THE McREL RURAL TECHNOLOGY INITIATIVE: RESEARCH AND EVALUATION STUDY

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Prepared by

Patricia A. Lauer
Kirsten L. Stoutemyer
Rebecca J. Van Buhler

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EXECUTIVE SUMMARY

Due to the isolation and limited resources that rural schools often face, retaining teachers in rural settings is particularly challenging. One way to reduce the sense of isolation within the teaching profession is to develop a professional community. Research suggests that collective learning and peer support are critical if teacher professional development is to result in changes in teacher practice, but meeting this need can be difficult in rural school districts that are small and isolated. Technology provides one way to address the professional development needs of rural teachers.

This study investigated McREL's Rural Technology Initiative (RTI), an online professional development intervention that provides opportunities for teacher collaboration while delivering training to teachers and administrators on instructional improvement, including the use of technology for teaching and learning. The purposes of the study were: (1) to examine the effects of online professional development on teacher professional community and teacher retention, (2) to evaluate the influences of the RTI on teacher instruction, teacher and administrator use of technology, and administrator practice, and (3) to identify those aspects of the RTI intervention that worked best and those that should be changed.

From a pool of 22 schools, McREL researchers chose seven pairs to participate in the study, based on the extent to which their rural status, demographic characteristics, and technology environments matched. Within each pair, schools were randomly assigned to the RTI treatment group or to the no-treatment control group. The study sample included 126 teachers and 14 administrators from six treatment schools (one school withdrew from the study) in four states, and 136 teachers and 17 administrators from seven control schools in three states.

The RTI was implemented between April 2004 and May 2005. The main components of the intervention were two monthly, one-hour online classes for teachers on instructional strategies, monthly threaded online teacher discussions, and one monthly online meeting for administrators on topics related to leadership.

Data were collected through teacher and administrator surveys administered before and after the RTI, an administrator interview and survey, and two focus groups. In addition, two of the online threaded discussions were analyzed for content. The study addressed six research questions:

1. What is the effect of the RTI on teacher professional community?
2. What is the effect of the RTI on variables related to teacher retention, including teaching efficacy, job satisfaction, and intention to stay in teaching?
3. What is the influence of the RTI on teachers' use of effective instructional practices?
4. How effective is the RTI at increasing teacher and administrator comfort with and use of technology?
5. What is the influence of the RTI on administrators' leadership practice?
6. What aspects of the RTI intervention did participants find effective and what improvements should be made?

The data indicated that the RTI was implemented as planned with relatively few technological difficulties. However, teacher participation in RTI activities varied considerably, with those who participated more perceiving more impact on their instruction and their students' learning.

Together the various sources of data and the analyses of these data led to the following conclusions:

- The RTI had a positive influence on teacher collaboration and the development of professional community.
- The RTI did not influence teachers' perceptions of their teaching efficacy, job satisfaction, or school environment.
- Teachers who participated more in the RTI benefited more in instructional improvements.
- There was limited evidence that the RTI increased technology use though this was mainly because the schools that participated were already technologically proficient.
- Teachers did not perceive changes in their principals' leadership, but administrators perceived positive influences of the RTI on their leadership practices.
- Teachers and administrators were satisfied with the content and delivery of the RTI professional development.

The evaluation data from the study suggested several recommendations for improvement of the RTI in the areas of scheduling, participant information, discussion boards, and logistics.

OVERVIEW

In 1996, the National Commission on Teaching and America's Future (NCTAF) documented the influence of teachers on improvements in student learning and on the success of standards-based reforms. In 2003, the commission again stressed the need to provide every child in America with a qualified teacher, but lamented that efforts to achieve this goal have been undermined by high rates of teacher turnover and attrition, particularly in low-income communities and rural areas. According to NCTAF, one way to address this problem is to build a high-quality teaching profession that increases teachers' job satisfaction. Among the strategies that NCTAF recommends for accomplishing this goal is to support both new and experienced teachers through professional development.

This document reports research and evaluation findings from a study of an online professional development intervention for rural teachers and administrators. The sections that follow describe the background, rationale and study questions, method, results, and conclusions. The audience for this report includes education researchers, K–12 administrators, staff developers, and technology directors. Policymakers in rural states also may find the report informative.

BACKGROUND

TEACHER RETENTION

The U.S. Department of Education projects that by the year 2010 there will be a demand for two million teachers (Moir & Gless, 2001). To an extent, this demand depends on increasing student enrollment, but it is primarily a result of high rates of teacher turnover (Ingersoll, 2001). According to the 1999–2000 Schools and Staffing Survey, 14 percent of new teachers leave after their first year of teaching, and another 15 percent transfer to a different school (McClure, Redfield, & Hammer, 2003). Teachers leave for a variety of reasons, including inadequate preparation; conditions in the school and classroom such as a lack of support, discipline problems, and lack of influence over decisions; family or personal reasons; retirement; other job opportunities; and dissatisfaction with salaries and benefits (Southern Regional Education Board, 2004; Ingersoll, 2001). NCTAF (2003) concluded that teacher turnover affects a school's financial position, improvement efforts, teacher quality, and student achievement. In schools with high teacher turnover, there is less opportunity to develop a cohesive, collaborative staff than in schools with low teacher attrition. Staff development becomes more challenging because different teachers are continually passing through the system, making sustained professional development difficult. Students also suffer because they are denied experienced teachers and are offered fewer course options (Jimerson, 2003; Chambers, 2000).

Due to the isolation and limited education resources and funding that rural schools often face, retaining teachers in rural settings is particularly challenging. In a survey of superintendents of rural school districts, low salaries, social isolation, and geographic isolation were the most frequently cited obstacles to attracting and retaining teachers. Additional barriers to hiring and retaining teachers were the need to teach multiple subjects, limited opportunities for training, and the poor economic health of the surrounding community (Schwartzbeck, Redfield, Morris, & Hammer, 2003). Teachers in rural areas generally are paid less than teachers in non-rural areas, and the disparities in salaries between rural and non-rural districts within the same state make it

difficult for rural communities to retain teachers (Jimerson, 2003; McCreight, 2000). Strategies suggested for retaining rural teachers include increased salary and benefits, collegial mentoring, support for beginning teachers, opportunities for professional development, and integrating technology into classrooms and professional development (Collins, 1999; McCreight, 2000; Harmon, 2001; Schwartzbeck et al., 2003).

Collaboration through Professional Community

If one of the main reasons teachers leave rural areas is professional isolation (Collins, 1999; Chambers, 2000; Hillkirk, Chang, Oettinger, Saban, & Villet, 1997), then decreasing teachers' sense of isolation might increase teachers' job satisfaction and thereby influence the decision to stay in rural areas. One way to reduce the sense of isolation within the teaching profession is to develop a professional community.

Newmann and his colleagues described five aspects of professional community in their research on restructuring schools (Newmann & Wehlage, 1995; Louis, Marks, & Kruse, 1996; Louis, Kruse, & Marks, 1996). According to these researchers, a professional community is defined by shared norms and values, collective focus on student learning, collaboration, deprivatization of practice, and reflective dialogue. Professional community among teachers is associated with variables related to student achievement, such as authentic pedagogy and instruction and teachers' shared responsibility for student learning (Louis & Marks, 1998) and with variables related to teachers' perceptions of their work, such as a sense of affiliation and support (Louis, Marks, & Kruse, 1996; Secada & Adajian, 1997; Newmann & Wehlage, 1995). Teachers in professional communities are encouraged to work together in one another's classrooms and to interact by observing, mentoring, providing feedback, and sharing expertise (Louis, Marks, & Kruse, 1996; Bryk, Camburn, & Louis, 1999). This deprivatization of practice not only decreases teachers' professional isolation but also encourages teachers to think about, analyze, and share knowledge related to instruction, curriculum, and student learning, which leads to a deeper understanding of teaching (Louis, Marks, & Kruse, 1996; Secada & Adajian, 1997).

Research suggests that collective learning and peer support are important aspects of teacher professional development if it is to result in changes in teacher practice (Desimone, Porter, Garet, Yoon, & Birman, 2002; Schlager, 2003; Joyce & Showers, 1995). Meeting this need can be a challenge for rural school districts that are small and isolated, as indicated in a report on teacher quality from the National Center for Education Statistics (1999). Table 1 shows the percentage of teachers in areas and cities of differing sizes who reported that they *never* participated in different types of collaborative professional development.

Table 1. Percentage of Teachers Reporting that They Never Participated in Collaborative Professional Development of Varying Formats

Topic *Never participated in...*	Type of Town or City		
	Rural/ Small Town	Urban Fringe/ Large Town	Central City
Common planning time	44%	35%	34%
Regularly scheduled collaboration with other teachers, excluding meetings held for administrative purposes	22%	19%	16%
Being mentored in a formal relationship	82%	82%	78%
Mentoring another teacher in a formal relationship	78%	74%	71%
Networking with teachers outside the school	46%	36%	34%

Source: National Center for Education Statistics (1999)

The same report indicates that rural teachers generally have fewer opportunities for professional development than teachers in other locations. Table 2 shows the percentage of teachers in locations of differing sizes who, for varying topics, reported that in the past 12 months they had not participated in professional development.

Table 2. Percentage of Teachers Reporting No Participation in Professional Development on Varying Topics in Past 12 Months

Topic *Never participated in...*	Type of Town or City		
	Rural/ Small Town	Urban Fringe/ Large Town	Central City
In-depth study in the subject area of your main teaching assignment	30%	28%	24%
New methods of teaching	25%	23%	22%
Student performance assessments	36%	31%	31%
Classroom management	53%	53%	47%
Addressing the needs of English language learners or students from diverse cultural backgrounds	82%	67%	58%

Source: National Center for Education Statistics (1999)

The Role of Technology in Professional Development

Technology provides a way to address the professional development needs of rural teachers. Online professional development is a method for providing teachers with training and peer support, especially the teachers who are physically isolated (Mather, 2000). Although the research on outcomes of online professional development is limited, there are studies that suggest its potential for supporting teacher learning. For example, a study that examined telecollaborative technology projects using asynchronous online forums to connect students,

scientists, and teachers found that teachers experienced substantial benefits from their online communications (Hawkes & Good, 2000). There was a significant increase in participating teachers' perceptions of the degree to which education technology increased their instructional practices, including their abilities to develop curricula, manage learning resources, and teach with an interdisciplinary focus. Another study examined the Rural Telecomputing Initiative, which created online professional development activities to connect rural math and science teachers. An online database of science and math resources was available to teachers, and teachers also were able to communicate with peers and experts through online networks. Research indicated that the program reduced teachers' professional isolation and increased their collaboration with colleagues and experts, including those outside of their education communities (Yap, 1997). In a study of TAPPED IN, a virtual professional development community, teachers who logged in more, and therefore participated more, reported less professional isolation and more impact on their teaching practices than those teachers who logged in less (Fusco, Gehlbach, & Schlager, 2000). Heath and Yost (2001) described the Teacher Training Academy, a program that matched a skilled facilitator with small groups of teachers in a virtual community. Teachers' positive perceptions of this program were related to the materials used for discussion and reflection, the variety of participants from around the country, the suggestions offered by colleagues, and the convenience of completing the activities at any time.

A different kind of online staff development program offered through West Virginia University used video, asynchronous discussion groups, and virtual bulletin boards to offer staff development for in-service training. Participants found the delivery of web-based staff development to be an effective and efficient way to disseminate information, especially to practitioners in rural areas (Ludlow, 2002). Survey results showed that teachers increased their confidence in working with computers, and teachers in focus groups reported learning new content and technical skills.

Finally, in a report for the Southern Regional Education Board, Thomas (2004) advocated for states' use of online professional development, citing as a key benefit connections among teachers who would not be in touch with one another without the online environment. Thomas also described a study in Baltimore in which teachers in an online technology course reported having a more positive experience than those who took the same course in a face-to-face setting. In explaining their reactions, the online participants cited their comfort in giving information and receiving feedback from others in the course.

In summary, there are a number of benefits to online professional development programs in general and especially for those living in rural areas. Teachers have access to resources that might not be available locally. Teachers gain experience with using technology for learning and presumably increase their understanding of how to integrate technology into their own teaching practices. Online professional development is ongoing and extended, so teachers are continually learning and building upon what they learn. Technology also provides a way for teachers to connect with colleagues, including those who are physically distant. Finally, participants can receive feedback and learn about different perspectives from a variety of online peers who have different backgrounds or experiences.

The Role of Administrators in Professional Development

Whether it is delivered online or face-to-face, research suggests that support from school administrators is an important aspect of teacher professional development. Bredeson and Johansson (2000) conducted 48 structured interviews of principals, school administrators, and teachers to examine the range of school principal roles related to teacher professional development. The researchers describe principals as both leaders and learners. Principals are stewards who value learning for all those in the school, and they are models who participate with teachers in professional development efforts. Principals are experts with professional knowledge related to teaching and learning, and they are instructional leaders who guide the school in accomplishing its learning objectives and goals. Another obvious role of principals is to create a supportive learning environment for teacher learning, where teachers have the freedom to practice new ideas.

Recent research in South Carolina demonstrates the relationship between teachers' perceptions of working conditions and school leadership, including leaders' support for teacher learning. Based on a survey of over 15,000 teachers, Hirsch (2004) reports, "Leadership is highly correlated with all working conditions, particularly professional development" (p. 25). The author explains that strong leaders involve teachers in decisions about professional growth and provide the resources and encouragement for teachers to work together. Importantly, Hirsch found correlations between teachers' perceptions of leadership and both teacher retention and the accountability status of the teachers' schools under NCLB.

Others have stressed the importance of administrators in moving schools toward technology integration. In a report on technology in U.S. schools, Coley, Cradler, and Engel (1997) observed, "Research on the adoption of innovations in schools consistently points to the key role of administrative leaders in the successful implementation of innovations" (p. 46). Coley et al. described approaches for training teachers in technology implementation in which principals and other administrators also participate. Such participation helps principals to improve their own understanding of how to integrate technology and learning and also indicates to teachers the importance of staff development. Mize and Gibbons (2000) reported on three case studies of schools that were addressing technology integration. Based on teacher surveys and principal and teacher interviews, the researchers concluded that administrators' involvement in and support of teacher training were important in moving the schools toward technology proficiency.

To summarize, support from school leaders is needed for professional development to change teacher and school practices and to result in perceptions of positive working conditions. Leaders can demonstrate this support by participating in the training that teachers receive and by providing resources (e.g., time, encouragement) for teacher collaboration and reflection.

Rationale

The previous sections described the problem of teacher retention and why it poses challenges for rural schools. Research on why teachers leave rural schools suggests that a primary reason is isolation, both physical and professional. A way to reduce teachers' sense of isolation in their profession is through participation in a professional community. Development of professional community requires reflective dialogue, deprivatization of practice, and collaboration with other

teachers teaching similar subject and grade levels, which can be difficult to implement in single rural schools due to their small size and physical isolation. Technology provides a possible solution.

This study investigates McREL's Rural Technology Initiative (RTI), an online professional development intervention. The RTI provides opportunities for participating in teacher professional communities within and across schools while delivering training to teachers and administrators on instructional improvement, including the use of technology for teaching and learning. The RTI also delivers training to administrators related to improved leadership practices.

This study has three main purposes: (1) to examine the effects of online professional development on teacher professional community and teacher retention, (2) to evaluate the influences of the RTI on teacher instruction, teacher and administrator use of technology, and administrator practice, and (3) to identify those aspects of the RTI intervention that worked best and those that should be changed. These purposes are reflected in the research questions listed in the next section.

METHOD

This section describes the research questions, the intervention, the sample of schools and teachers, and the data collection instruments.

Research Questions

Table 3 indicates the research questions and the data sources for each question.

Table 3. Research Questions and Data Sources

Research Question	Teacher Pre-post Intervention Survey	Treatment Teacher Online Discussion	Teacher & Administrator Pre-post Technology Surveys	Treatment Administrator Satisfaction Survey	Treatment Administrator Interview	Focus Groups
1. What is the effect of the RTI on teacher professional community?	**X**	**X**				
2. What is the effect of the RTI on variables related to teacher retention including teacher efficacy, job satisfaction, and intention to stay in teaching?	**X**					
3. What is the influence of the RTI on teachers' use of effective instructional practices?	**X**			**X**		

Research Question	Teacher Pre-post Intervention Survey	Treatment Teacher Online Discussion	Teacher & Administrator Pre-post Technology Surveys	Treatment Administrator Satisfaction Survey	Treatment Administrator Interview	Focus Groups
4. How effective is the RTI at increasing teacher and administrator comfort with and use of technology?	**X**		**X**	**X**		
5. What is the influence of the RTI on administrators' leadership practice?	**X**		**X**	**X**		
6. What aspects of the RTI intervention did participants find effective and what improvements should be made?	**X**			**X**	**X**	**X**

Intervention

The RTI is an online staff development intervention aimed at helping rural schools — especially those in more remote areas — provide staff development to teachers and administrators without the expense of travel and lodging. The goal of the RTI is to create a collaborative online network among rural and/or geographically isolated schools, providing online staff development regarding instruction and technology integration and helping administrators build an environment that fosters technology-rich instruction.

A memorandum of understanding between McREL and each participating school specified that "80% or more of the teachers and administrators attend two online monthly meetings," omitting the summer months. The RTI was implemented for this study between April 2004 and May 2005 and included the following activities:

- A face-to face orientation meeting of school representatives (an administrator and one teacher from each school) and McREL RTI implementers in April 2004
- *Two monthly, one-hour online classes for teachers*
  - The content of the general and second teacher meetings was drawn from *Classroom Instruction That Works* (Marzano, Pickering, & Pollock, 2001), which describes nine categories of research-based strategies for classroom instruction. The strategies are based on a meta-analysis of comparison-group research studies on the effects of instructional techniques on student achievement (Marzano, 1998). The average standardized effect sizes of the nine categories of strategies range from .59 to 1.61, indicating their potential for positive influences on student outcomes. A different strategy

was taught each month, except during December and January, which were combined due to the holiday breaks.

- The first class concerned that month's instructional strategy, and the second class focused on integrating technology with the instructional strategy presented in the first class. The technology strategies were based on an article by Brabec, Fisher, and Pitler (2004), which explains how teachers can use different technologies to support the instructional strategies described in *Classroom Instruction That Works*. Schools were given a choice of two times each month for teachers to attend the second follow-up class, which was designed to include brief times for schools to discuss the topics and report back to the large group. It was originally planned to separate teachers attending the second class into several live chat rooms based on teacher subject or grade; however, the chat rooms were discontinued in October based on administrator feedback concerning technical difficulties.
- *E-Campus* software was used to distribute materials (i.e., PowerPoint and Word files) and support the threaded discussion boards. Materials posted on the E-campus site were available to participants during and after class meetings. These materials always included the meeting invitations and overview for each month and all PowerPoint presentations for each online class, as well as the discussion assignment and the threaded discussion board for each month. Additional materials were posted to *E-Campus* as needed and included samples from the instructional strategies and technology applications discussed in meetings; links to pertinent websites; and the articles, resources, and tools discussed in the classes. The video conferencing software was *WebEx* through mid-January and *Marratech* was used thereafter (starting in early February).
- The instructors were trainers with expertise in technology, teaching, and the content of *Classroom Instruction That Works*. Three had published the article on technology strategies used in the online classes (Brabec et al, 2004). The fourth instructor joined the team in 2005 and met with the RTI director to go over content and procedures and debriefed with the training team after each class.

- *Threaded online teacher discussions and debriefing with other teachers in the project.* Online discussions using *E-campus* were designed to provide opportunities to develop professional community though engaging in reflective dialogue about instructional practice. The trainers provided initial prompts at the second class meeting, usually asking teachers to try out the strategies and report back.
- *One online meeting each month for administrators on topics related to leadership development and fostering innovation.* Software was the same as that used for the teacher class meetings. Materials included *Balanced Leadership: What 30 Years of Research Tells Us about the Effect of Leadership on Student Achievement* (Waters, Marzano, & McNulty, 2003),

Good to Great (Collins, 2001), and *First, Break all the Rules* (Buckingham & Coffman, 1999).

DESIGN AND SAMPLE

To identify the initial population of participating schools, McREL's director of technology contacted the state director of technology in each of the seven Central Region states served by McREL. The state directors suggested names of rural schools that might benefit from the RTI. Schools also were identified from those that responded to a notice about the RTI posted on McREL's website. The resulting initial population included 61 rural schools; 41 of these schools agreed to take the McREL Technology Surveys for teachers and administrators (Pitler, Enriquez-Olmos, & Manley, 2003), and 32 schools completed and returned the surveys. The surveys measure teachers' and administrators' perceptions of their technology skills and comfort level and the degree to which the school uses technology and integrates it with teaching and learning. The teacher response rate within schools ranged from 29 percent to 100 percent. Only the 22 schools that had a teacher response rate of 70 percent or higher were considered for participation in the study.

From the 22 schools, seven pairs of schools were chosen based on the degree to which they were matched on the following characteristics: rural status, state, school size, Title-I status, student ethnicity, student socioeconomic status, teachers' perceived comfort with technology, and teachers' perceptions of the school community's acceptance of technology (Pitler et al, 2003). Schools in each pair were randomly assigned to the treatment/intervention group or to the control/comparison group. One treatment school chose not to participate and was switched with its matched control school, and a control school chose not to participate and was replaced with a school in the overall pool that had similar characteristics. An additional school was recruited to participate as a backup control site. In one district, the elementary school was a treatment site, and the middle school/high school was in the initial control group. Due to possible exposure to the RTI materials through the superintendent who participated in the RTI, this control middle school/high school was eliminated from the study. One treatment school dropped out of the RTI in August 2005 due to school management issues. Table 4 indicates the characteristics of the schools in the final study sample.

DATA COLLECTION

This section describes the instruments and procedures used to collect data from the sources shown in Table 3. Appendix A contains the survey items for the constructs addressed by the teacher and administrator surveys. The primary data collection instrument was a teacher pre-post intervention survey. Table 5 shows the constructs that the teacher survey addressed and gives examples of survey items.

Table 4. Characteristics of Treatment and Control Schools

School Characteristic	Treatment Schools (n = 6)	Control Schools (n = 7)
Rural status	All Rural, outside of a Metropolitan Statistical Area	All Rural, outside of a Metropolitan Statistical Area
Geographic distribution	KS, MO, NE, SD	CO, NE, SD
Grade distribution	Pre-K–12	Pre-K–12
School Title I status	5 schools	7 schools
Student ethnicity	65% – 100% white Mean = 91% white	49% – 100% white Mean = 92% white
Student socioeconomic status	45% Free /reduced lunch	39% Free /reduced lunch
Teacher perceived technology comfort*	Mean rating = 2.47	Mean rating = 2.65
Teacher perceived acceptance of technology in the school **	Mean rating = 3.81	Mean rating = 3.59
Mean number of students per school	205	231
Number of teachers participating in the study	123	136
Number of administrators participating in the study	14	17

*response set: 1 = very uncomfortable, 5 = very comfortable
**response set: 1 = strongly disagree, 5 = strongly agree

Data were collected to determine the extent to which the RTI influenced teacher professional community and teacher retention. The teacher pre-post intervention survey measured two aspects of teacher professional community — shared norms and values and teacher collaboration (Louis & Marks, 1998). Due to the short time span of the intervention (14 months), the primary data sources on retention were teachers' self-reported intentions to stay in teaching and teachers' perceptions of variables that were related to retention in prior research. The latter include job satisfaction, motivation for teaching, and teacher efficacy. Teachers' dissatisfaction with their teaching jobs is associated both with teachers' decisions to move to other schools and their decisions to quit the profession (Ingersoll, 2001). Sources of motivation for teaching, such as salary and interacting with children, are linked to job satisfaction and commitment to teaching (Dilworth, 1991). Finally, teachers with a higher sense of teaching efficacy are more committed to teaching and more likely to remain in teaching, as compared to teachers with a lower sense of teaching efficacy (Tschannen-Moran, Hoy, & Hoy, 1998).

In an effort to more fully understand RTI influences on professional community and retention, data were collected on school environment and principal support based on evidence that both are needed for the development of professional community and effective teacher collaboration (Newmann & Wehlage, 1995; Hirsch, 2004; Van Buhler & Lauer, 2005). A final element measured by the teacher pre-post intervention survey was the amount of different types of professional development that teachers experienced the school year immediately prior to the RTI

and also other professional development they had during the RTI. These data were collected to examine possible influences from professional development other than the intervention.

Table 5. Constructs on Teacher Pre-post Intervention Survey

Construct	Sample Survey Item
Professional community- shared norms & values (Louis & Marks, 1998), n = 5 items	Teachers share beliefs and values about what the central mission of this school should be. (agreement)
Professional community- collaboration (Louis & Marks, 1998), n = 9 items	Meeting with other teachers on lesson planning, curriculum development, or other collaborative work related to instruction (frequency)
Intention to stay in teaching (Schools & Staffing Survey; NCES, 2001), n = 2 items	I plan to remain in teaching or K–12 education as long as I'm working. (agreement)
Job satisfaction (Schools & Staffing Survey; NCES, 2001), n = 4 items	All things considered, I am satisfied with being a teacher. (agreement)
Motivation for teaching (Davis, 2002), n = 17 items	Influence of salary and benefits, materials and resources, professional development opportunities, rural lifestyle/community, etc. (extent)
Teacher efficacy (Tschannen-Moran et al., 1998), n = 10 items	When I really try, I can get through to most difficult students. (agreement)
School environment- general support (Newmann & Wehlage, 1995; Charlotte Advocates for Education, 2004), n = 9 items	Staff members are recognized for a job well done. (agreement)
School environment- principal support (Lee & Smith, 1996; Charlotte Advocates for Education, 2004), n = 7 items	The principal is interested in innovation and new ideas. (agreement)
Professional development (Schools & Staffing Survey; NCES, 2001), n = 5 items	Attended professional development activities developed by your school (amount)

In addition to the 74 survey items related to the constructs listed in Table 5, a total of 14 items addressed the teacher's background, including education, teaching experience, and current teaching assignment — student grade levels, subject areas, classroom access to the Internet, and planning time. The post-intervention surveys for both treatment and control teachers included the items on the pre-survey and additional items related to the professional development that teachers received between the surveys. The teachers in the treatment schools were queried about their specific experiences with the RTI, including amount of participation, use of RTI instructional and technology strategies in their instruction, perceptions of change in their teaching and in their principal's leadership, and satisfaction with different aspects of the RTI.

Selected scales from McREL Technology Surveys for teachers and administrators (Pitler et al, 2003) were used to measure treatment and control teachers' and administrators' perceptions and attitudes toward technology both before and after the implementation of the RTI. Additional items concerning the RTI were added to the post-technology surveys that were given to teachers and administrators participating in the treatment group.

Administrators in the treatment group completed a post-intervention survey about their satisfaction with the RTI. The survey measured administrators' perceptions of the quality and usefulness of different RTI components, administrators' and teachers' attendance at the online classes, and perceptions of changes in their teachers' instruction and their own leadership practices.

All surveys were administered online using *Perseus* software. Each participant received an e-mail message that provided a URL link to the appropriate survey. In every case, the message explained that participation was voluntary, that answers were confidential, and that no individual teacher, administrator, school, or district would be identified in any reports about the data. As an incentive for completing the pre- and post-intervention surveys, teachers in both the treatment and control groups had a chance to win one of eight $50 online gift certificates (four per group) when they completed the surveys by the requested dates.

In addition to the data collection from online surveys, treatment administrators participated in a telephone interview with a researcher midway through the RTI intervention. The interview protocol had formative evaluation questions about different aspects of the delivery and content of RTI classes and discussion groups, perceptions of teachers' engagement, perceptions about effects from the RTI, and recommendations for improvement.

Finally, researchers conducted face-to-face focus groups in June 2005 after the completion of the RTI to further explore participants' experiences with the RTI and to identify problems and solicit recommendations. There was one focus group of teachers and one focus group of administrators.

RESULTS

This section begins with an examination of the degree to which the intervention occurred as planned. Next, there is a detailed description of the respondents for the pre-post intervention survey, followed by an analysis of treatment teachers' participation in the RTI. The results related to each of the six research questions follow. The results section concludes with findings that are not directly connected with the research questions but which inform the interpretation of the results for these questions.

FIDELITY OF IMPLEMENTATION

All online meetings took place as planned. This set of meetings included 10 general teacher classes, eight follow-up teacher classes, and nine administrator meetings. Using an observation protocol, a researcher observed a sample of meetings to record how the technology was functioning, the degree to which discussions were on topic, and the degree of participant engagement.

Six of the ten general teacher classes were observed. For the most part, these online classes were implemented as planned. However, in the February 2005 meeting, a change in video conferencing software resulted in one school being unable to connect and caused less severe interruptions and difficulties for several other participating schools. The second instance in which a school could not connect occurred in April 2005. Among the remaining four general classes observed, there were no technical difficulties or only glitches that were minor and did not

prevent school participation. Five of the six observed general classes included discussion that occurred mainly within each school. The wrap-up meeting was almost entirely whole group discussion. In all cases the discussions were considered to be "on-topic." For the five meeting that included discussion, the observers rated participants as "very engaged" in three meetings, and "somewhat engaged" in two meetings.

A researcher observed one of the two follow-up teacher classes for seven of the eight months in which one occurred. Although there were some technical difficulties in the observed classes, none prevented any school's participation. Five of the seven observed classes included discussion, and the researcher rated the participants as "very engaged" in three meetings and "somewhat engaged" in two.

Finally, a researcher observed seven of the nine administrator meetings. Technology difficulties prevented administrators from participating in one of the observed meetings. Due to the change in video conferencing software, the January 2005 meeting class was taught via phone and PowerPoint slides that were e-mailed to the participants. Since these meetings involved a small number of administrators as compared to the teacher meetings, they included more discussion between schools. The smaller number of participants gave individuals more opportunities to interact with administrators in the other schools. Except for the meeting that had technical problems, the observed administrator meetings included extensive on-topic discussion, and researchers rated the administrators as "very engaged."

TEACHER PRE-POST INTERVENTION SURVEY

Invitations to complete the pre-post intervention surveys were e-mailed to 123 teachers in the treatment group and 136 teachers in the control group. A total of 116 treatment teachers and 127 control teachers completed the pre-intervention surveys, resulting in respective response rates of 94 percent and 90 percent. A total of 93 teachers in the treatment group and 114 teachers in the control group completed the post-intervention surveys resulting in response rates of 76 percent and 84 percent respectively. Forty-five treatment teachers and 25 control teachers completed only the pre-intervention survey; 22 treatment teachers and 17 control teachers completed only the post-intervention survey. Nine survey respondents in the treatment group and 10 in the control group were not classroom teachers (e.g., librarian, counselor, paraeducator), and these persons were excluded from the two samples. After this adjustment, the number of teachers whose pre-intervention surveys could be matched with their post-intervention surveys was 71 in the treatment group and 97 in the control group. All data analyses reported for the pre-post intervention surveys are based on these samples.

Table 6 shows the demographic characteristics of the teachers in the treatment and control groups as reported on the intervention survey. *T*-tests indicated statistically significant differences between the groups in years of teaching experience ($p < .05$) and years at current school ($p < .05$), with the control teachers reporting more teaching experience than the treatment teachers. The two groups of teachers did not statistically differ on other characteristics.

Table 6. Demographic Characteristics of Teachers in the Treatment and Control Groups

Teacher Characteristic	RTI Treatment Group n = 71	Control Group n = 97
Grade level	47% elementary 39% secondary 14% K-12*	47% elementary 41% secondary 12% K-12*
Mean years teaching	14.26 years	19.06 years
Mean years at current school	9.97 years	12.92 years
Masters degree	25 %	15 %
Regular state certification	96%	98%
Internet access in classroom	93%	96%
Teaching is first career	86%	82%

* Generally music, art, and physical education teachers.

Six constructs on the pre-post intervention survey were measured by scales. The reliabilities for these scales on the pre- and post-surveys are indicated in Table 7. The Chronbach's alphas ranged from .71 to .93, indicating their adequacy in measuring the targeted constructs.

Table 7. Reliabilities of Scales on Teacher Pre-Post Intervention Survey

Scale	Chronbach's alpha*	
	Pre-survey	Post-survey
Professional community — shared norms and values (5 items)	.82	.85
Teacher efficacy (10 items)	.71	.75
School environment — general support (9 items)	.79	.80
School environment — principal support (9 items)	.92	.93
RTI impact on teacher instruction (6 items; post-intervention survey only)	-----	.96
Teacher satisfaction with the RTI (7 items; post-intervention survey only)	-----	.91

* Measure of internal consistency of the scale items

TEACHER PARTICIPATION IN THE TREATMENT (RTI)

Teachers in the treatment group were asked about the extent of their participation in the RTI professional development program. The responses of the teachers in the matched sample were: 3 percent "very limited extent," 14 percent "some extent," 17 percent "considerable extent," and 7 percent "great extent." Eighty percent of these teachers reported that they attended "8–9" of the nine general meetings; 16 percent attended "5–7" general meetings, and four percent attended "2–4" general meetings. Sixty-three percent reported that they attended "8–9" of the nine follow-up meetings; 17 percent attended "5–7" follow-up meetings; and 20 percent attended "2–4" follow-up meetings.[1] Teachers' participation in the discussion boards varied more than their

[1] School records of teacher attendance at the RTI meetings were similar to the attendance reported by teachers.

participation in the class meetings. Forty-one percent of the treatment teachers reported that they read "8–9" of the nine discussions; 28 percent read "5–7" discussions, 23 percent read "2–4" discussions, and seven percent read "0–1" discussion. On average, the teachers reported they posted "2–4" messages to the discussion boards and "2–4" classroom materials to the RTI website. These data suggest that teachers participated more in the online classes than in the RTI discussions.

The responses to each of the questions concerning level of participation were summed to obtain an overall measure of participation level. Forty-three treatment teachers were ranked as being at or above median participation ("high-participation RTI"), and 26 treatment teachers were ranked as below median participation ("low-participation RTI").[2] Table 8 show the percentages of the teachers in the high-RTI and low-RTI groups who reported participating in the different RTI activities and illustrates the differences in participation between the two groups. The data indicate that teachers varied in the amount of their exposure to the RTI intervention. For this reason, level of participation was used as a grouping variable in the analyses of teacher survey data.

Table 8. Treatment Teachers' Reported Participation in RTI Activities

Type of RTI Activity	Number of RTI Activities			
	0–1*	**2–4**	**5–7**	**8–9**
Attended RTI general online meetings				
High participation**			5%	95%
Low participation***		11%	35%	54%
Attended RTI follow-up online meetings				
High participation			9%	91%
Low participation	31%	23%	31%	15%
Read online discussions?				
High participation		5%	32%	63%
Low participation	19%	54%	23%	4%
Posted a message to online discussions				
High participation	5%	30%	35%	30%
Low participation	42%	46%	12%	
Posted a lesson plan or classroom materials to RTI website				
High participation	33%	37%	23%	7%
Low participation	73%	27%		

*Refers to the number of meetings, discussions, or postings depending on the activity
** n = 43 teachers
*** n = 26 teachers

Teachers had the opportunity to receive one hour of college credit at their own expense for their participation in the RTI. Forty-three percent of the treatment teachers reported they were

[2] Two treatment teachers did not answer questions about their participation in the RTI; therefore, the responses of these two teachers were not included in any analyses that examined influences of participation.

receiving college credit — 27 percent of the low-participation RTI teachers and 51 percent of the high-participation RTI teachers. There was a significant correlation between reported participation and receiving college credit (contingency coefficient = .23, $p < .05$) indicating that obtaining college credit was associated with a higher level of reported participation in the RTI (see Table 9). This finding suggests that receiving college credit motivated teachers to participate more than they might have without college credit. It also suggests that providing college credit for participation in the RTI (and other professional development) can be an incentive for teachers.

Table 9. Number of Treatment Teachers Receiving College Credit for RTI Participation

	High RTI Participation n = 43	Low RTI Participation n = 26
College credit	22	7
No college credit	21	19

WHAT IS THE EFFECT OF THE RTI ON TEACHER PROFESSIONAL COMMUNITY?

The intervention survey measured teacher professional community through the constructs of shared norms/values and teacher collaboration (see Table 5). There were no significant differences between the treatment and control groups in shared norms/values on the pre-or post-intervention surveys. The treatment and control groups did not differ significantly in the mean frequency of different types of collaboration on the pre-intervention survey. In an Analysis of Variance (ANOVA) of difference scores between the pre- and post-intervention surveys, significant differences were found among the high-participation RTI, low-participation RTI, and control groups' pre-post change frequency of collaboration. As expected, there was a significantly greater increase in online collaboration for the treatment groups as compared to the control group ($p < .001$), and the increase was significantly larger for the high-participation RTI group than for the low-participation RTI group ($p < .05$). However, there were also significant differences in the mean change in frequency of collaborative activities that were not online ($p < .05$), such as peer observation and peer feedback. The control group reported a mean decrease in non-online collaboration, and the treatment groups reported a mean increase, which again was significantly larger for the teachers in the high-participation RTI group than the low-participation RTI teachers ($p < .05$). This pattern of findings is summarized in Table 10 and suggests that the RTI promoted both online and non-online collaboration, especially for those teachers with higher levels of participation.

Online Discussions Content Analysis

The purpose of the online teacher discussions in the RTI intervention is to encourage a high-level discussion of teaching practice and to create professional community within and across RTI schools. Teachers had approximately three weeks to participate in each of nine monthly discussions. A guide was developed to code the content, depth of discussion, and professional community observed in the discussions. The level of coding and analysis was at the message level, and because messages could contain multiple ideas, multiple codes were applied to each message. Two coders independently coded each message in the discussions and discussed any

discrepancies in their codes. In the few instances where they could not agree, a third coder resolved the discrepancies.

Table 10. Mean Frequency of Teacher Collaboration

RTI Participation	Pre-intervention Survey				Post-intervention Survey			
	Online Teacher Collaboration		Non-online Teacher Collaboration		Online Teacher Collaboration		Non-online Teacher Collaboration	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
High n = 43	1.26	.59	2.21	.60	2.30	.80	2.45	.64
Low n = 26	1.27	.45	2.25	.50	1.88	.83	2.41	.75
None (control) n = 97	1.36	.78	2.42	.61	1.40	.85	2.35	.61

Response set: 1 = never, 2 = occasionally, 3 = monthly, 4 = weekly, 5 = almost daily

Content coding was based on whether the message contained material that was relevant to general aspects of teaching, the RTI content, the use of technology in teaching, or topics unrelated to teaching. The coding for depth of discussion was adapted from the coding schemes used by Entwisle and Waterson (1988) and Henri (1992). Messages were coded at one of the following levels: (1) surface level processing — no new information added to ongoing discussion about teaching; (2) midlevel processing — adds an example to what has already been said but without any analysis of the example; (3) in-depth processing — adds new information and analysis to ongoing discussion about teaching.

Each message was coded for four aspects of professional community: reflective dialogue on instructional practice, focus on student learning, deprivatization of practice, and collaboration (Louis & Marks, 1998). A message was coded as containing reflective dialogue if it concerned specific issues of instructional practice. Examples include teachers' discussion of problems and solutions for specific students or teaching practices that they had tried. A message was coded as containing a focus on student learning if it included explicit discussion of ways to promote student learning of content such as deeper understanding or higher-order thinking (as opposed to improving behavior or providing entertainment). Each message was coded for the following levels of deprivatization: (1) none; (2) moderate — shares general non-detailed examples of classroom practice; (3) high — shares classroom practice with a medium level of detail; (4) very high — shares details of student performance and/or lesson plans, materials, or curriculum they have used. A message was coded as collaboration if it included signs of teachers working together on class content, themes, curriculum, class outlines, lesson plans, class materials, projects, or team teaching.

A sample of two of the nine threaded discussions was analyzed. These were the Homework and Practice discussion, which occurred in the fourth month of the intervention, and the discussion of Nonlinguistic Representation, which occurred in the six month. These discussions were chosen for analysis because teachers had sufficient time to become accustomed to the technology and they occurred at a time when teachers were not distracted with state testing of students.

For the discussion of Homework and Practice, the discussion prompts provided by the instructor addressed the purposes, types, and effectiveness of homework/practice assignments. For the

discussion of Nonlinguistic Representation, the discussion prompts asked teachers to implement the strategy in a lesson with and without technology and then discuss their experiences and their students' reactions. There were 103 messages posted to the Homework discussion, and 122 messages posted to the Nonlinguistic discussion. Eighty-seven different teachers posted to the Homework discussion, and 67 different teachers posted to the Nonlinguistic discussion.[3]

Topic and content. All messages in the Homework discussion contained content relevant to teaching and to the RTI, and none contained content that was not on topic. Two messages contained content relevant to using technology in teaching. All messages in the Nonlinguistic discussion contained content relevant to teaching, and only one message was not relevant to the RTI. In addition, 33 messages (35%) contained content relevant to using technology in teaching (which was included in the prompt for the Nonlinguistic discussion).

Depth of discussion. Just over half (54%) of the messages in the Homework discussion were coded as exhibiting in-depth processing, and an additional 29 percent exhibited midlevel processing through shared examples or experiences. Thirty-four percent of the messages posted to the Nonlinguistic discussion were coded as containing in-depth processing, and an additional 45 percent were coded as midlevel processing.

Professional community. Ninety-nine percent of the messages in the Homework discussion and 85 percent of the messages in the Nonlinguistic discussion were coded as including reflective dialogue. Seventy-seven percent of the Homework messages included discussion of ways to promote student learning. The Nonlinguistic prompts tended to elicit examples of practice more than reflections on student learning; nonetheless, 40 percent of these messages were coded as including a focus on student learning. In the Homework discussion there was a moderate level of deprivitization of practice; 53 percent of the messages shared examples of the respondent's classroom practice, but none shared detailed classroom practice or materials. There was stronger evidence of deprivitization of practice in the Nonlinguistic discussion; 95 percent of the messages showed some level of deprivitization. Forty-seven percent included examples of the respondent's classroom practice, and an additional 25 percent shared detailed examples. None of the messages in the Homework discussion suggested teachers working together on class materials. There were three messages in the Nonlinguistic discussion in which teachers mentioned working with other teachers. These results for collaboration are not surprising given the nature of the discussion prompts, which did not ask for collaborative input regarding instruction or materials. Graphs of the coding results for professional community are contained in Appendix B.

Online Discussions Survey Data

An additional data source regarding the online discussion and the creation of professional community was the post-intervention survey. As shown in Table 11, teachers in the high-participation RTI group had numerically higher means than the teachers in the low-participation RTI group on the extent to which they perceived that the online discussions influenced their feeling of being connected with other teachers and created opportunities for peer mentoring.

[3] These numbers include treatment teachers for whom pre- and post-interventions surveys could not be matched.

However, t-tests indicated no significant differences between these two groups on either item (feeling connected: $p < .06$; mentoring opportunities: $p < .12$).

Table 11. Treatment Teachers' Perceptions of RTI Online Discussions

Teacher Post-intervention Survey Item	High RTI Participation n = 43		Low RTI Participation n = 23	
	Mean	SD	Mean	SD
Extent to which RTI online discussions made teachers feel connected with other teachers	3.07	.86	2.62	1.13
Extent to which RTI online discussions created opportunities for peer mentoring	2.95	1.02	2.54	1.14

Response set: 1 = not at all, 2 = very limited extent, 3 = some extent, 4 = considerable extent, 5 = great extent

Summary of Professional Community Findings

Results of the pre-post intervention surveys indicated that the RTI did not change teachers' perceptions of shared norms and values but did increase the frequency of collaboration with other teachers — both online and non-online collaboration. The online discussions that were coded provided evidence for the creation of professional community, especially in reflective dialogue but also in the focus on student learning and deprivatization of practice. Data from the post-intervention survey suggested that teachers who participated more in the RTI may have felt slightly more connected with other teachers compared to treatment teachers who participated less.

WHAT IS THE EFFECT OF THE RTI ON VARIABLES RELATED TO TEACHER RETENTION?

This section describes results related to teacher retention, including efficacy for teaching, job satisfaction, and intent to stay in teaching. Efficacy for teaching was measured by the teacher efficacy scale. The treatment and control groups did not significantly differ in mean teaching efficacy on the pre-intervention survey, the post-intervention survey, or in the analysis of pre-post difference scores. As Table 12 indicates, difference scores were in the predicted direction, with a mean decrease in efficacy for the control teachers and a mean increase for the treatment teachers, but these differences were not statistically significant ($p < .41$).

Table 12. Teacher Efficacy on Pre- and Post-intervention Surveys

RTI Participation	Pre-intervention Survey		Post-intervention Survey	
	Mean	SD	Mean	SD
High n = 43	2.83	.35	2.85	.36
Low n = 26	2.71	.36	2.78	.35
None (control) n = 97	2.83	.35	2.82	.40

Response set: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree

Job satisfaction and intent to stay in teaching were measured by four and two items respectively on the teacher pre-post intervention survey. Because these items addressed similar concepts, a Multivariate Analysis of Variance (MANOVA) was conducted on the scores for the six items on the pre-intervention surveys and on the pre-post difference scores. The treatment and control groups did not significantly differ on any of these items on the pre-intervention survey or in the analysis of pre-post difference scores. Although not statistically significant ($p < .14$), the largest numerical increase between pre- and post-intervention surveys occurred for the low participation RTI group in their intent to remain in teaching as long as they are working (see table 13). Overall, the results indicate medium to high levels of satisfaction with teaching except for the salaries, with which teachers were less satisfied.

A question about intention to return to current teaching assignment was asked on the post-intervention survey only. Although an ANOVA indicated that the differences were not statistically significant ($p < .19$), as indicated in Table 13, the teachers in the low-participation RTI group had the lowest mean on this measure.

Table 13. Teachers' Mean Responses Concerning Job Satisfaction and Intention to Stay in Teaching

Teacher Post-intervention Survey Item	High RTI Participation n = 43		Low RTI Participation n = 26		No RTI Participation (control) n= 97	
	Pre-survey	Post-survey	Pre-survey	Post-survey	Pre-survey	Post-survey
	Mean SD	Mean SD	Mean SD	Mean SD	Mean SD	Mean SD
If I could go back to my college days and start over again, I would still be a teacher	3.56 .67	3.51 .70	3.15 .92	3.27 .78	3.32 .84	3.29 .82
All things considered, I am satisfied with being a teacher	3.56 .50	3.58 .54	3.46 .65	3.38 .57	3.52 .63	3.51 .61
I am satisfied with the working environment at this school	3.16 .65	3.19 .70	3.31 .62	3.31 .73	3.21 .78	3.02 .85
I am satisfied with my teaching salary	2.16 .97	2.28 .85	2.58 .90	2.46 1.10	2.25 .92	2.23 .88
At some point, I will probably try to find a teaching job in another community	2.10 .93	2.23 .92	2.46 .90	2.35 1.02	1.96 1.01	2.11 1.00
I plan to remain in teaching or K-12 education as long as I'm working	3.40 .76	3.48 86	2.85 1.12	3.08 .80	3.42 .79	3.68 .69
I plan to return to this school in 2005-2006	-----	3.77 .48	-----	3.46 .86	-----	3.68 .48

Response set: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree

A final set of 17 survey items related to job satisfaction asked teachers about the degree of influence that various factors had on their thinking about whether to continue teaching.

Univariate ANOVAs were conducted on responses to these items on the pre- and post-intervention surveys and on the pre-post difference scores. The only significant difference was in the factor of "professional development opportunities at this school" ($p < .05$). The high-participation RTI group decreased significantly in their perceptions of professional development as an important factor from the pre- to post-intervention surveys, while the low-participation RTI group and the control group increased in their perceptions of this as an important factor to consider in deciding whether to continue teaching. A similar but non-significant pattern was observed for the factor of "other teachers in this school" ($p < .10$). The overall means and standard deviations for the influence of the 17 different factors are given in Appendix B. The factors with mean ratings of 3.5 and above (on a 4-point scale where 4 = "strong influence") were "working with the students," "the rural lifestyle/community," and "close to family and/or home." The factors with mean ratings of 2.5 or lower were "access to recreational opportunities nearby" and "having no viable job alternatives to teaching in this geographical area."

Summary of Teacher Retention Findings

In general, the findings indicate that the RTI did not have statistically significant effects on the variables related to teacher retention in this study. There was some suggestion that results were in the desired direction (e.g., for teacher efficacy), so it is possible that differences would be detected with a larger sample size. The analyses of factors that teachers perceived as influencing their decision to continue teaching produced an unexpected pattern. The high-participation RTI group perceived professional development and the other teachers in the school as less important influences after the RTI intervention while the opposite occurred for the low-participation RTI and control groups. Perhaps the high-participation RTI treatment teachers perceived less need for these elements after the RTI occurred. Overall, the factors with the strongest reported influence on whether teachers in the study continue to teach concerned aspects of both the profession (working with children) and the location (rural and close to family).

WHAT IS THE INFLUENCE OF THE RTI ON TEACHERS' USE OF EFFECTIVE INSTRUCTIONAL PRACTICES?

This research question concerns teachers' use of the nine categories of instructional strategies from *Classroom Instruction That Works* (Marzano et al., 2001) that RTI teachers were taught in the monthly online classes. The primary source of data related to this question is the post-intervention survey of teachers in the RTI treatment group. The teachers were asked to rate on a 5-point scale how much they changed their frequency of use of eight different instructional strategies, from "much less use" to "much more use," compared to their instruction prior to the RTI. (The post-survey was administered to teachers prior to the last class on the ninth strategy of cooperative learning, so a question concerning that strategy — the ninth — was not on the post-survey.) The mean response for teachers' reported change in the use of the strategies was 3.52 for high-participation RTI teachers ("more use") and 3.20 for low-participation RTI teachers ("about the same use"). The *t*-test of the difference between the participation groups was statistically significant ($p < .001$). A MANOVA resulted in statistically significant differences favoring the high-participation RTI group on four of the eight strategies, as indicated in Figure 1.

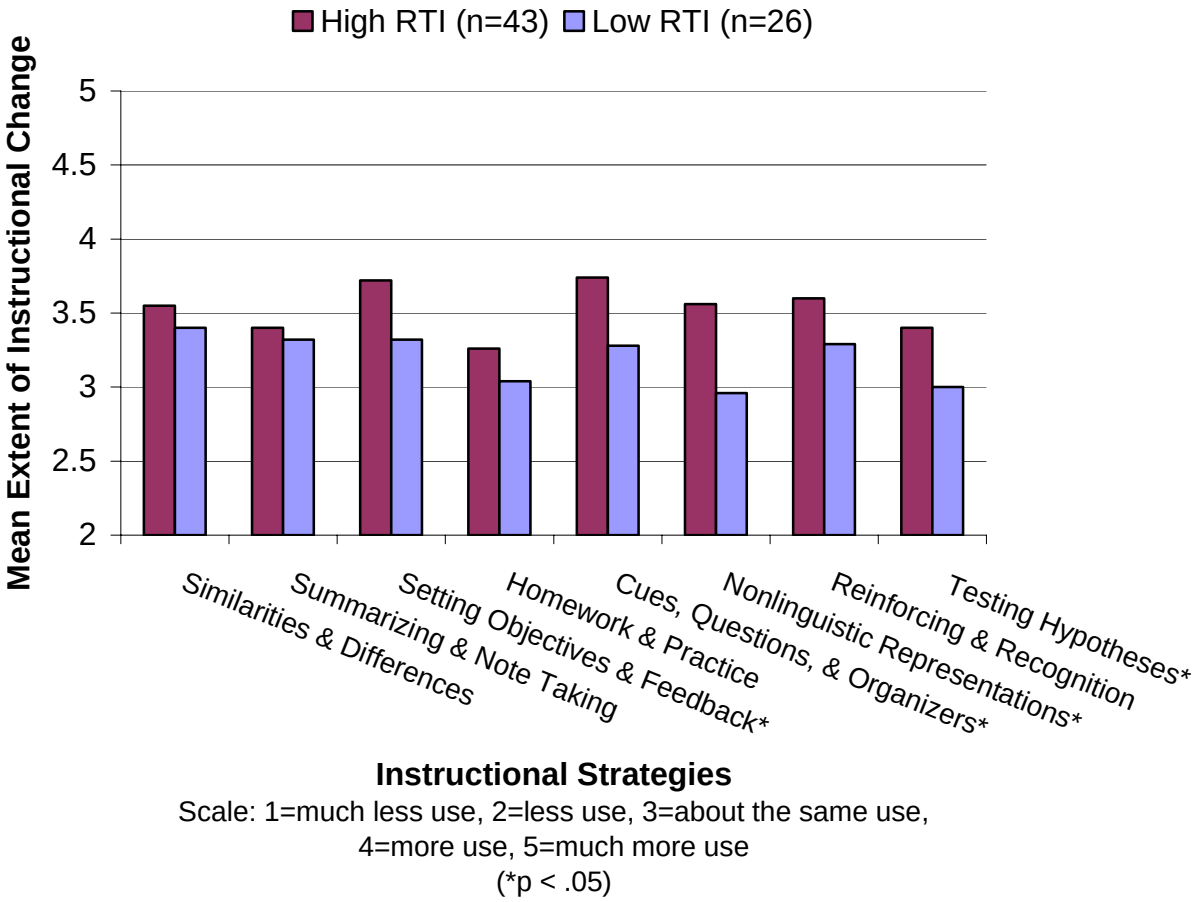

Figure 1. Treatment Teachers' Reported Use of Instructional Strategies Compared to Their Instruction Prior to the RTI

RTI teachers also were asked three questions related to the frequency with which they implemented RTI instructional and technology strategies. Table 14 shows the means and standard deviations for these questions. Based on *t*-tests, teachers in the high-participation RTI group reported significantly more frequent use of RTI instructional or technology strategies in lessons ("monthly") than teachers in the low-participation RTI group ("occasionally") ($p < .01$). High RTI teachers reported more frequent discussion related to the strategies, but the difference was not statistically significant (both "occasionally"), and the two groups reported the same frequency ("occasionally") of working with other teachers on using the strategies.

Another source of data concerning teachers' use of RTI strategies is a set of four questions on the administrator surveys given after the RTI ended in May 2005. Administrators were asked the approximate number of times they observed most of their teachers in their classroom since the beginning of the school year. The average number of observations was between two to three times, and the administrators in the two groups did not significantly differ. As indicated in Table 15, the RTI administrators perceived increased use of RTI instructional strategies in more than 50 percent of their teachers, while control administrators perceived increased use of different

instructional strategies in 26–50 percent of their teachers, a difference that was statistically significant ($p < .05$). RTI administrators also perceived that more of their teachers improved and more increased their use of technology compared to the perceptions of control administrators, but these differences were not statistically significant.

Table 14. Treatment Teachers' Reported Frequency of Implementing RTI Strategies

Treatment Teacher Post-intervention Survey	High RTI Participation n = 43		Low RTI Participation n = 26	
	Mean	SD	Mean	SD
Use RTI instructional or technology strategies in a lesson.	3.14	.92	2.50	.91
Work with other teachers (online or in person) to develop classroom materials or lesson plans that incorporate RTI instructional or technology strategies.	1.98	.86	1.92	.80
Discuss with other teachers (online or in person) a lesson or classroom materials that use RTI instructional or technology strategies.	2.51	.80	2.27	.87

Response set: 1 = never, 2 = occasionally (1-8 times year), 3 = monthly (1-3 times a month), 4 = weekly (1- 3 times a week), 5 = almost daily (more than 3 times a week)

Table 15. Treatment Administrators' Perceptions of Teaching

Administrator Survey Item In the past year, what percentage of teachers in your school would you say…?	Treatment Administrators n =10		Control Administrators n = 12	
	Mean	SD	Mean	SD
Improved their overall teaching quality	3.40	.70	2.92	.90
Increased their use of technology in their classrooms	3.10	.60	2.75	.87
Increased their use of RTI instructional strategies (treatment) Increased their use of different instructional strategies (control)	3.60	1.08	2.64	.81

Response set: 1 = none, 2 = 1%–25%, 3 = 26%–50%, 4 = 51%–75%, 5 = 76%–100%

Summary of Findings on Treatment Teachers' Instructional Practices.

Teachers who reported higher levels of participation in the RTI reported a greater increase in use of the instructional strategies in *Classroom Instruction That Works* (Marzano et al., 2001) compared to teachers who reported lower levels of participation in the RTI. The high-participation RTI teachers also indicated more frequent use of RTI instructional or technology strategies in lessons as compared to the low-participation RTI teachers. However, because the

questions about strategy use were asked on the post-survey only, caution is warranted in interpreting the results as indicating teacher change.

The administrators of RTI schools perceived increased use of RTI instructional strategies by over 50 percent of the RTI teachers. There was a trend in the data suggesting that RTI administrators perceived more improvement in teaching quality over the past school year as compared to administrators in control schools. This difference was not statistically significant ($p < .18$) possibly due to the small sample size of the administrators. However, the result does suggest that RTI administrators perceived positive changes in the instruction of many of their teachers.

How Effective Is the RTI at Increasing Teacher and Administrator Comfort with and Use of Technology?

The primary data source for this question is the pre-post teacher technology survey. This survey included scales designed to measure teachers' comfort with technology, their perceived technology skills, and their perceptions of the school's acceptance of technology. The reliabilities for these scales are shown in Table 16. The Chronbach's alphas ranged from .65 to .92, indicating their adequacy in measuring the targeted constructs

Table 16. Reliabilities of Scales on Teacher Pre-Post Technology Survey

Scale	Chronbach's alpha	
	Pre-survey	Post-survey
Teacher comfort with technology (11 items) Response: 1 = very comfortable, 5 = very uncomfortable	.91	.88
Teacher technology skill (10 items) Response: 1 = no skill at all, 5 = expert.	.92	.92
School technology acceptance (9 items) Response: 1 = strongly agree, 5 = strongly disagree	.65	.75

Invitations to complete the pre-post technology surveys were sent to 123 teachers in the treatment group and 136 teachers in the control group. There were 109 teachers in the treatment group and 127 teachers in the control group who completed the pre-technology survey, for response rates of 87 percent and 93 percent respectively. Seventy-nine treatment teachers and 112 control teachers completed the post-technology surveys, for response rates of 64 percent and 82 percent respectively. The technology pre-survey was conducted via paper and pencil, and the technology post-survey was conducted online, which created difficulties in matching teachers' pre-post surveys. As a result, surveys were matched for 26 RTI (treatment) teachers and 35 control teachers.[4] On the pre-survey, the 109 RTI teachers who responded had significantly higher perceptions of technology skill and school acceptance of technology than the 112 control teachers. Thus, the two groups were not equivalent in technology perceptions prior to the RTI. For this reason, the matched sample of 61 teachers who responded to the technology surveys was

[4] In contrast to the sample of teachers who responded to the pre-post intervention survey, respondents who were not classroom teachers were retained in the sample for the teacher technology survey because the latter targeted technology-related change more than impact on instruction.

analyzed despite its relatively small size. Difference scores were created to measure the amount of change in these teachers' means on the three scales in Table 15, and separate ANOVAs were conducted.

Among the matched sample of teachers, the level of comfort with technology was not significantly different between the RTI and control groups on either the pre-survey or post-survey. All teachers increased in technology comfort from pre to post ($p < .01$), but the amount of change was statistically similar for the two groups (see Table 17). The level of teachers' perceived skill with technology was significantly higher among the teachers in the treatment group than in the control group on both the pre-survey ($p < .01$) and post-survey ($p < .05$). The mean pre-post difference scores in technology skill were not significantly different between the RTI and control teachers, although there was a weak trend towards an increase for both groups. The perceptions of the treatment teachers with regard to their school's acceptance of technology were significantly higher than those of the control teachers on both the pre-survey ($p < .01$) and post-survey ($p < .05$), with no significant differences in the analysis of pre-post change.

Table 17. Teachers' Perceptions of Technology Comfort, Skill, and School Acceptance

Teacher Pre-post Technology Survey	RTI Treatment n = 26				Control n = 35			
	Pre-survey		Post- survey		Pre-survey		Post-survey	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Teacher comfort with technology Response set: 1 = strongly agree, 5 = strongly disagree	3.71	1.08	4.16	.82	3.26	1.08	4.04	.79
Teacher technology skill Response set: 1 = no skill at all, 5 = expert	3.39	.68	3.69	.58	3.10	.75	3.27	.65
Technology environment Response set: 1 = very comfortable, 5 = very uncomfortable	3.81	.53	3.86	.51	3.56	.45	3.50	.45

The sample of teachers who responded to the post-technology survey was examined to determine if differences in their level of participation in the RTI were related to their perceptions. Univariate ANOVAs revealed no significant differences among the high RTI, low RTI, and control groups for any of the three constructs. Differences among teachers' perceived technology skill on the post-technology survey approached significance ($p < .06$), with higher perceived technology skill by teachers with higher levels of participation ($M = 3.16$, 3.23, and 3.56 for control, low-participation RTI, and high-participation RTI teachers respectively).

The pre-post technology surveys administered to both RTI and control administrators provide a second source of data pertaining to the RTI's impact on perceptions related to technology. Response rates on the pre-post technology surveys for administrators in the RTI group were 13/14 (93%) and 12/14 (86%) respectively. For administrators in the control group, response rates were 14/17 (82%) and 13/17 (76%) respectively. The technology pre-survey was conducted via paper and pencil, and the technology post-survey was conducted online, which created

difficulties in matching administrators' pre-post surveys. Pre-surveys were matched to post-surveys for nine RTI and six control administrators. This matched pre-post administrator sample is used for analyses of questions that appeared on both the pre- and post technology surveys. Additional questions were asked on the post-survey only, and for these questions the entire post-survey administrator sample was used. Although significance testing is reported, due to the small sample sizes, administrator survey data will be discussed in terms of trends as well.

Administrators were asked on the pre-post technology surveys how supportive the community, district, and faculty were of using technology in the school. There were no significant differences between administrators on either the pre- or post-levels of support, nor were there any significant differences in the pre-post difference scores between the RTI and control group. This suggests that change in community, district, or faculty support during the RTI was not a factor in the study findings regarding technology integration. In all schools, administrators perceived support for technology integration. (See Appendix B, Table B2.)

Administrators were asked only on the post-survey what percentage of their teachers increased their use of technology in their classrooms over the past year. Answers were given in ranges (1 = none, 2 = 1–25% , 3 = 26–50%, 4 = 51–75%, 5 = 76–100%). There was a non-significant trend for RTI administrators to report a higher average percentage range (M = 3.10, SD = .74) than control administrators (M = 2.75, SD = .87).

The post-technology survey also asked both groups of administrators 12 questions related to technology environment and attitudes toward technology. The means and standard deviations for seven of the items are shown in Table 18. The remaining five items concern leadership and are discussed in the next section. Based on a MANOVA, the RTI administrators had significantly more agreement than the control administrators with statements concerning beliefs about computers stimulating creativity and teachers' knowledge about integrating technology in the classroom ($p < .05$). However, because there are no pre-survey data for these items, the group differences might have existed prior to the RTI intervention.

Summary of Technology Findings

Findings based on the matched pre-post teacher technology sample indicate that the RTI did not have statistically significant effects on increasing teachers' comfort with technology compared with the control sample. Teachers in both the RTI and control groups experienced significant increases in comfort with technology. There was a trend toward increases in technology skill over the course of the study, but this did not differ significantly between the treatment and control teachers.

Findings based on the sample of all the administrators who completed the post-technology survey suggest that RTI administrators perceived moderate positive effects on technology integration. There was a trend for RTI administrators to report a higher percentage of teachers using technology more in classrooms over the past year than control administrators. Given the small sample size of administrators involved in this study, it is possible that this difference would be statistically significant with a larger sample size. Further, RTI administrators were significantly more likely than control administrators to agree that their teachers know how to

integrate technology in their classroom to improve student achievement. However, the RTI teachers posted significantly higher perceptions of technology skill and school acceptance of technology on the pre-survey as compared to teachers in the control group, which could indicate pre-existing differences.

Table 18. Administrators' Mean Responses Concerning Technology Environment on the Post-Technology Survey

Administrator Post-Technology Survey	RTI Administrators n =12		Control Administrators n =13	
	Mean	SD	Mean	SD
The district encourages the use of technology in your school.	3.50	.52	3.46	.66
The community is supportive of using technology in our school.	3.17	.39	3.00	.58
Teachers in my school are in favor of using technology in their classrooms.	3.08	.29	2.92	.64
Teachers in my school know how technology can be integrated into their classrooms to improve student achievement.*	3.17	.39	2.62	.51
I believe that the use of computers in education reduces the personal interaction between teachers and students.	3.17	.58	2.85	.38
Technology has been helpful in meeting district and state standards.	3.00	.60	2.69	.48
Technology makes teaching more effective.	3.25	.62	3.08	.28
I feel that computers are useful as instructional aids.	3.33	.49	3.08	.13
I believe that computers can stimulate student creativity.*	3.58	.52	3.15	.38

Response set: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree
* $P < .05$

WHAT IS THE INFLUENCE OF THE RTI ON ADMINISTRATORS' LEADERSHIP PRACTICE?

The primary data for this question come from items on the teacher pre-post intervention survey that concerned school environment. As indicated in Tables 5 and 7, there were nine survey items that measured general aspects of school environment and seven that measured those aspects of school environment associated with principal support. The post-intervention teacher survey included an additional four items related to principal support that were not on the pre-intervention survey (see Table 19).

ANOVAs revealed no significant differences between teachers in the RTI and control groups on the school environment and principal support scales on either the pre- or post-intervention

survey. Nor were there any significant differences between these groups of teachers on the four additional post-survey items. ANOVAs also showed no significant differences on the two school environment scales among high RTI, low RTI, and control groups on either the pre- or post-intervention survey scales (see Table 19). Difference scores reflecting pre-post change were calculated for both scales. There was a slight increase in the mean perceptions of high-participation RTI teachers regarding school environment and principal support and a slight decrease in the perceptions of low-participation RTI teachers and control teachers; however, these changes were not statistically significant for the two groups.

Table 19. Teachers' Mean Perceptions of School Environment and Principal Support

Teacher Pre-post Intervention Survey	High RTI Participation		Low RTI Participation		No RTI Participation	
	Pre-survey	Post-survey	Pre-survey	Post-survey	Pre-survey	Post-survey
	Mean SD	Mean SD	Mean SD	Mean SD	Mean SD	Mean SD
School environment- general (9 items)	2.67 .55	2.72 .49	2.88 .51	2.88 .50	2.76 .44	2.71 .46
School environment- principal support (9 items)	2.90 .64	2.90 .70	3.16 .61	3.15 .54	2.92 .67	2.93 .69
I feel supported by my principal.*	-----	3.26 .82	--	3.46 .71	--	3.16 .98
The principal has made positive changes in his/her leadership in the past year.*	-----	2.72 .88	--	3.12 .77	--	2.93 .93
The principal is supportive of integrating technology in the classroom*	--	3.49 .59	--	3.52 .65	--	3.45 .65
The principal is supportive of teacher participation in (RTI) professional development*	--	3.63 .54	--	3.65 .49	--	3.54 .61

* Single item, post-survey only
Response set: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree

A second source of data concerning administrators' leadership practice was the administrator post-technology survey discussed in the previous section. The post-survey included five items that were not on the pre-survey and that addressed administrators' leadership practice with regard to technology (see Table 20.). The five survey items were clustered to form a technology leadership scale (Chronbach's alpha = .62). As Table 20 indicates, the RTI administrators reported a significantly higher mean for technology leadership than the control administrators, a difference that approached significance ($p < .07$). Based on a MANOVA, administrators participating in the RTI showed significantly more agreement than the control administrators with respect to knowing how to integrate technology for the improvement of student achievement ($p < .05$) and helping teachers acquire technology for classroom projects ($p < .01$). However, there are no pre-survey data for these items, so group differences might have existed prior to the RTI intervention.

Table 20. Administrators' Perceptions Concerning Technology Leadership

Administrator Technology Post-survey	RTI Administrators n =12		Control Administrators n =13	
	Mean	SD	Mean	SD
I encourage staff to use technology.	3.58	.52	3.46	.52
I know how technology can be integrated into the classroom to improve student achievement.*	3.42	.52	2.69	.86
Integration of technology into classrooms is a high priority for me.	3.33	.49	3.15	.37
I use incentives to encourage faculty to participate in technology professional development.	2.42	.51	2.38	.77
I help teachers acquire technology for their classroom projects.**	3.42	.52	2.92	.28
Technology Leadership Overall Mean	3.23	.34	2.98	.31

Response set: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree
* $P < .05$
** $P < .01$

Summary of Leadership Findings

Findings based on the matched teacher sample indicate that the RTI did not significantly influence teachers' perceptions of their principal's leadership or school environment relative to the control group's perceptions. Findings based on the sample of the administrators who completed the post-technology survey indicate higher levels of technology leadership for RTI administrators than control administrators, particularly for awareness of how to integrate technology and for assistance provided to teachers for technology integration.

WHAT ASPECTS OF THE RTI INTERVENTION DID PARTICIPANTS FIND EFFECTIVE AND WHAT IMPROVEMENTS SHOULD BE MADE?

The purpose of these questions is to examine participants' reactions to the RTI and to solicit recommendations. Several sources of quantitative and qualitative data were used to answer these questions, and findings are organized according to the data source.

Post-intervention Teacher Survey

RTI teachers were asked to indicate the extent of their agreement with seven survey items about their satisfaction with the RTI professional development intervention. The reliability for the overall scale was high (Chronbach's alpha = .91). The mean response of teachers was 2.73 on a 4-point scale, indicating their general satisfaction with the RTI. Teacher satisfaction was significantly greater for high-participation RTI teachers than low-participation RTI teachers ($p < .01$) with means of 2.91 and 2.42, respectively ($SD = .47$ and .75). As shown in Figure 2, the high-participation RTI group agreed significantly more than the low-participation RTI group that

the online class meetings were interesting, that the content was useful and that the discussion groups were interesting and informative.

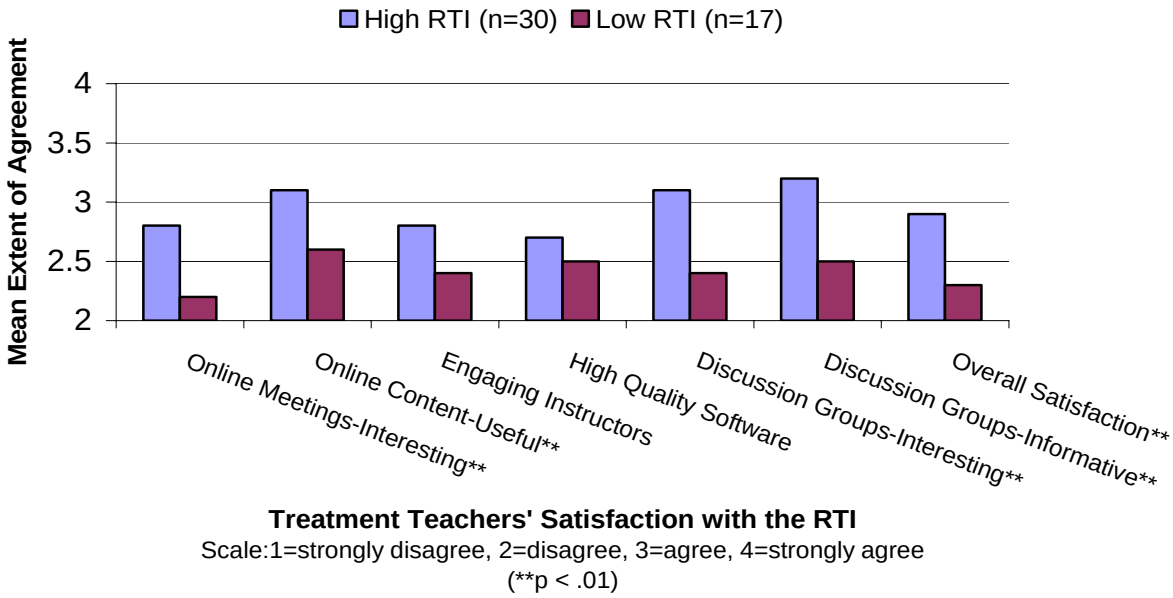

Figure 2. Treatment Teachers' Reported Satisfaction with the RTI

Teachers in the treatment group also were asked six questions about the extent to which the RTI had improved aspects of their teaching and their students' learning. The reliability for the scale formed from these items was .96 (Chronbach's alpha). The teachers had a mean response of 2.92 (*SD* = .81) or "some extent." On average, perceived impacts were significantly higher for the high-participation RTI group than for the low-participation RTI group ($p < .01$). As shown in Figure 3, the RTI teachers with a high level of participation gave the intervention significantly higher impact ratings for six aspects of teaching and student learning than the RTI teachers with a low level of participation.

Finally, teachers in the treatment group were asked how often technical difficulties significantly interfered with their school's ability to connect with, hear, or see the RTI general or follow-up teacher online class. Forty-one percent of the teachers reported that technical difficulties "rarely" interfered (0–2 meetings); 37 percent said that they "infrequently" interfered (3-8 meetings); 17 percent said they "frequently" interfered (9–14 meetings), and 4 percent said that technical difficulties "almost always" interfered (15–18 meetings). Eighteen of the 69 treatment teachers who responded to this question provided comments regarding these difficulties. Teachers indicated that they found these technical difficulties frustrating and not conducive to learning.

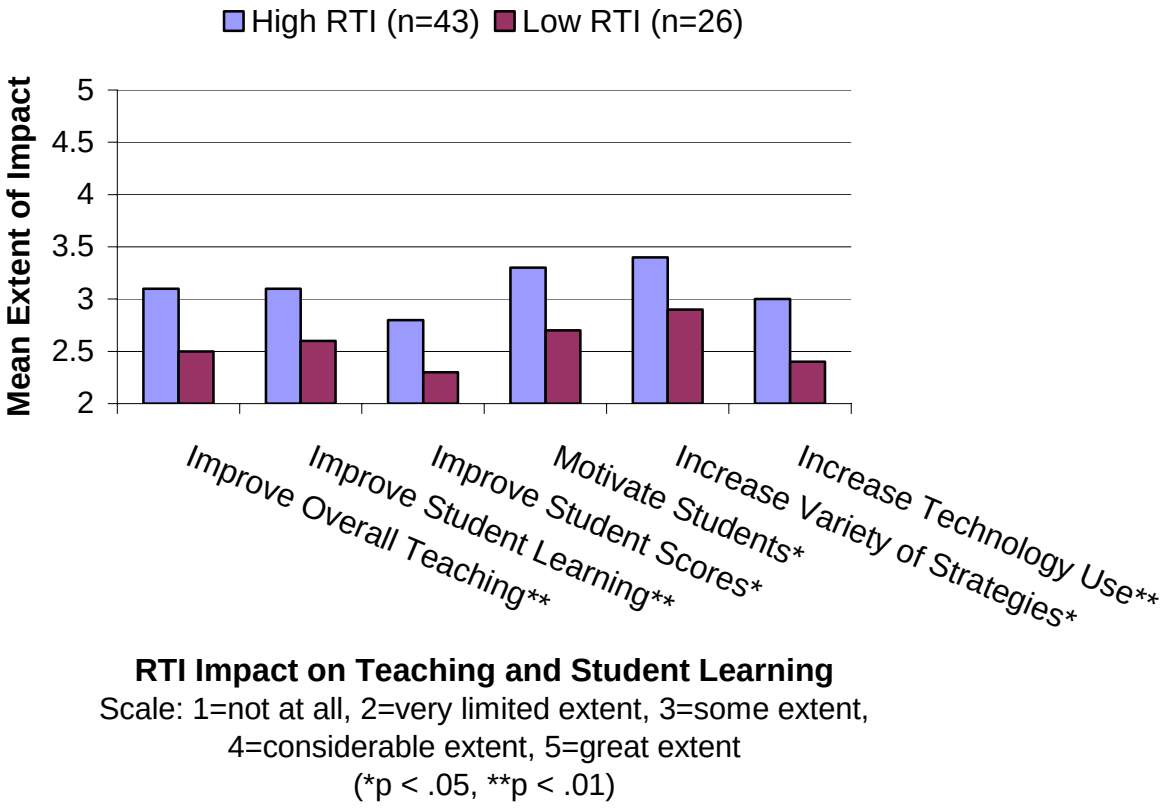

Figure 3. Treatment Teachers' Perceived Impact of the RTI on Teaching and Student Learning

Teacher Technology Survey

Additional quantitative teacher data on the perceived impact of the RTI on teaching and learning come from the teacher post-technology survey discussed previously. Teachers in the treatment group were asked the extent of their agreement with seven statements about the RTI's impact on teaching and technology integration (see Table 21). Mean responses for all statements fell between "neither agree nor disagree" and "agree." The high-participation RTI group had higher mean responses than the low-participation RTI group on five of the seven items. The differences were not statistically significant, possibly due to the smaller sample of teachers who completed the post-technology survey compared to the post-intervention survey[5]. The comparison between high and low participation approached significance for the statement "The McREL training has helped me think deeply about how I use technology in the classroom" ($p < .06$.).

[5] Using the participation measure from the post-intervention survey reduced the sample size for the post-technology because participation data were not available for all the teachers who took the post-technology survey.

Table 21. Treatment Teachers' Perceptions of RTI Teaching and Learning Benefits

Teacher Post-Technology Survey	High RTI Participation Post- survey n = 30		Low RTI Participation Post- survey n =17	
	Mean	SD	Mean	SD
The McREL training has helped me think deeply about how I use technology in the classroom.	3.70	.65	3.24	1.20
My classroom has benefited as a result of the McREL training.	3.73	.65	3.41	1.50
Teachers in my school share what they learn through the McREL training.	3.47	.86	3.25	1.07
The McREL training has helped to improve the quality of classroom instruction in my school.	3.70	.60	3.55	1.18
I receive adequate support from my school/district as I try to implement what I learn through the McREL training.	3.77	.82	3.76	1.09
As a result of the McREL training, teachers in my school are more proficient in the use of technology.	3.43	.94	3.47	1.18
As a result of the McREL training, students are using technology more in their learning.	3.50	.86	3.41	1.18

Response set: 1 strongly disagree, 2 =disagree, 3 = neither agree nor disagree, 4= agree, 5 = strongly agree

Administrator Satisfaction Survey

The 13 RTI administrators were sent e-mail invitations to complete a satisfaction survey at the end of the RTI intervention. The survey asked about their school and personal participation in RTI meetings and discussions, perceptions of the RTI and its usefulness, and perceived effects of the RTI. Ten of the 13 RTI administrators completed the satisfaction survey (response rate = 77%). Two of these respondents reported that their primary role in the school was technology coordinator, and the other eight reported that they were administrators.

All ten of the respondents reported that their schools attended nearly all (8–9) of the nine general online class meetings that had occurred by the time that the survey was administered. Their reported school attendance for the follow-up teacher meetings was almost as high — nine of the ten administrators reported that their school attended 8–9 meetings. The administrators also were asked to what extent they personally participated in the RTI professional development program. They responded with a mean answer of 4.0 on a 5-point scale indicating a "considerable extent." Four administrators reported that they personally attended "8–9" general teacher meetings, five attended "5–7" meetings, and one attended "2–4"meetings. Four administrators reported reading "8–9"of the nine threaded discussions, four read "2–4" discussions, and two read "0–1." *E-campus* records showed that half of the administrators never posted to (i.e., contributed to) an online discussion, while one-third posted only once. Only two administrators posted regularly (7–8 posts each). Three administrators reported that they attended all six administrator online meetings; six attended "4–5" meetings; and one attended "2–3" meetings.

Administrators were asked to rate the quality and usefulness of different RTI components on a 5-point scale. As shown in Table 22, administrators' quality and usefulness ratings on five of the seven components of the intervention were 4.00 or above, indicating administrators' overall satisfaction with the RTI.

Table 22. Treatment Administrators' Perceptions of the Quality and Usefulness of RTI Components

Administrator Satisfaction Survey	Quality n = 10		Usefulness n = 10	
	Mean	SD	Mean	SD
The materials and resources provided	4.40	.97	4.20	.92
The RTI technology (its operation and platform)	3.20	1.0	3.50	1.4
The teacher e-mail discussion boards	4.10	.74	4.00	.94
The general and follow-up teacher meetings	4.00	.82	3.80	.79
The content presented in the teacher meetings	4.50	.97	4.40	.70
The administrator sessions	4.40	.97	4.56	.53
The content presented in the administrator meetings	4.80	.42	4.80	.42

Response set: 1 = low, 5 = high

Regarding technical difficulties, RTI administrators reported that connectivity was rarely a problem. They also indicated that they were rarely affected by other technical difficulties. Midway through the intervention, it was necessary to change the video conferencing software from *WebEx* to *Marratech*. Seventy percent of the administrators reported that the *Marratech* system worked better than the *WebEx* system.

RTI administrators also were asked about the extent of the RTI's impact on their leadership. These questions did not have high reliability as a scale (Chronbach's alpha = .48), and so are reported individually. As shown in Table 23, administrators reported that the RTI had "some" to "considerable" impact on various aspects of their leadership. The highest mean ratings of impact were for overall leadership, focusing on school priorities, and clarifying priorities as a school leader. An additional four questions concerned the influence of specific elements of the RTI on leadership. As Table 24 indicates, mean responses again ranged from "some" extent to "considerable" extent, with the highest mean reported for influence on organizational vision and priorities.

Table 23. RTI Administrators' Perceptions of RTI Impact on Aspects of Leadership

Administrator Satisfaction Survey	RTI Administrators n = 10	
	Mean	SD
Make you feel more connected with other administrators in your position	2.63	.92
Allow you to give and get ideas for problems administrators in your position face	3.38	.74
Improve your relationship with the staff in your school	3.63	.52
Improve your ability to evaluate your staff	3.63	.52
Improve your focus on which priorities are the most important for your school now and in the near future	4.13	.84
Improve your overall leadership in your school	4.00	.00
Clarify your priorities as a school leader	4.00	.76
Observing the teachers RTI sessions has been useful to me as an administrator.	3.80	1.23
The RTI work has begun to clarify my role in setting the stage for technology integration.	3.80	1.14
The administrator RTI sessions have influenced my organizational vision.	4.10	.88
I have developed a sense of community and shared purpose with the other administrators participating in the RTI.	3.00	1.16

Response set: 1 = not at all, 2 = very limited extent 3 = some extent, 4 = considerable extent, 5 = great extent, or NA/ I don't do this in my position

Table 24. RTI Administrators' Perceptions of RTI Influence

Administrator Satisfaction Survey	RTI Administrators n = 10	
	Mean	SD
Observing the teachers' RTI sessions has been useful to me as an administrator	3.80	1.23
The RTI work has begun to clarify my role in setting the stage for technology integration.	3.80	1.14
The administrator RTI sessions have influenced my organizational vision.	4.10	.88
I have developed a sense of community and shared purpose with the other administrators participating in the RTI.	3.00	1.16

Response set: 1 = not at all, 2 = very limited extent 3 = some extent, 4 = considerable extent, 5 = great extent, or NA/ I don't do this in my position

RTI Administrator Interviews

In October 2004, the 12 administrators and two technology coordinators who were part of the RTI treatment group at that time were interviewed by telephone for the purpose of gathering formative information about the RTI. (One school later left the treatment group.) Data pertaining to intervention effectiveness and improvements are reported here. All 12 administrators were positive about the administrator online meetings and the content covered. Most reported enjoying the opportunity to talk with other administrators during these meetings. Eight of the administrators said that access to online professional development is "very important" because their schools are more than an hour away from the nearest college or university that could offer professional development. The remaining six administrators said that online delivery was "somewhat important" to them and referred to advantages in time and convenience.

Four administrators reported overhearing informal discussions among their staff about the RTI instructional strategies, and eight administrators reported seeing some increase in teachers' use of these strategies in the classroom. There was also a perception of increased technology comfort and use in the classroom among the six administrators in schools that did not already focus on technology. The other five said their teachers were comfortable with technology prior to the RTI, creating a ceiling effect in these schools. Nine administrators reported positive change in school climate since the RTI began.

Administrators viewed the threaded online teacher discussion as helpful to those teachers who were using it frequently, commenting that the discussion was the only way that their teachers interact with teachers in other schools. A suggestion was to replace the one large discussion with several different discussions depending on the teacher's grade level taught, and in the upper levels, the subject area. Another suggestion was to pair teachers for e-mail correspondence. Overall, administrators viewed the content of the RTI teacher professional development (*Classroom Instruction That Works,* Marzano et al, 2001) as valuable and would not change it. Eleven administrators said teacher participation in the RTI helped teachers who were not already "highly qualified" by NCLB standards to go in the right direction toward meeting these standards.

Although the majority of administrators reported that their teachers were engaged in the RTI professional development, some voiced concerns about individual teachers who were less engaged and passive in the project. Twelve of the administrators said that offering college credit for participation was very important and increased teacher motivation. Several administrators commented on the need to increase teacher accountability for participation, especially for those who were receiving college credit. Suggestions included assigning prior reading, having more within-school discussion during and after meetings, asking a group of teachers in each school to try the instructional strategies and briefly report on their experiences in the next meeting or in the threaded discussion. Teachers in specific schools also might be asked to share their experiences while other teachers could be asked to post lesson plans or assignments to the RTI website.

Focus Groups

After completion of the intervention, schools were invited to send an administrator and teacher to McREL's offices in Aurora, Colorado, to participate in a closing meeting. During this meeting,

separate focus groups of teachers and administrators were conducted to obtain feedback regarding the RTI, its influence on the staff at their schools, their concerns, and suggestions for improvement. Five teachers participated in the teacher focus group, four elementary and one secondary. The teachers represented five of the six treatment schools. Four administrators representing four of the treatment schools (also represented by the teachers) participated in the administrator focus group, including one technology coordinator. All four had attended RTI administrator meetings.

Teachers

Four of the five focus group teachers reported positive changes in their principals' leadership, which they attributed to the RTI. The teachers reported increased discussion among their school staff, with more discussion occurring among elementary than secondary teachers. Teachers reported that the RTI generally fostered more connection among teachers within the schools than between the schools. The five teachers said that those who participated increased their use of the RTI instructional strategies, especially the elementary teachers. One teacher observed that although the RTI increased technology use among participating teachers, it did not overcome the resistance of those who were uncomfortable with it.

Teachers liked the content of the RTI, and two reported that their schools plan to continue to use the RTI materials for professional development. These teachers liked the online discussion and felt it helped connect them to other teachers and to exchange ideas. They agreed that the discussion would be improved if teachers were grouped into elementary and secondary levels, with the latter further grouped by subject area. All five teachers said that for ease of scheduling, they would prefer to have one longer meeting each month instead of two. One teacher reported that secondary teachers had conflicts with the meetings due to after-school obligations, such as coaching. Teachers also mentioned that meetings should not be scheduled in May because they are too busy then to attend the classes. Some teachers observed that communication would be improved if e-mails regarding the classes were sent ahead of time and to more than one person at each school. They also suggested that class materials and PowerPoint presentations be available at least one week prior to each class. Some schools experienced technology problems at various times, and the teachers found this frustrating. They pointed out that it takes significant time to set up electronic connections and implement changes in small schools, where technology staff may be overburdened or non-existent.

Administrators

The four administrators agreed that the RTI provided them with new ideas about leadership. There was consensus that the RTI increased teacher discussion and improved instruction for the teachers who attended meetings and were attentive, but the administrators reported wide variation in their teachers' level of engagement in the RTI. They expressed overall satisfaction with the content of the RTI, which in their view reinforced good instruction. They perceived the online delivery mechanism as valuable to rural schools. There was mixed experience with the technology connections, and they recommended a pilot test of the technology infrastructure prior to the first class meeting.

The administrators made suggestions for improving teacher engagement, which was an important issue for them. One suggestion was to increase teacher buy-in with an initial face-to-face or online presentation to teachers about the RTI — letting teachers know what they will learn and how it can help them. Similar to the teachers' focus group comments, there was a consensus that scheduling the meetings before or after the normal school day made it difficult for teachers to attend meetings. The administrators recommended one longer meeting each month, ideally on teacher in-service days. They commented that compensating teachers in some way might improve their attendance. The technology coordinator observed that the teachers appeared more engaged at the meetings that the principal attended than at those where there was not an administrator present. It was suggested that the principal be required to attend all teacher meetings and to take attendance. They also suggested that each school have a follow-up staff meeting shortly after each RTI teacher meeting to discuss what the teachers had learned.

Summary of Perceived Intervention Effectiveness and Suggested Improvements

There is evidence that, overall, administrators and teachers, particularly the high participation teachers, were satisfied with the RTI and its components. Analyses of survey data indicated teachers' agreement with positive statements about the RTI, and high-participation RTI teachers agreed significantly more with these statements compared to low-participation RTI teachers. Administrators gave high ratings to the quality and usefulness of different RTI components with a mean of four on most items on a five-point scale (where five indicates "high" quality or usefulness). The only exception was the technology platform, which they rated as "neutral." The teacher and administrator post-intervention focus groups and the mid-intervention administrator formative interviews suggest that participants valued the content of the RTI class meetings, and that teachers who participated learned from the meetings and the online discussions. The opportunity for online professional development was viewed as valuable to rural schools.

The data revealed some logistical issues that made RTI participation difficult for some. Suggestions were made regarding meeting preparation, scheduling, and technology testing that might improve the quality of the RTI delivery. Survey, focus group, and interview data suggest that technical difficulties occasionally interfered with participants' ability to hear, see, or attend online class meetings, and that participants found this frustrating.

Teachers perceived the RTI as having a slight positive influence on their instructional practices. Mean responses for statements about the RTI's positive impact on teaching, technology integration, reflective dialogue, school support, and student use of technology were between "neutral" and "agree." The treatment teachers reported that the RTI increased or improved six aspects of their teaching and their students' learning, and the teachers with a high level of participation reported significantly more improvement than the teachers with a low level of participation. Data from the teacher focus group were consistent with these results. Administrator interview and survey data also support the conclusion that the RTI influenced instruction but suggest that teacher participation in RTI activities was an important mediating factor. Although RTI teachers reported on the post-intervention teacher survey that they participated between "some extent" and a "considerable extent," discussion board records of participation, survey data, focus group data, and administrator interviews suggest that there was extensive variability in teacher participation and engagement in the RTI program. Administrators were particularly concerned about those teachers who were not engaged in the RTI. Given that the level of teacher

participation (high vs. low) mediated teachers' perceptions about the RTI and its effects, efforts to improve teacher engagement might increase the overall effectiveness of the RTI at participating schools.

On the satisfaction survey, RTI administrators reported that the RTI had positive influences on their leadership behaviors, particularly in the areas of focusing on school priorities, clarifying priorities as a school leader, and forming an organizational vision. Data from the administrator interview and the teacher focus group confirmed that the RTI positively influenced leadership.

OTHER RESULTS

In addition to the findings for each of the six research questions, there are other results that inform the interpretation of these findings. Analyses were conducted on the amount of different types of professional development that the treatment and control teachers experienced the year prior to and during the RTI intervention. These data were collected using the teacher pre-post intervention survey.

Teachers in the treatment and control groups did not statistically differ on the pre-survey in the amount of professional development they experienced the year prior to the start of the intervention. This included professional development required by the district, professional development at the school, and non-required professional development such as conferences. Importantly, the two groups did not differ on the pre-survey in participation in online professional development ("less than 8 hours to none"). On the post-survey, the control teachers were asked about their professional development for the year during which the RTI was implemented. The teachers in the treatment group were asked about their professional development *other* than the RTI. The teachers in the control group reported participating in significantly more district-required professional development than the teachers in the treatment group while the RTI was being implemented ($p < .05$), although the absolute amount was still small for both groups. (The means were 2.70 and 2.95 for treatment and control teachers respectively, on a response set of 2 = "8 hours or less" and 3 = "9–16 hours"). The two groups of teachers again did not differ in amount of non-RTI online professional development.

These data on teachers' participation in professional development other than the RTI are important for interpreting the findings of this study. The data indicate that the treatment and control teachers experienced similar amounts of professional development prior to the RTI intervention. They also demonstrate that treatment teachers' non-RTI professional development was not significantly more than the control group's. However, the control group did participate in slightly more district-required professional development than the treatment group, which theoretically could attenuate RTI effects.

Another set of data analyses addressed possible influences of teacher demographic variables on study findings. As previously described, treatment teachers reported significantly more years of teaching experience and more years teaching at their current school than control teachers. To determine whether experience was related to study outcomes, Pearson correlations were computed for each of the two experience variables with each variable measured on the teacher pre-intervention survey (see Table 5). None of the correlations was statistically significant, indicating that teacher experience was unrelated to study outcomes, so additional sub-group

analyses (similar to those performed for levels of teacher participation in the RTI) were not conducted.

There was some suggestion in the focus group data that teachers' engagement in the RTI varied depending on whether teachers worked at the elementary or secondary level. To address this possibility, a Chi Square was calculated to determine whether elementary teachers were more likely than secondary teachers to be in the high RTI participation group. The result from this analysis was not statistically significant, indicating that teacher grade level did not influence reported participation in the RTI. In addition, Pearson correlations between grade level and each variable measured on the teacher pre-intervention survey (see Table 5) were not statistically significant.

SUMMARY AND CONCLUSIONS

This section summarizes and interprets the primary findings of McREL's RTI study, presents conclusions about the effectiveness of the RTI, and provides recommendations for improvements in the intervention.

SUMMARY OF FINDINGS

First, the RTI was implemented with fidelity. Meetings occurred as planned with few technological difficulties. However, the difficulties that did occur were frustrating for the participants, especially for those in schools that did not have dedicated technology support. Second, teacher participation in the RTI activities varied greatly, and the degree of teacher participation mediated many of the results. Third, although teachers responded at moderately high rates to the individual pre-surveys and post-surveys, many teachers did not complete both surveys. As a result, the statistical analyses that depended on pre-post matches had small sample sizes. The necessity to conduct sub-group analyses based on teachers' levels of participation further reduced sample sizes. Several findings reported in the results section approached statistical significance and may have reached significance with a larger sample size.

Overall, the findings were mixed for the six research questions. Based on pre-post measures of professional community, the RTI did not change the aspect of professional community related to shared norms and values reflected in statements such as, "Teachers share beliefs and values about what the central mission of this school should be." However, the RTI did influence the extent of teachers' collaborative activities. The RTI increased the reported frequency of both online and non-online teacher collaboration. The online collaboration obviously occurred through the RTI, but the frequency of non-online collaboration such as peer feedback also increased more for the RTI teachers than the control teachers, and the increase was greater for teachers who had a higher level of participation in the RTI. The RTI administrators who were interviewed and the RTI teachers in the focus group confirmed the increase in collaborative discussion within the schools. The content analysis of the threaded discussions provided evidence of online professional community among teachers from the different schools, particularly in their reflective dialogue on instruction.

The RTI did not significantly influence the variables related to teacher retention in this study, which included teacher efficacy, job satisfaction, and intention to stay in teaching. Interventions

that attempt to change teachers' attitudes toward teaching generally produce relatively small effect sizes that require large sample sizes to detect (Lipsey & Wilson, 1993). Another problem was the possible disengagement of the low RTI teachers, who had the lowest mean response regarding intent to return to the current teaching assignment.

The analysis of factors that influence teachers' decisions about whether to continue teaching produced some interesting findings. Treatment and control teachers did not differ in their perspectives that the students, the rural lifestyle, and the location close to family are strong influences on the continuation of their teaching careers. However, the high RTI group perceived professional development and the influence of other teachers in the school as less important factors influencing their decisions to continue teaching after the RTI intervention, while the opposite occurred for the low RTI and control groups. This finding provides indirect evidence about RTI impact.

Participation in the RTI did influence teachers' reported use of the instructional strategies that comprise the content of the online teacher classes. The high group indicated significantly more frequent use of these strategies than the low RTI group. The administrators of RTI schools perceived increased use of RTI instructional strategies by over 50 percent of the teachers. There was a non-significant trend suggesting that RTI administrators perceived more improvement in teaching quality over the past school year compared to administrators in control schools.

The findings related to technology were complicated by pre-existing differences in the sample of teachers who responded to the pre-post technology survey. The RTI teachers were significantly higher in perceptions of technology skill and school acceptance of technology constructs related to technology use in the school than the control teachers. This finding necessitated the use of the small matched sample of teachers completed both the pre-and the post-technology surveys. Findings based on this sample indicated that the RTI did not have statistically significant effects on increasing treatment teachers' comfort with technology compared with the control sample: both groups experienced significant but similar increases. This finding may be related to the sample selection. The control schools were as interested in participating in the RTI as the treatment schools, which suggests that the control schools would continue in their use of technology and attempts to integrate technology with or without the RTI.

Some indication of RTI influence on teachers' use of technology was found in the post-technology survey completed by the administrators. The RTI administrators perceived moderate positive effects of the RTI on technology integration. In interviews, about half of the administrators perceived increased technology comfort and use in the classroom, but the others said their teachers were already comfortable with technology prior to the RTI. This suggests that there may have been a ceiling effect with regard to technology in some of the schools in the study.

Regarding the influence of the RTI on leadership, the data indicated some differences between the perceptions of teachers and administrators. The RTI did not significantly change treatment teachers' perceptions of their principals' leadership relative to perceptions of control teachers. However, on the post-technology survey, the RTI administrators had higher mean perceptions related to their technology leadership compared to control administrators, particularly in their reported awareness of how to help teachers integrate technology. However, there are no pre-

survey data on technology leadership, so these group differences might have existed prior to the RTI intervention.

The question concerning perceptions of intervention effectiveness and suggestions for improvement is primarily an evaluation question. While the data are only from RTI participants, the comparison of perceptions of teachers with high versus low levels of participation provides a way to assess intervention effectiveness. In addition, the combination of quantitative and qualitative data lends strength to the findings.

The RTI teachers who participated more in the intervention reported greater impact from the RTI on teaching and student learning than the teachers who participated less, although the level of impact was moderate. Similarly those teachers who participated more expressed more satisfaction with the various components of the RTI. Administrators also indicated their satisfaction with the RTI and rated the various components of the intervention as high in utility and usefulness. RTI administrators perceived positive influences of the RTI on their leadership, particularly in the areas of focusing on school priorities, clarifying priorities as a school leader, and forming an organizational vision. Data from the administrator interviews and the teacher focus group also suggest a positive RTI influence on leadership, although teacher survey results did not support this observation.

Administrators were concerned about those teachers who were not engaged in the RTI. They observed that those who participated learned from the meetings and the online discussions and that the RTI influenced instruction. The statistical analyses comparing teachers who had high versus low levels of participation confirm the administrators' observations. Both administrators and teachers made suggestions on how to improve the RTI intervention.

CONCLUSIONS

Together the various sources of data and the analyses of these data lead to several conclusions. The major findings are:

- The RTI had a positive influence on teacher collaboration and the development of professional community.
- The RTI did not influence teachers' perceptions of their efficacy for teaching, job satisfaction, or school environment.
- Teachers who participated more in the RTI benefited more in terms of instructional improvements.
- There was limited evidence that the RTI increased technology use, mainly because several of the schools that participated were already technologically proficient.
- Teachers did not perceive changes in their principals' leadership, but administrators perceived positive influences of the RTI on their leadership practices.

- Teachers and administrators were satisfied with the content and delivery of the RTI professional development and suggested recommendations for improvement.

RECOMMENDATIONS

Recommendations for improvement of the RTI in are in the areas of scheduling, participant information, discussion boards, and logistics.

With regard to scheduling:

- Change the two monthly RTI teacher class meetings to one longer monthly meeting.
- Attempt to schedule the monthly teacher meeting during the school day. If this is not possible, consider offering teachers compensation of some type.
- Do not schedule class meetings in May because teachers are too busy then to attend.

With regard to participant information:

- Provide each teacher with the book on which the content is based.
- Provide teachers with incentives to participate, such as college credit.
- Give teachers more information about the RTI at the beginning of the program to increase their buy-in.
- Make all requirements for participation clear to teachers at the start of the program.
- Provide administrators with guidance on how to motivate their teachers and monitor their participation.
- Clarify administrators' responsibilities.
- Require an administrator to attend every teacher meeting.
- Suggest that each RTI meeting be followed shortly afterward by a staff meeting.

With regard to discussion boards:

- Communicate the requirements regarding suggested levels of discussion board participation to administrators and teachers at the start of the program.
- Divide the threaded discussions into elementary and secondary teachers; consider further dividing the secondary level by subject area.

With regard to logistics:

- E-mail the contact person several days before the meetings.
- E-mail more than one contact person in case the main contact person is unavailable.
- Send the PowerPoint presentations to schools several days before the class meetings.
- Increase testing time for the initial technology setup and for technology changes.

REFERENCES

Brabec, K., Fisher, K., & Pitler, H. (2004). Building better instruction: How technology supports nine research-proven instructional strategies. *Learning & Leading with Technology*, *31*(5), 6–11.

Bredeson, P. V., & Johansson, O. (2000). The school principal's role in teacher professional development. *Journal of In-Service Education, 26*(2), 385–401.

Bryk, A., Camburn, E., & Louis, K. (1999). Professional community in Chicago elementary schools: Facilitating factors and organizational consequences. *Educational Administration Quarterly, 35*, 751–181.

Buckingham, M. and Coffman, C. (1999). *First, Break all the Rules*. New York, NY: Simon & Schuster.

Chambers, L. (2000, March). Rural schools balance strengths and challenges. *Changing Schools.* Aurora, CO: Mid-Continent Research for Education and Learning. Available at http://www.mcrel.org/topics/changingSchool.asp

Charlotte Advocates for Education. (2004, February). *Role of principal leadership in increasing teacher retention: Creating a supportive environment.* Retrieved March 2, 2004, from http://www.advocatesfored.org/publications/Principal%20Final%20Report.pdf.

Coley, R., Cradler, J., & Engel, P. (1997). *Computers and classrooms: The status of technology in U.S. schools*. Retrieved August 23, 2005, from ftp://ftp.ets.org/pub/res/compclss.pdf

Collins, J. (2001). *Good to Great*. New York, NY: HarperCollins.

Collins, T. (1999, December). Attracting and retaining teachers in rural areas. *ERIC Digest* Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools. (ERIC Document Reproduction Service No. 438152)

Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. S., & Biramn, B. F. (2002). Effects of professional development on teachers' instruction: Results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis, 24*(2), 81-112.

Davis, M. S. (2002). *An investigation of factors related to teacher retention in small rural school districts in Montana.* Dissertation, Montana University.

Dilworth, M. E. (1991). *Motivation, rewards, and incentives* (Trends and Issues Paper No. 3). Washington, DC: ERIC Clearinghouse on Teacher Education.

Entwisle, N. & Waterson, S. (1998). Approaches to studying and levels of processing in university students. *British Journal of Educational Psychology, 58*, 258–265.

Fusco, J., Gehlbach, H., & Schlager, M. (2000). *Assessing the impact of a large-scale-online teacher professional development community.* Proceedings of the 11th International Conference for the Society for Information Technology and Teacher Education.

Harmon, H. L. (2001, March). *Attracting and retaining teachers in rural areas.* Paper presented at the American Association of Colleges for Teacher Education, Dallas, TX.

Hawkes, M., & Good, K. (2000). Evaluating professional development outcomes of a telecollaborative technology curriculum. *Rural Educator, 21*(3), 5–11.

Heath, J. A., & Yost, R. (2001). Expanding teacher mentorship programs through electronic learning communities. *Journal of School Improvement, 2*(1). Retrieved January 29, 2004, from http://www.ncacasi.org/jsi/2001v2i1/expand_teacher.

Henri, F. (1992). Computer conferencing and content analysis. In A. Kaye (ed.), *Collaborative learning through computer conferencing* (pp. 117–136.) Berlin: Springer-Verlag.

Hillkirk, K., Chang, B., Oettinger, L.A., Saban, A., & Villet, C. (1997). *Strengths and challenges of a rural professional development collaborative.* Athens: Ohio University.

Hirsch, E. (2004). *Listening to the experts: A report on the 2004 South Carolina teacher working conditions survey.* Chapel Hill, NC: The Southeast Center for Teaching Quality. Retrieved May 29, 2005, from http://www.teachingquality.org/resources/pdfs/TWC_SCFinalReport.pdf

Ingersoll, R. M. (2001). *A different approach to solving the teacher shortage problem.* Seattle, WA: Center for the Study of Teaching and Policy.

Jimerson, L. (2003). *The competitive disadvantage: Teacher compensation in rural America*. Washington, DC: Rural School and Community Trust.

Joyce, B., & Showers, B. (1995). *Student achievement through staff development: Fundamentals of school renewal.* White Plains, NY: Longman.

Lee, V., & Smith, J. B. (1996). Collective responsibility for learning and its effects on gains in achievement for early secondary school students. *Journal of Education, 104*, 103–147.

Lipsey, M. W., & Wilson, D. B. (1993). The efficacy of psychological, educational, and behavioral treatment. *American Psychologist, 48*(2), 1181–1209.

Louis, K. S., & Marks, H. M. (1998). Does professional community affect the classroom? Teachers' work and student experiences in restructuring schools. *American Journal of Education, 106*, 532–575.

Louis, K. S., Marks, H. M., & Kruse, S. (1996). Teachers' professional community in restructuring schools. *American Educational Research Journal, 33*(4), 757–798.

Louis, K., Kruse, S., & Marks, H. (1996). Schoolwide professional community. In Newmann and Associates (Eds.), *Authentic achievement: Restructuring schools for intellectual quality* (pp. 179–203). San Francisco: Jossey Bass.

Ludlow, B. L. (2002). Web-based staff development for early intervention personnel. *Infants and Young Children, 14*(3), 54–64.

Marzano, R. J. (1998). *A theory-based meta-analysis of research on instruction.* Aurora, CO: Mid-continent Research for Education and Learning.

Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement.* Alexandria, VA: Association for Supervision and Curriculum Development.

Mather, M. (2000). In-service to go. *Technology & Learning, 20*(6) 18–28.

McClure, C. T., Redfield, D., & Hammer, P. C. (2003, December). *Recruiting and retaining high-quality teachers in rural areas* [policy brief]. Charleston, WV: Appalachia Education Laboratory.

McCreight, C. (2000). *Teacher attrition, shortage, and strategies for teacher retention.* College Station: Texas A & M University.

Mize, C. D., & Gibbons, A. (2000). *More than inventory: Effective integration of instructional technology to support student learning in K–12 schools.* Paper presented at the Society for Information Technology and Teacher Education

Moir, E., & Gless, J. (2001). Quality induction: An investment in teachers. *Teacher Education Quarterly, 28,* 109–114.

National Center for Education Statistics. (2001). *Public school teacher questionnaire: Schools and staffing survey, 1999–2000 school year.* Washington, DC: National Center for Education Statistics, U.S. Department of Education.

National Center for Education Statistics. (1999, January). *Teacher quality: A report on the preparation and qualifications of public school teachers.* Washington, DC: National Center for Education Statistics, U.S. Department of Education.

National Commission on Teaching and America's Future. (1996). *What matters most: Teaching for America's future.* Washington, DC: Author.

National Commission on Teaching and America's Future. (2003). *No dream denied: A pledge to America's children.* Washington, DC: Author.

Newmann, F. M., & Wehlage, G. G. (1995). *Successful school restructuring.* Madison: Center on Organization and Restructuring of Schools, University of Wisconsin-Madison.

Pitler, H., Enriquez-Olmos, M., & Manley, M. (2003). *McREL Technology Initiative interim progress report* (REL Deliverable #2003-18). Aurora, CO: Mid-continent Research for Education and Learning.

Schlager, M. (2003, July). *Designing equity and diversity into online strategies to support new teachers.* Paper presented at the NECC Conference, Seattle, WA.

Secada, W. G., & Adajian, L. B. (1997). Mathematics teachers' change in the context of their professional communities. In E. Fennema & B. S. Nelson (Eds.), *Mathematics teachers in transition* (pp. 193–219). Mahwah, NJ: Lawrence Erlbaum.

Southern Regional Education Board. (2004). *Reduce your losses: Help new teachers become veteran teachers.* Atlanta: Author. Retrieved March 1, 2004, from http://www.sreb.org

Schwartzbeck, T. D., Redfield, D., Morris, H., & Hammer, P. C. (2003). *How are rural school districts meeting the teacher quality requirement of No Child Left Behind?* Charleston, WV: Appalachia Educational Laboratory.

Thomas, W. R. (2004). *Online professional development: Why SREB states should use it.* Atlanta, GA: Southern Regional Education Board. Retrieved August 22, 2005, from http://www.sreb.org/programs/EdTech/pubs/PDF/04T05-OnlineProfDev.pdf

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68,* 202–248.

Van Buhler, R. J. & Lauer, P.A. (2005, April). *Beating the odds: The influence of teacher professional development and conditions that support it*. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

Waters, J. T., Marzano, R. J., & McNulty, B. A. (2003). *Balanced leadership: What 30 years of research tells us about the effect of leadership on student achievement*. Aurora, CO: Mid-continent Research for Education and Learning.

Yap, K. O. (1997, March). *Creating connections: The internet and teacher isolation*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.