a way to assemble "very good evidence" of the contribution that PD has on student learning.

Limitations and Implications for Future Research

As with every research project, and especially for one attempting to identify links between PD for teachers and improved student learning, there are important caveats and limitations. First, there is no way to account for variations in instruction beyond what we have already considered. Although all of the STAR teachers whose student data were collected are using STAR practices as judged by state STAR trainers, there is great variation in programs and teachers' personalities and relationships with students. In addition, we did not consider the varying educational levels or experience of the STAR versus non-STAR teachers. It is possible that the teachers who chose to participate in STAR are highly motivated or experienced and may be more successful in terms of student learning than non-STAR teachers; comparing STAR and non-STAR teachers without considering this possibility may suggest a correlation that is in fact misleading. We also recognize that our sample sizes were limited by the number of STAR teachers and the incompleteness of program record-keeping using different student data systems. Although we have trained nearly 100 teachers in the state, it became clear

that most of them were only partially integrating STAR instruction into their teaching. Reliance on data reporting systems that were not constructed to collect data tied to teacher PD adds another complication. Additional research that considers teacher experiences and characteristics and includes a larger sample of accurate student data would paint a more complete picture of the impact of STAR on teachers and learners.

This project also cannot tease apart what components of the PD may be most significant in terms of gains for teaching and learning. There are multiple pieces to STAR and all seem to matter: the use of diagnostic assessments and differentiation of instruction to determine individual students' strengths and challenges and then tailoring instruction to address challenges, the use of adult appropriate texts, or the use of explicit instruction that scaffolds learning. Programmatic changes are also important, such as the establishment of a managed enrollment model that allows teachers and students to work together for a scheduled amount of time (Strucker, 2007), "offering students predictable, consistent programming [that] enabled them to participate more fully and with greater ease" (Nash & Kallenbach, 2009, p. 78). Many of our ABE programs had never instituted managed enrollment for any classes prior to STAR; the impact of this feature alone cannot be underestimated. The field would benefit from future research that explore ways to more clearly identify the cause-effect relationship and disaggregate the many components of STAR reforms to determine just what aspects of STAR positively impact learning outcomes and persistence.

Other limitations impact our findings related to student level gains and persistence, including the possibility of selection bias for students who chose to participate or were placed into intensive

STAR instruction. Because there was no random assignment of eligible students to STAR or non-STAR reading classes for this study, perhaps the increased learner gains and persistence in our study are a result of highly motivated students being placed into, or choosing to participate in, STAR classes. Future research is needed that includes a more rigorous research design that draws from a larger sample and eliminates to the extent possible the problem of selection bias.

Because the evidence indicates that STAR reading reforms have a positive impact on student outcomes, the state will continue to provide assistance and training for STAR teachers and programs.

Final Recommendations

We are heartened to see that fundamental change can happen in ABE classrooms. We credit this success not just to the investment of resources and quality of the initial training, but in the additional supports and follow-up provided in subsequent years. Because the evidence indicates that STAR reading reforms have a positive impact on student outcomes, the state will continue to provide assistance and training for STAR teachers and programs.

The findings persuade us to make three recommendations: first, evaluation matters. We lacked the financial resources to invest in a comprehensive external evaluation (Killian, 2008) and acknowledge the resulting limitations, yet taking the time to do an in-house evaluation and to integrate evaluation measures from the beginning has given us important data to continually improve training content, delivery, implementation, and

supports needed to sustain change. It is important that long-term PD activities take seriously the need to build evaluation into those projects.

It was disappointing not to get the student data we had hoped to collect for this evaluation. Our second recommendation, therefore, is for states to explore and modify student data systems in ways that will assist evaluators to track and link students, teachers, and PD activities. In fact, this is already being explored by MN ABE leaders for future PD projects.

Finally, the findings from this evaluation have provided information for stakeholders, including funders, about the return on investment in STAR PD. Thus, our third recommendation is more local, that MN ABE continues supporting STAR to meet the needs of its struggling adult readers. This includes expanding the reach of STAR training and also providing the critical teaching supports needed beyond the training year. In light of the evidence presented, we would encourage other states to consider the value of STAR for their own contexts and for other professional developers to share their evaluation tools and processes and the outcomes to teaching and learning that result.

ACKNOWLEDGEMENTS

REFERENCES

Bogdan, R.C., & Biklen, S.K. (2007). *Qualitative research for education: An introduction to theories and methods.* 5th Edition. Boston, MA: Pearson Education.

Carnevale, A.P., Smith, N., & Strohl, J. (2010). *Help wanted: Projections of job and education requirements through 2018.* Washington, D.C.: Georgetown Center for Education and the Workforce.

Frechtling, J., & Westat, L. S. (Eds.) (1997). *User-friendly handbook for mixed method evaluations.* National Science Foundation. Retrieved from http://www.nsf.gov/pubs/1997/nsf97153/start.htm

Guskey, T. R. (2002). Does it make a difference? Evaluating professional development. *Educational Leadership, 59*(6), 45-51.

Guskey, T. R. (2000). *Evaluating professional development.* Thousand Oaks, CA: Corwin Press.

Haslam, M.B. (2010). *Teacher professional development evaluation guide.* Washington, D.C.: Policy Studies Associates.

Henry, M.A., Murray K.S., & Phillips, K.A. (2007). *Meeting the challenge of STEM observation in evaluating teacher professional development projects: A comparison of two widely used instruments.* St Louis, MO: M.A. Henry Consulting, LLC. Retrieved from http://sirc.mspnet.org/index.cfm/14976

Johnson, B., & Christensen, L. (2000). *Educational research: Quantitative and qualitative approaches.* Needham Heights, MA: Allyn & Bacon.

Killion, J. (2008). *Assessing impact: Evaluating staff development* (2nd Ed.). Thousand Oaks, CA: Corwin Press.

Kruidenier, J.R. (2002). *Research-based principles for adult basic education reading instruction.* Washington, D.C.: National Institute for Literacy.

Kruidenier, J.R., MacArthur, C.A., & Wrigley H.S. (2010). *Adult education literacy instruction: A review of the research.* Washington, D.C.: National Institute for Literacy.

Lowden, C. (2005). Evaluating the impact of professional development. *The Journal of Research in Professional Learning* [electronic version]. Retrieved from http://institute.nsta.org/learningcenter/pdp/NSDC_Evaluating_Impact_PD.pdf

Marchwick, K. (2010). *Charting the Future - Minnesota's ABE Workforce: Professional Experience, Challenges and Needs.* Adult Basic Education Teaching and Learning Advancement System (ATLAS) report. Retrieved from: http://www.atlasabe.org/pd-system/research-surveys/abe-practitioner-survey-2009

McMillan, J. H., & Schumacher, S. (2006). *Research in education: Evidence-based inquiry.* Boston: Pearson Education.

McShane, S. (2005). *Applying research in reading instruction for adults: First steps for teachers.* Washington, D.C.: National Institute for Literacy.

Minnesota ABE NRS Core Performance Targets and Results. (n.d.). Retrieved from http://mnabe.themlc.org/Accountability_and_NRS.html

Nash, A., & Kallenbach, S. (2009). *Making it worth the stay: Findings from the New England Adult Learner Persistence Project.* Boston, MA: New England Literacy Resource Center/ World Education.

Prince, D., & Jenkins, D. (2005). *Building pathways to success for low-skill adult students: Lessons for community college policy and practice from a statewide longitudinal tracking study.* New York: Community College Research Center, Teachers College, Columbia University.

Smith, C., Hofer, J., Gillespie, M., Solomon, M., & Rowe, K. (2003). *How teachers change: A study of professional development in adult education* (NCSALL Reports No. 25a). Cambridge, MA: National Center for the Study of Adult Learning and Literacy. Retrieved from http://www.ncsall.net/fileadmin/resources/research/report25a.pdf

STAR Toolkit (n.d.). Retrieved from http://www.startoolkit.org/

StatSoft, Inc. (2011). *Survival Analysis.* Electronic Statistics Textbook. Tulsa, OK: StatSoft. Retrieved from http://www.statsoft.com/textbook/survival-failure-time-analysis

Strucker, J. (2007). *Bridging research to practice: Managed enrollment and evidence-based reading instruction.* STudent Achievement in Reading (STAR) toolkit. Retrieved from http://www.startoolkit.org/assets/files/Issue_MgdEnrollPols.pdf

Strucker, J. & Davidson, R. (2003). *Adult reading components study (ARCS).* Boston, MA: National center for the study of adult literacy and learning. Retrieved from http://lincs.ed.gov/readingprofiles/index.htm

Tamassia, C., Lennon, M., Yamamoto, K., & Kirsch, I. (2007). *Adult literacy in America: A first look at results from the adult education program and learner surveys.* Princeton, NJ: Educational Testing Service.

APPENDIX A

STAR Teacher Survey Questions

Statements	%Yes	%No
1. I can describe the four components of reading and how they are related.		
2. I can describe the key elements of evidence-based reading instruction (EBRI).		
3. I administer diagnostic reading assessments (besides CASAS and TABE) to my intermediate students.		
4. I can interpret diagnostic reading assessments and determine strengths and needs of my intermediate ABE students.		
5. I organize my reading lessons based on the strengths and needs of my intermediate ABE students.		
6. I teach alphabetics to my intermediate ABE students.		
7. I teach fluency to my intermediate ABE students.		
8. I teach vocabulary to my intermediate ABE students.		
9. I teach comprehension to my intermediate ABE students.		
10. I have support for learning and applying evidence-based reading instruction in my classroom.		
11. I have time to plan and deliver evidence -based reading instruction in my classroom.		
12. I have materials to deliver evidence-based reading instruction in my classroom.		

APPENDIX B

STAR Teacher Observation Record (After onsite or video-taped observation)

STAR Implementation Goals	Observation Comments	Recommendations
1. Are managed enrollment structures and policies in place to support EBRI?		
2. Is reading instruction prioritized and planned according to diagnostic reading assessment results?		
3. Were reading skills or concepts explained by the teacher?		
4. Were reading skills or concepts modeled or demonstrated by the teacher?		
5. Were ample guided practice activities provided by the teacher?		
6. Was the teacher monitoring application of taught reading skills or concepts?		
7. Overall, was the reading instruction explicit, effective, and engaging?		
8. Overall, was there an organized reading routine based on students' reader profiles?		

APPENDIX C

STAR Observation Rubric

STAR Implementation Goals & Practices	3 Completely implemented: All recommended practices in place; no need for Trainer TA	2 Partially implemented: Some recommended practices in place; needs Trainer clarification	1 Insufficiently implemented: Few to no recommended practices in place; needs Trainer or Toolkit review	0 Not applicable: Recommended practices not applicable during the observed lesson
1. Reading instruction was planned according to diagnostic reading assessment results				
2. New reading skills, concepts, or techniques were explained				
3. New reading skills or techniques were modeled or demonstrated				
4. Ample guided practice activities were provided				
5. Application activities and monitoring were provided				
6. An organized reading instructional routine was present				

Notes: