

Project CRISSsm: A History of Reliable, Replicable Research

By Dr. Carol M. Santa, original developer of Project CRISSsm

Over these last few years, we have become more and more aware of the demand from school districts across the country for instructional practices that make a difference; for practices based on reliable, replicable research. What's more, federal and state mandates require the examination of student performance as part of educational practice.

Fortunately, Project CRISSsm has always been data driven. We have repeatedly asked and researched these questions: Do students in CRISSsm classrooms improve their reading, learning, and retention of content significantly more than students in non-CRISSsm classrooms? Do CRISSsm students have a better understanding of their own learning processes than non-CRISSsm students? Over multiple replications in various classrooms across the country, we found the same answer: CRISSsm does make a significant difference in student performance. We also have some evidence that CRISSsm students perform better on state assessments.

Initial Project Development

Collecting data began immediately. In fact, it started 23 years ago, when I was hired as the facilitator of a high school reading program which later became Project CRISSsm. Steve Nelson, an evaluation expert from Northwest Regional Educational Laboratory in Portland, Oregon, and I spent that first week huddled around a table developing a process for program development and evaluation. During my first two years on the job, Steve continued to help with the development and evaluation procedures.

By the third year, the project had progressed to the point where the Kalispell high school teachers involved in the project development began to conduct in-service training for outlying districts. Our informal teacher research studies indicated our students were doing better in their classes as a function of our teaching, but we needed more objective measures. Could our ideas be exported to other districts and have similar effects to those in our high school? Steve helped us think through a research design which included specifying experimental and control groups and measuring project effectiveness outside the Kalispell School District. We conducted a workshop for teachers in Columbia Falls High School, which we had designated as the experimental school, and we identified Whitefish High School as the control school with the promise of a CRISSsm workshop the following year at the completion of the study.

We did an assortment of evaluations from classroom tests to pre- and post-assessments which involved multiple choice and essay examinations. In most situations, the experimental students did better than the controls. However, the effects were always stronger with essay-type examinations following a delay between reading and studying the materials and the test. If students took a multiple choice test immediately after reading a selection, the differences between experimental and control students were at best marginal. It started to make sense to us that recall rather than immediate recognition measures would be a more sensitive measure of

project effects. When you read an article and then immediately take a multiple choice test, the only mental requirement is to hold information in memory long enough to answer the questions. You don't have to do much else with it. But, the memory demands are different for recall tests where one writes down or retells what they remember from a selection. In order to do this successfully, one needs to structure or transform information by creating internal representations. The effects were even stronger with a delayed recall measure. When students read a selection and then waited 24 hours to take the recall test, the differences between the experimental and control students became more pronounced. This, too, made sense given that CRISSsm strategies assist with organizing information for long-term retention.

These initial studies not only showed the project could produce results outside of Kalispell schools, but provided us with a laboratory for exploring measures sensitive to CRISSsm instruction. We had figured out a research design that started to make sense for evaluating project effectiveness. The results were also good enough for Project CRISSsm to be designated as a state validated program so we could accept state funds to conduct workshops for schools throughout Montana.

National Validation

By the fifth year of the project, we felt confident enough in the project's effectiveness and reliability to begin the process of National Validation. We hired another third party evaluator Stu Horsfall from Sopris West in Longmont, Colorado, to insure our research design was unbiased and appropriate for our research questions. With his guidance, we conducted a major research study which I will describe in more detail momentarily. Stu Horsfall developed the final report for the Joint Dissemination and Review Panel (JDRP) in Washington, D.C. (Horsfall and Santa, 1985). In March of 1985, Stu and I went before the research panel to answer any questions about the program, its research design, and the results. The panel unanimously gave their stamp of approval, and we became a part of the National Diffusion Network validated for high schools. For the next 8 years, we received federal funds to disseminate the project throughout the country.

During these years, elementary and middle school teachers kept pressuring us to include them in our CRISSsm workshops. They told us Project CRISSsm was just as important for elementary and middle school students as it was for high school students. Even though we welcomed their participation, we could not officially count elementary and middle school teachers as participants for grant funding because our validation was only for grades 10-12. The solution was to expand our levels of validation.

In 1993-94, we replicated our original study. This time we included students from fourth, sixth, eighth, and eleventh grades. The study encompassed experimental and control classrooms from Kalispell, Montana; Putnam County, Florida; and Stafford, Virginia. With these positive data in hand, which included eight different experimental and control comparisons, we went before the Program Effectiveness Panel (previously JDRP) again (Horsfall and Santa, 1994) and

were unanimously approved as a validated National Diffusion Network Project for elementary, middle, and high school students. (Copies of this report are available from the Project CRISSsm National Office.)

Since these validation studies, we have conducted three other major studies in different locations using the same research design as in the 1985 and 1993 validation studies. In every situation the results supported the project. In 1995 (Santa, 1995), we found the same results in two high schools (one experimental and the other control) in Spokane, Washington, and in a middle school in Aurora, Colorado, (two experimental and two control classrooms). In 2001-2003, we replicated the effects again in several districts in Utah (Santa and O'Neil, 2004) with fourth grade, seventh grade, and high school students (8 comparison studies) and most recently with experimental and control students in two Las Vegas high schools (Santa and Vick, 2004). (Click here for a technical report of the Utah study.) Again, the results are remarkably consistent. Students in the experimental groups—regardless of location, grade level, or subject—demonstrate significantly more improvement in learning than do control students. The data are reliable and replicable over a span of twenty years in more than 21 different comparison groups.

Research Design and Procedures

Given these data, one can safely conclude the research design and procedure turn out to be sensitive to the effects of the project. Each study followed the same pre- and post-test experimental design where we evaluated students' learning from text in the fall before their teachers had attended a CRISSsm workshop and again in the spring. In each replication, the experimental teachers attended a CRISSsm in-service in the fall and incorporated CRISSsm into their teaching for the remainder of the school year. Teachers of control classrooms did not attend a CRISSsm in-service.

Both experimental and control students took the CRISSsm assessment test at the beginning of the school year (September) and again in May of the same school year. The test involved two consecutive days (1 class period each day) in the fall and two more testing days in the spring. For both testing periods, students at each of the grade levels tested read age-appropriate selections (4 to 8 pages in length) on a science or history topic. The students read and studied the material any way they wanted. Time to read and study the selection varied by grade level from thirty minutes in grade 4 to forty minutes in middle and high school. At the close of the reading period, all reading and study materials were collected. The next day the students took a free-recall test where they wrote down everything they could remember.

The assessment materials and procedures mirrored ordinary classroom practices where students are frequently asked to read and study an assignment followed by a test the next day. Free recall turns out to be a pure measure of comprehension and learning since there are no clues about content in the assessment procedure. With essay or multiple choice questions, the content of the questions can trigger memories for specific information. With free recall, students have

only a pen or pencil and a blank sheet of paper on which they record, in list or phrase form, anything they remember from the previous day's reading. This assessment procedure is highly sensitive to the effects of CRISSsm because students have no external memory cues to aid recall and therefore must rely on the organizations and structures they imposed on the prose material. Moreover, measuring student retention after a 24-hour delay provides an assessment of long-term retention which more closely reflects goals for learning in school.

For each reading selection, scoring grids were developed which listed all probable content that could be recalled from the fourth grade, middle school, and high school selections. Students received a point for each item on the grid they recalled.

We predicted both experimental and control classes would perform similarly on the pre-test, but the experimental students would show more growth on the post-test than the control students. In order to remember more effectively in this delayed recall situation, we hypothesized students need to apply learning strategies to the reading and learning situation. Students who receive explicit instruction in strategy use should show more growth on the post-test than those who receive little if any instruction in how to learn. Our predictions were substantiated in every research site. As predicted, the CRISSsm classrooms improved significantly more than the controls. In every replication, the performance for the control students remained stagnant, whereas the experimental students did far better on the post-test. These data provide clear indication that CRISSsm principles and strategies help students learn and remember content information. Why is it we get the same effects so consistently? Let's take a moment to offer some explanations.

Student Use of Strategies

In each of the studies, we also did some informal evaluations regarding students' strategy use. After post-testing, students from both experimental and comparison classes were asked to write a paragraph explaining what they did to read and learn the information in the articles (Horsfall & Santa, 1994; Santa & Vick, 2004) or to respond to a study skills survey (Santa, 1995; Santa & O'Neil, 2004). In each of the studies, the experimental students indicated a definite pattern of strategy use, while the control students had little strategy knowledge. In the two studies (Horsfall & Santa 1994; Santa & Vick, 2004) where students wrote paragraphs about their learning, the most common response from the control subjects was that they studied by re-reading or memorizing. By contrast, the experimental students used a rich assortment of learning strategies and often used multiple strategies such as taking notes, writing summaries, and self-questioning. In the other two studies (Horsfall & Santa, 1994; Santa & O'Neil, 2004), the study skills surveys indicated that most of the experimental students used the principles and strategies of the project in their own learning. Across all of these studies, the experimental students appear to have internalized key aspects of the project, which offers a logical explanation of the experimental effects.

CRISSsm and Performance on State Assessments

While data confirm project effectiveness, there is the larger issue of student performance on state assessments. Does Project CRISSsm make a difference? This question is extremely difficult to investigate given CRISSsm is usually one of several staff development programs used in districts to improve achievement. These comparisons are often confounded by other factors which make it difficult to tease out students' gains in achievement based on Project CRISSsm from gains derived from other effects. However, many districts have reported changes in student achievement after implementing the project. CRISSsm appears to account, at least partially, for improving test scores.

For example, Meadowlawn Middle School in St. Petersburg, Florida, adopted Project CRISSsm as a part of their school improvement plan. CRISSsm was the only major staff development program adopted by this school over a four-year period, so teachers and administrators felt any changes in student performance could be largely attributed to the project. Over eighty percent of their teachers, including the principal, took the Level 1 training. The school had its own district-level trainer who worked with the principal to insure continual implementation and follow-up. During this time period, the district used the same achievement test, the California Test of Basic Skills, and for several years tracked the same students.

The gap between their students' reading scores and those of the district began to shrink. By the time the sixth graders graduated from the middle school, their achievement test scores had moved from the 40th percentile to the 55th percentile on the assessment. Even more important, many teachers reported students were performing better in school. School counselors also noted a reduction in truancy and behavior problems.

Lumsden (1998) did a descriptive study of program practices in selected schools scoring above average on the Florida's Comprehensive Assessment Test (FCAT). He examined whether or not there were any common program practices that might explain the positive test results in these schools. In particular, he asked schools to specify staff development programs that helped them address comprehension skills on the FCAT. It turned out most of the successful FCAT schools had implemented CRISSsm training as a central feature of their staff development programs. One could tentatively conclude Project CRISSsm deserves some of the credit for improved test performances.

Probably the cleanest data supporting gains on state assessments comes from schools participating in the CRISSsm study conducted in Utah (Santa & O'Neil, 2004). In one of the experimental schools, Granite High School, we tracked experimental students over a two-year period on the Utah State Criterion Reference Test which students take every spring. We compared student performance the spring before they had CRISSsm with their performance a year later. Nineteen of the 21 experimental students having complete data sets over this time period showed substantial improvement on the state test. The mean performance for students on the CRT improved from 53.45 in 2001 to 67.72 in 2002. Overall, the experimental students showed an average improvement of 26%. These differences are impressive and certainly are

attributable, in part, to Project CRISSsm given these same students had also performed significantly better than the control students on the CRISSsm assessment (Santa & O'Neil, 2004).

Another result, likely attributable to Project CRISSsm, was the improvement in the SAT scores at Canyon View High School in Cedar City, Utah. Students at Canyon View High School showed substantial improvement in SAT scores after CRISSsm was implemented school-wide. Over a period of three years, when every teacher received CRISSsm training, the average performance of Canyon View students taking the SAT increased 22% from 45 to 55 in reading. A similar change did not occur in the comparison school, Cedar High School, where average SAT scores remained the same over this same three-year period.

Research-based Learning Strategies

Why does CRISSsm work so effectively to improve student learning? There are many ways to answer this question. One only has to look at the ingredients of Project CRISSsm to realize the strategies and the theoretical framework forming the very core of the project are based on decades of research in cognitive psychology. For example, the practices of Reciprocal Teaching, Question-Answer Relationships, schema development, and Story Plans have hundreds of citations in refereed research journals documenting effectiveness.

Support from National Reports

Two reports sponsored by the U.S. Department of Education, the National Reading Panel Report (2000) and the Rand Report (Snow, 2002), also provide substantial evidence for both the content and the delivery of Project CRISSsm. (Both of these reports are available online (www.nationalreadingpanel.org and the www.rand.org/publications.) Given I have already discussed the NRP report in an earlier CRISSsm newsletter which can still be found on our website, I will make only brief mention of it here. While there has been considerable criticism of the report because of its narrow focus, the portion which reviews research on comprehension strategies and staff development strongly supports the mission of CRISSsm. The report advocates use of strategies that help students become more metacognitive. This is particularly true in studies where teachers begin by showing students how to learn specific strategies and when they provide them with opportunities for examining how these strategies work for them as individuals.

The Rand Report provides convincing support for not only the research base of Project CRISSsm, but for its staff development mission. The reading experts, charged with writing this report for the Office of Educational Research and Improvement of the U.S. Department of Education, reviewed comprehension research and developed an agenda for future research on comprehension. They concluded "research has shown that many children who read at the third-grade level in grade 3 will not automatically become proficient reading comprehenders in later grades. Therefore, teachers must teach comprehension explicitly, beginning in the primary

grades and continuing through high school. Research has also shown that a teacher's expertise makes a big difference." We couldn't agree more.

CRISSsm also represents an integration of research-based practices from a variety of disciplines—not just reading research. Research on models of teaching, reading engagement, and school change supports the content and delivery of Project CRISSsm. Just as CRISSsm serves to unite diverse content areas with a common language and philosophy, so too does it bring together diverse lines of research.

Models of Teaching Research

The conclusions from research on models of teaching fit exactly with CRISSsm. This research examines the effects of transactional strategies instruction on reading achievement (Duffy, 2002; Anderson & Roit, 1993; Brown, Pressley, Van Meter & Shuder, 1996). Basically, these researchers examined the effects of class delivery models (teacher modeling, guided practice, and student application) on reading achievement. It's hardly a surprise transactional strategy instruction leads to improved reading, but it's good to have some hard data directly supporting the CRISSsm model of teaching.

Reading Engagement

Another line of research which dove-tails with CRISSsm is the work on reading engagement. As educators, we want students to leave our classrooms continuing as readers, writers, and learners. Engaged learners have internalized a literacy passion—a desire to read, write, and learn throughout their lives. In a review of research which defines the factors conducive to reading engagement, John Guthrie (2004) notes there is a direct relationship between reading engagement and achievement in school. In fact, reading engagement compensates for low family income and educational background. Highly engaged students simply achieve better in school irrespective of background and income.

So what does this research say about the Project CRISSsm? What's intriguing is that so many of the factors which Guthrie describes as contexts conducive to reading engagement are the same as those for CRISSsm. For example, motivation is strongly dependent on a student's perception of his or her own competence in using strategies. When students feel competent in strategy use, their attitudes about school and their motivation to learn increase. Another factor has to do with learning and knowledge goals. Students are more motivated to learn in classrooms where the emphasis is on understanding rather than getting the right answers. Both of these features, strategy knowledge and content understandings are, of course, fundamental to the mission of Project CRISSsm.

Another conclusion from the work on student motivation has to do with the professional environments for teachers. Literacy engagement occurs in classrooms where professional

environments within the school are healthy for teachers. Teachers must succeed before students can succeed. Students tend to be more highly motivated in classrooms where teachers are not only treated respectfully within the system, but work within a dynamic community of teacher learners. These are situations where teachers work collaboratively from a foundation of shared beliefs, have opportunities to do their own research, make curriculum decisions, and simply have time to “talk shop.” We are experts at fostering professionalism in schools and promoting a spirit of dynamic inquiry that filters throughout a system. When teachers are engaged, so too, are their students.

Research on School Change

Finally, our implementation model fits perfectly with the key principles underlying research on school change (Fullan, 1993, 1999). Change begins with an individual voice, a dream-maker (a CRISSsm facilitator within a district), who begins to nudge teachers to examine their practice. Change involves collaboration, where good ideas converge and common sense is corroborated with outside knowledge from research and experts (a CRISSsm Level 1 Workshop). Change happens when learning environments are healthy for teachers and when teachers come together and have opportunities to share their own discoveries (CRISSsm follow-up sessions). All of these principles fit exactly with our own views of how to insure a successful implementation of CRISSsm.

Support for Project CRISSsm converges from a variety of sources. Research specifically designed from examining project effects have shown time and time again that CRISSsm students, irrespective of grade level or context, make significant improvements in reading and learning from text, compared to their control counterparts. The data are reliable and replicable. The CRISSsm model of teaching and the specific instructional strategies inherent in the project are supported by a rich history of research in a variety of disciplines. CRISSsm works because we practice fundamental principles about what to teach, how to teach, and how to change entire school systems.

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