



# Research on Outcomes Related to Creating a Content Literacy Continuum of Instruction for Secondary Schools

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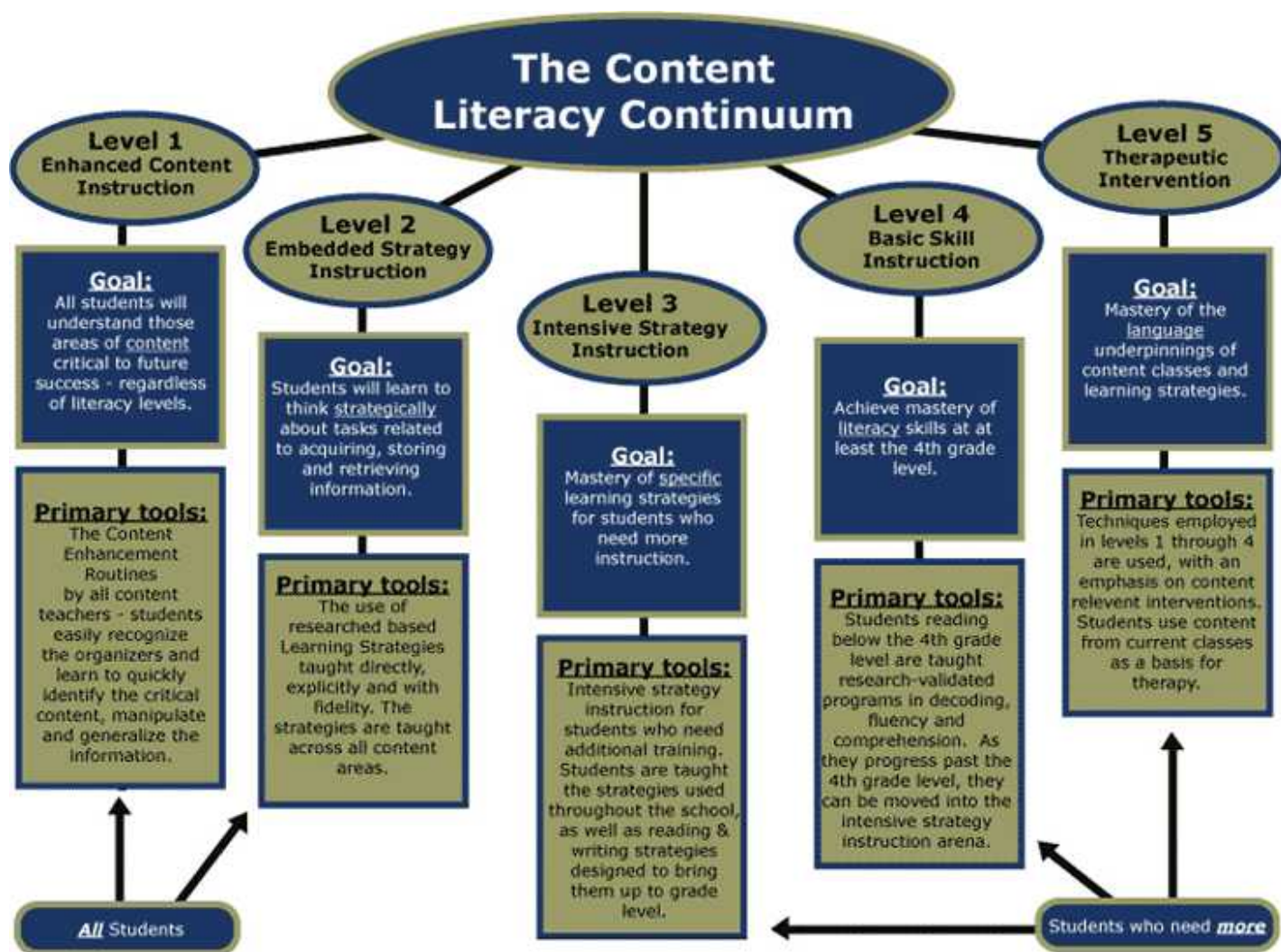
***The Center for Research on Learning  
The University of Kansas***

For the past 28 years, researchers at the University of Kansas Center for Research on Learning (KUCRL) have conducted programmatic research on the type of instruction needed to ensure that students are ready for and can succeed in college or other demanding postsecondary educational options. Their studies have included a wide variety of research designs selected to address specific educational problems in the context of specific types of classrooms and schools for specific types of learners.

Because of the size of the “performance gap” that must be closed for struggling adolescent learners, interventions must be exceedingly well designed so that many years of growth in achievement can be accomplished in a relatively short period of time. To that end, intervention research conducted by KUCRL researchers has been driven by six design principles to ensure the types of gains needed to close the performance gap.

Specifically, KUCRL researchers have found that large student gains occur when the interventions (a) enable students to successfully compete in challenging courses; (b) are easy to use and easy to integrate into ongoing classroom routines; (c) lead to gains for the diversity of low-, average-, high-achieving students found in most secondary classrooms; (d) actively engage students as partners in the learning process; (e) require that teachers regularly monitor student progress so instructional adjustments can be quickly made; and (f) are highly valued by both students and teachers. The studies that are described in this report are a representative sampling of KUCRL investigations that demonstrate the kinds of gains that can be realized when these six design principles are carefully followed.

Collectively, these research design principles have resulted in interventions that help close the performance gap. Emerging from research efforts spanning nearly three decades has been a continuum of interventions comprised of the types of instruction needed to ensure academic success for all students. In essence, this continuum, called the Content Literacy Continuum (CLC), allows some students to receive gradually more and more intensive, systematic, and explicit instruction of content, strategies, and skills as their needs dictate. Figure 1 provides a summary of the five levels of this continuum.



**Figure 1.** A Continuum of Literacy Instruction

**Level 1: Enhance content instruction** (mastery of critical content for *all* regardless of literacy levels)

**Level 2: Embedded strategy instruction** (routinely weave strategy instruction within *and* across classes using large-group instructional methods)

**Level 3: Intensive strategy instruction** (teach specific strategies using intensive-explicit instructional sequences)

**Level 4: Intensive basic skill instruction** (teach entry-level literacy skills up to the 4<sup>th</sup>-grade level)

**Level 5: Therapeutic intervention** (teach language underpinnings related to curriculum content and learning strategies)

The purpose of this report is to highlight some of the research conducted by KUCRL staff that supports the various levels of the CLC and this continuum as a whole. This report contains two sections.

Section 1: A brief profile of the characteristics of struggling adolescent learners based on a large-scale descriptive study conducted by KUCRL researchers in urban schools.

Section 2: A description of studies demonstrating the effects of CLC implementation on large groups of students or on the performance of a whole school.

## Section 1

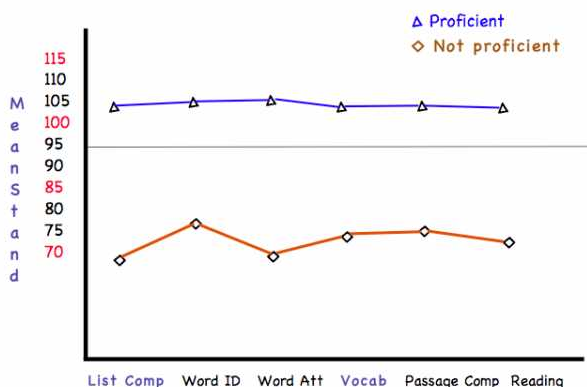
### Characteristics of Struggling Adolescent Learners

To be optimally effective, interventions for struggling adolescent learners must be designed to meet the unique characteristics of these students. Thus, the KUCRL staff has conducted several large-scale descriptive studies of adolescents in urban high schools to understand these students better.

One recent study, conducted in a large inner-city school district on over 350 adolescents painted an interesting picture. To get an idea of how those adolescents who struggle in reading compared with those who do not, researchers compared the performance of “good” 9<sup>th</sup>-grade readers (i.e., those who scored at the Exemplary, Advanced, and Proficient levels on a state reading assessment) with “poor” 9<sup>th</sup>-grade readers (i.e., those who scored at the Basic and Unsatisfactory levels of the state test). As seen in Figure 2, poor readers earned scores nearly one standard deviation below the mean in all critical reading components measured. Additionally, this research showed that nearly 45% of the entire 9<sup>th</sup>-grade class lacked sufficient decoding and word recognition skills to succeed in rigorous subject-matter classes. This research indicates that many adolescents need instruction in basic decoding and word recognition skills as well as reading comprehension skills. Hence, instructional programs in high schools must be organized to meet the broad range of reading needs of these students. In short, because the literacy needs of struggling adolescent readers are so diverse, the most effective literacy programs are ones that offer instruction at various levels of intensity, are comprehensive, and are well coordinated. In the following section, information will be presented about ways that different schools have attempted to respond to the varying literacy needs of adolescents and the resultant outcomes.

Figure 2 Adolescent reading profile

### Reading Component Profile



## Section 2

### *The Effects of CLC Implementation on Large Groups of Students and Whole School Performance*

One of the biggest voids in the field of adolescent literacy is an absence of data demonstrating school-wide effects of literacy interventions. The major reason for this void is a lack of research funding to support these kinds of studies. Until only a few years ago, the vast majority of educational research funding has been directed toward younger children and elementary schools. For example, in the current budget year, federal expenditures for Reading First (for children in grades K-3) was \$1.04 *billion* versus \$24.8 *million* for Striving Readers (for adolescents)!

In spite of a lack of support for this kind of research, the KUCRL has worked with schools to generate meaningful outcome measures on student performance. However, each of the studies described below suffers from some limitations – many of which are tied directly to the fact that school districts seldom budget for the kinds of annual assessments on critical reading and math skills that show the kinds of progress being made in critical outcome areas. The need for large data sets to accurately depict school-wide and district-level outcomes has been largely unaddressed by the researchers because of the limited opportunities to collect this information.

The three schools/districts described below reflect the kinds of progress being made in schools that have adopted a CLC approach to improving student outcomes across a variety of literacy areas and with a variety of learners, including those who are often most resistant to instruction, students with disabilities. Of particular note is the fact that the three scenarios described below represent varying approaches to the implementation of the CLC. These approaches *were based on the characteristics and needs of the school/district*.

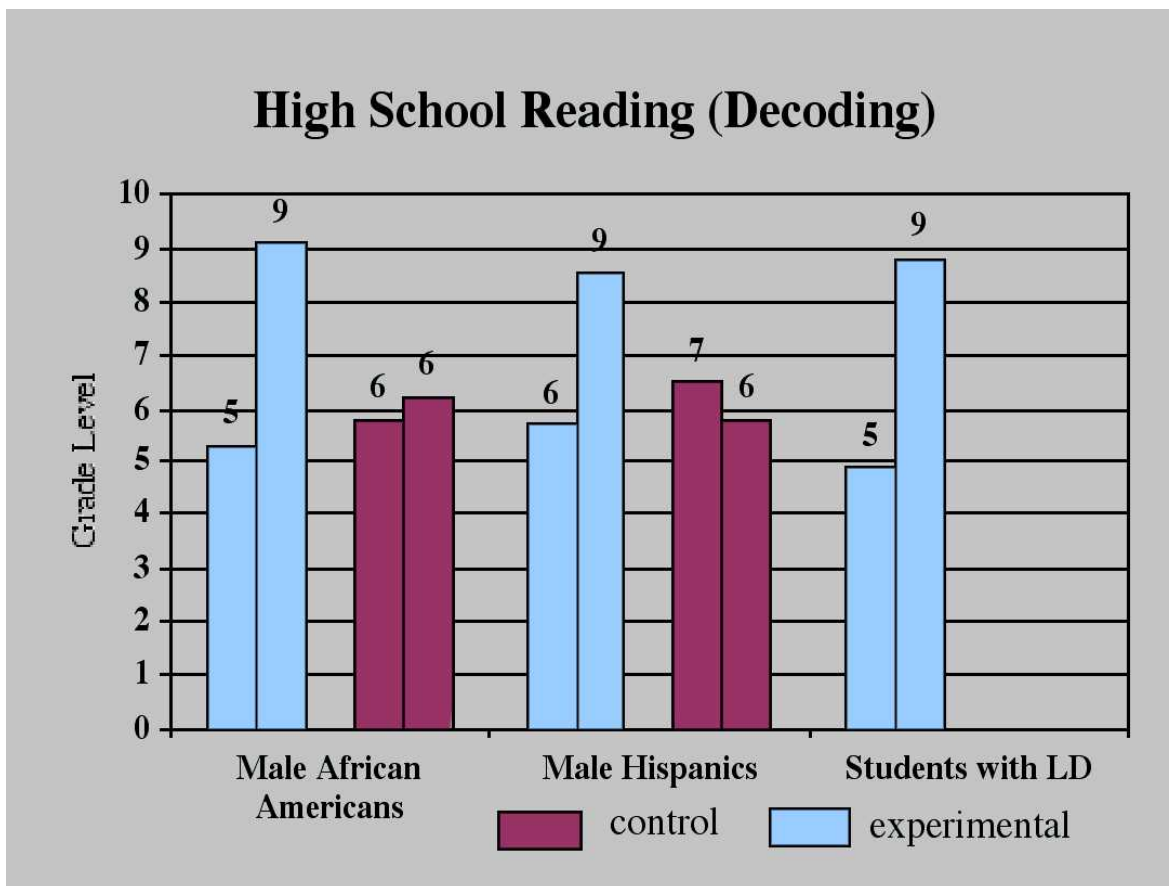
## Large High School Example

### *Phase 1: Improving Word Identification Skills of 9<sup>th</sup> Graders*

**Description:** This school was one of the earliest school-wide initiatives in which the KUCRL was involved. In the early 1990s, teachers began teaching several of the reading strategies from the Strategic Instruction Model (SIM) [SIM is the KUCRL intervention model] to students with LD in the resource room. While preparing for an evaluation visit, the data on reading gains by the students with LD came to the attention of the school principal and the reading committee. They were thrilled to see the tremendous gains that the students with LD were making but were frustrated by the fact that such large numbers of at-risk students in this high school (who were not formally classified as LD) were failing miserably because of poor reading skills. The committee decided to design a program that could be made available to the entire group of entering freshman who were doing poorly in reading. Hence, a reading screening was done on all incoming freshman. Students who earned scores two or more years below grade level were targeted for instruction. The program was so successful that the teachers decided to set up an experiment to demonstrate the program's success. This work is representative of Level 3 in the CLC.

**Results:** Figure 3 below shows the students’ grade-level scores on the reading pre-test and the post-test. The darkly shaded bars depict the mean scores for the students enrolled at the experimental high school. The lightly shaded bars show the mean scores for the students at the comparison school. The left bar in each set shows the mean pre-test score, the right bar the mean post-test score. Male African-Americans, male Hispanics, and students with learning disabilities at this high school made mean gains of about three grade levels with regard to decoding while they were in the program. Similar students in the other high school made either small gains or no gains on the average. Individual student data reflect these group means. Caucasian students and female students made gains similar to those shown in Figure 3.

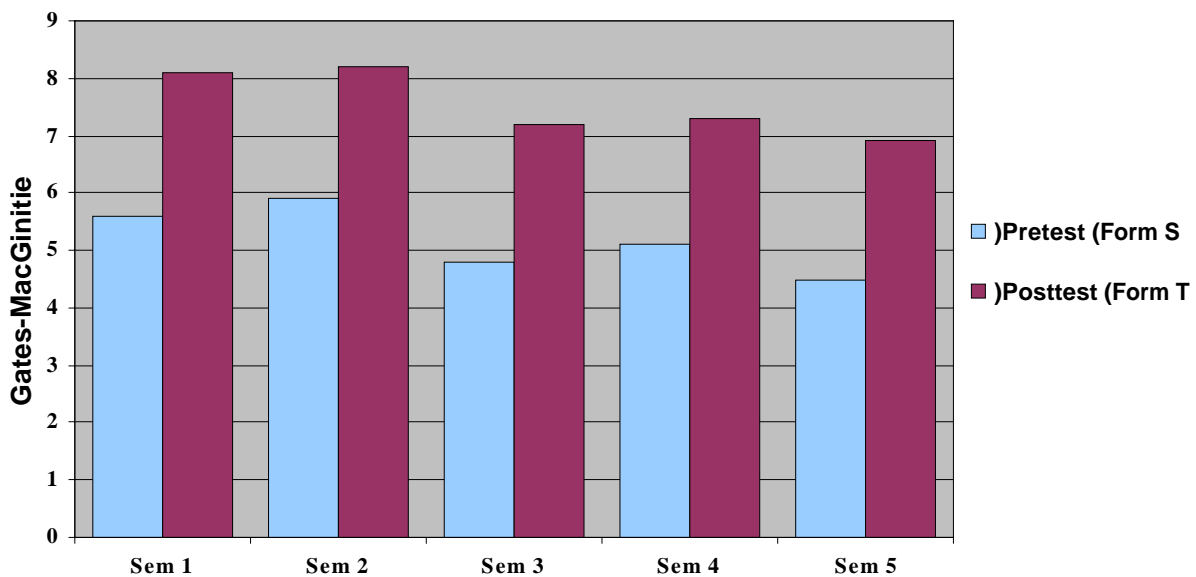
*Figure 3 Mean grade level scores in decoding*



## Phase 2: Improving Reading Comprehension Skills of 9<sup>th</sup> Graders

**Description:** After realizing the success of teaching *The Word Identification Strategy* in Phase 1 in a very focused intense manner to improve the decoding performance of students, the school turned its attention to improving the comprehension skills of students. A one-semester class called Strategic Reading was created to serve as the vehicle for teaching a set of KUCRL comprehension strategies that emphasized mastering paraphrasing, self-questioning, and visual imagery. This course is an example of the type of instruction that is provided at Level 3 of the CLC.

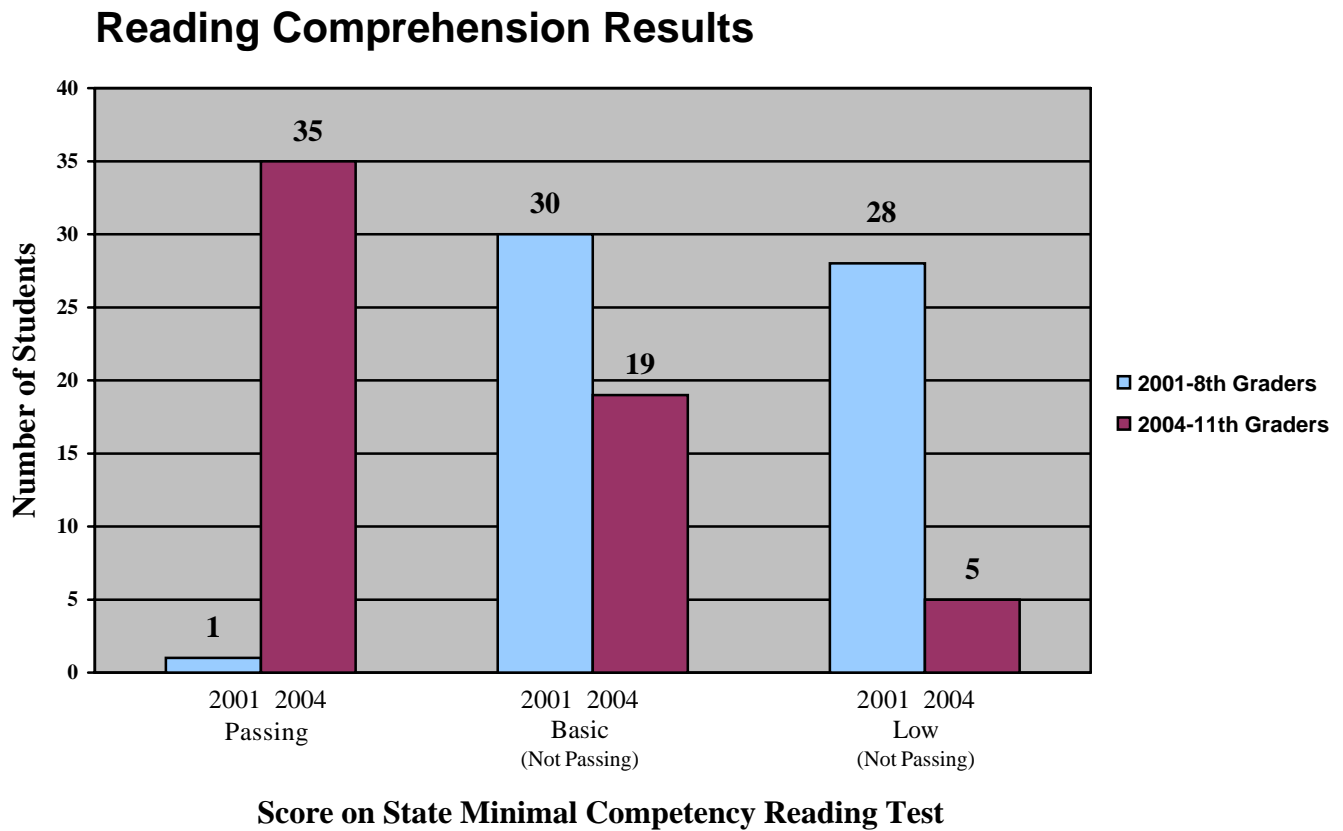
**Results:** Again, students enrolled in the course showed significant gains in reading. The scores below show the mean grade-level equivalent pretest and posttest scores as measured on the Gates-MacGinitie reading comprehension subtest. Figure 4 shows an average of two to three year gain in reading comprehension scores was made by students enrolled in the course each semester.



**Figure 4** Strategic Reading Class

A related study was conducted to measure the effects of cumulative exposure to high-quality strategy instruction over time. The state assessment exam was used to compare the scores of students who took the test in the 8<sup>th</sup> grade (2001) to their scores in the 11<sup>th</sup> grade (2004) to determine if more students passed the test in the 11<sup>th</sup> grade than in the 8<sup>th</sup> grade (see figure 5). During their 8<sup>th</sup>-grade year, only one student passed the exam; 58 did not pass. After intensive learning strategy instruction, 35 students passed the exam as 11<sup>th</sup> graders. Interestingly, of the 19 students who scored at the Basic level in 2004 (shown in the second pink bar in Figure 5), 16 were within three points of passing (on a scale of 330 points).

Figure 5 Performance on state reading state assessment test



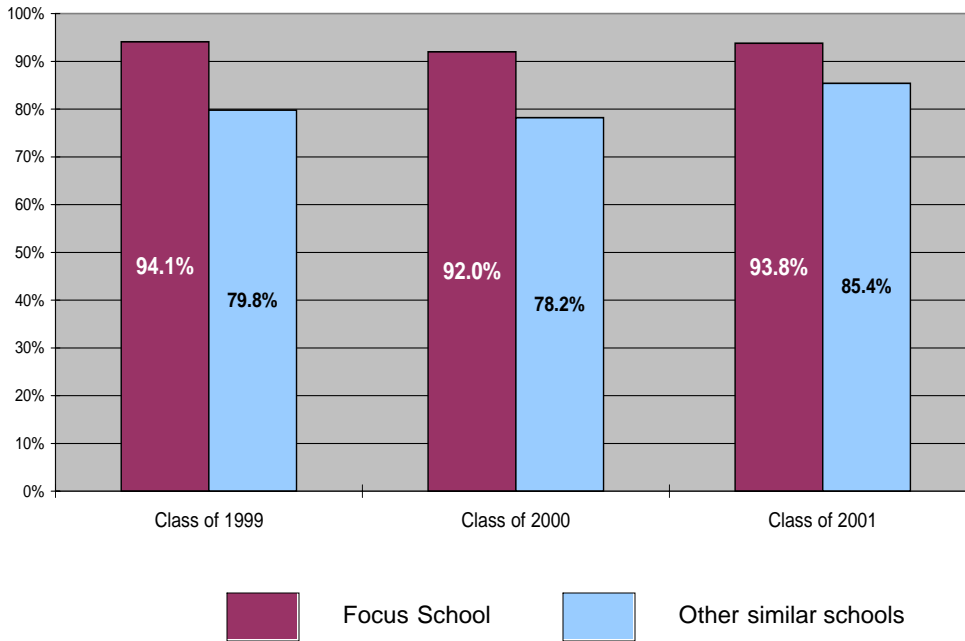
### Phase 3: Improving Written Expression Performance

**Description:** Based on the success of the reading program, school administrators and teachers turned their attention to identifying interventions that would improve writing performance so students would be in a position to perform successfully on the state assessment in the 11<sup>th</sup> grade. A series of learning strategies (e.g., paragraph writing and theme writing strategies designed by KUCRL researchers) was taught within English classes in the ninth and tenth grades to improve students’ written expression. Other subject-matter teachers (e.g., teachers of science, history) prompted students to generalize the writing strategies to subject-area assignments. Integration of strategy instruction within general education courses is the type of instruction that is associated with Level 2 of the CLC.

**Results:** Figure 6 depicts the 11<sup>th</sup>-grade results on the state writing assessment for students from the High School for three consecutive years. The maroon bars represent the percentage of students who passed the state exam. The blue bars depict the average percentage of students who passed the state exam in high schools of comparable size and demographics in the state.

**Figure 6** Performance on writing state assessment

**Relation to Like Districts & State Comparisons of Writing Over 3 Years**  
- % Students Passing the Test



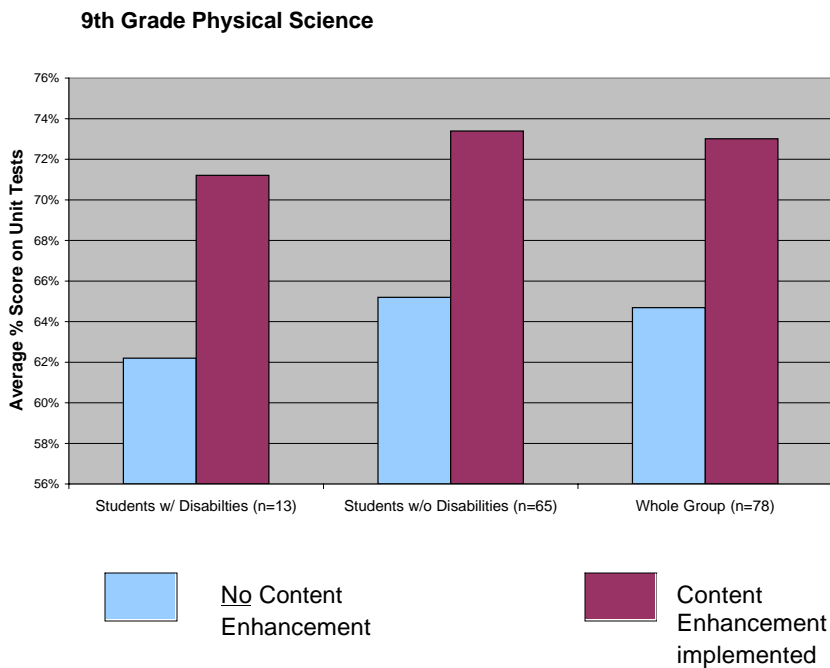
**Phase 4: Improving Performance in Subject-Matter Classes**

**Description:** The changes implemented during the first three phases described above resulted in significant increases in students’ reading and writing outcomes. However, teachers continued to voice concern about the large number of students who were failing in core subject-matter classes. To address this problem, the staff decided to implement a package of Content Enhancement Routines. These are instructional tools used by subject-matter teachers to aid them in selecting and teaching critical content that many students find difficult to learn.

**Results:** Figure 7 shows the effects of physical science teachers using these routines in their classes. The blue bars represent the average scores that students earned on their unit tests when teachers did *not* use Content Enhancement Routines to teach subject matter. The maroon bars represent the average scores students earned for the units in which the teachers *did* use Content Enhancement Routines. This increase in scores occurred for both students with and without disabilities. The application of Content Enhancement Routines on a regular basis by subject matter teachers is an example of Level 1 instruction in the CLC.



**Figure 7** Mean percentage of points earned on unit physical science tests



## District Example

**Description:** This is a school district that approached the KUCRL to help them align instruction in the secondary curriculum to state standards using the SMARTER planning model developed by KUCRL researchers. This planning tool supports Level 1 of CLC initiatives. The district is a high-achieving district with relatively few low-income or special needs students. However, the district did have a sizable subgroup of American Indian students that was not performing at acceptable achievement levels and was not making the academic progress demonstrated by other groups in the district. For certain, these students were not in a position to be successful in postsecondary education. There was a strong district-level commitment to implement the CLC with the goal of creating a strong and competent distributed leadership structure to ensure student achievement through continuous improvement in instruction.

**Results:** Figures 8 – 10 in the sections below show the percentage of students at the high school and two middle schools scoring at the proficient level on the state assessment in each of three years. The 2002-2003 school year depicts student results before CLC components were introduced; 2003-2004 is when teachers began implementation of CLC components on a limited basis; and 2004-2005 is the second year of implementation of CLC components. The staff at the three schools in the district approached CLC implementation in ways that were tailored to the unique needs of their schools. Hence, they emphasized different levels of the CLC, and these varying emphases are reflected in the various outcomes across the schools.

## The High School

The High School put the greatest emphasis on improving student readiness for college for underperforming students. These efforts primarily included improving learning for American Indian students. The school staff was successful at increasing the percentage of American Indian students meeting proficiency. Of particular note is the fact that the number of students meeting proficiency across all student groups increased as well. As a result of implementing CLC components, the percentage of students meeting the proficiency standard in reading on the state assessment jumped from about 50% in 2003 to over 70% in 2005 (see Figure 8).

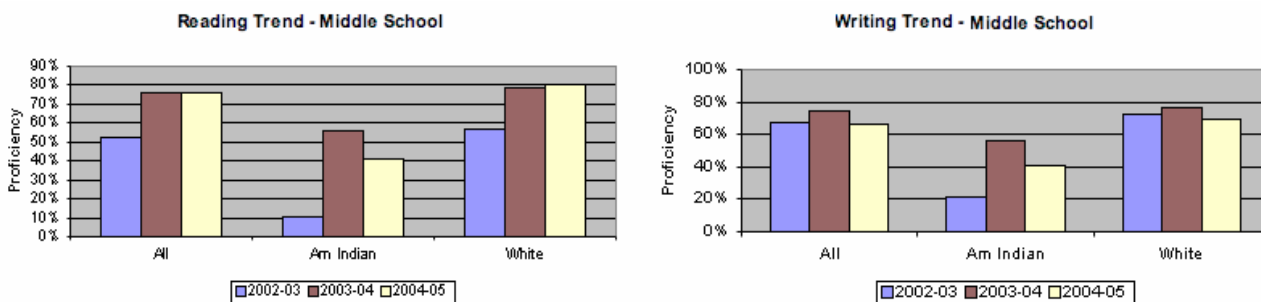
**Figure 8** State assessment results for the High School

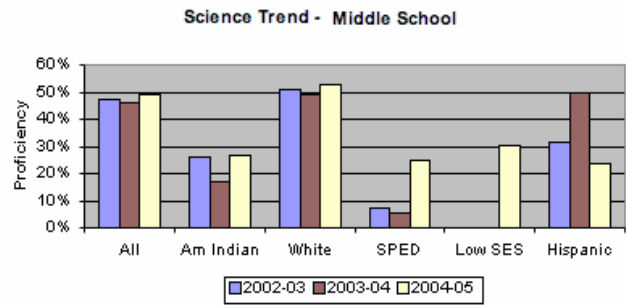
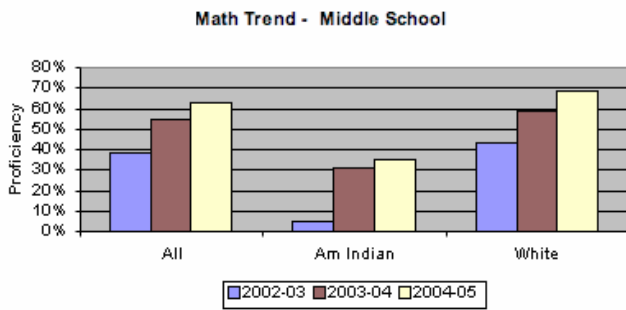


## Middle School 1

The Middle School 1 staff implemented the CLC across various groups of students. For Level 1 of the CLC, they stressed the implementation of Content Enhancement Routines with particular emphasis on reading and organizing content for writing. See the graphs in Figure 9 for their results.

**Figure 9** State assessment results for Middle School 1

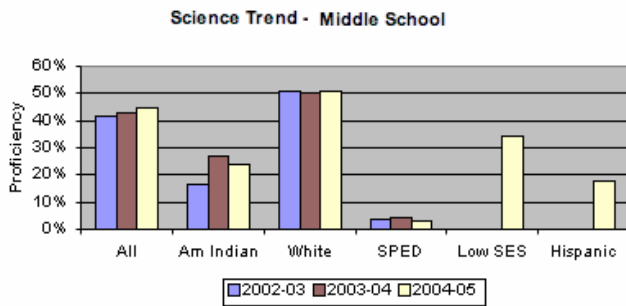
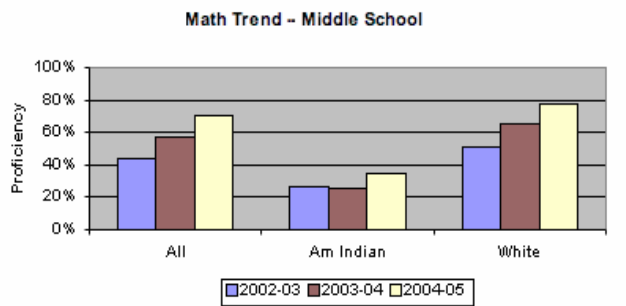
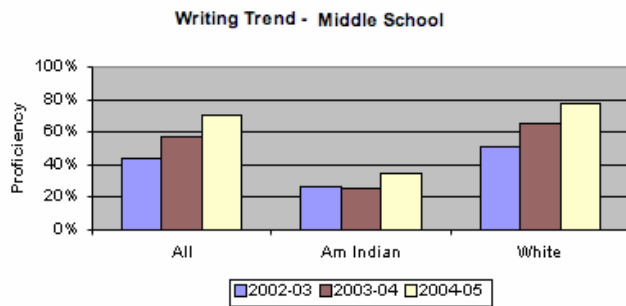
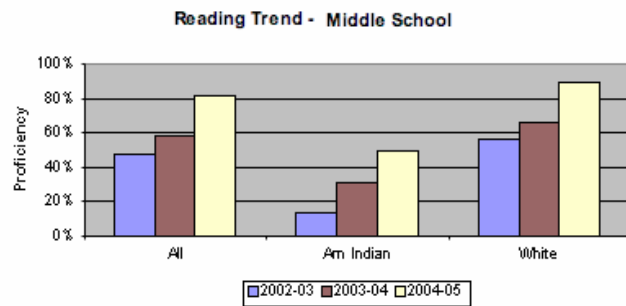




**Middle School 2**

Middle School 2 had the strongest administrative leadership in the district, and the rate and quality of teacher implementation of CLC components at Middle School 2 was the highest amongst the three schools. Interventions at Levels 1, 2, and 3 of the CLC were implemented (see Figure 10). Their results show increased percentages of students earning scores at the proficient level for subgroups of students on all tests.

**Figure 10** State assessment results for Middle School 2

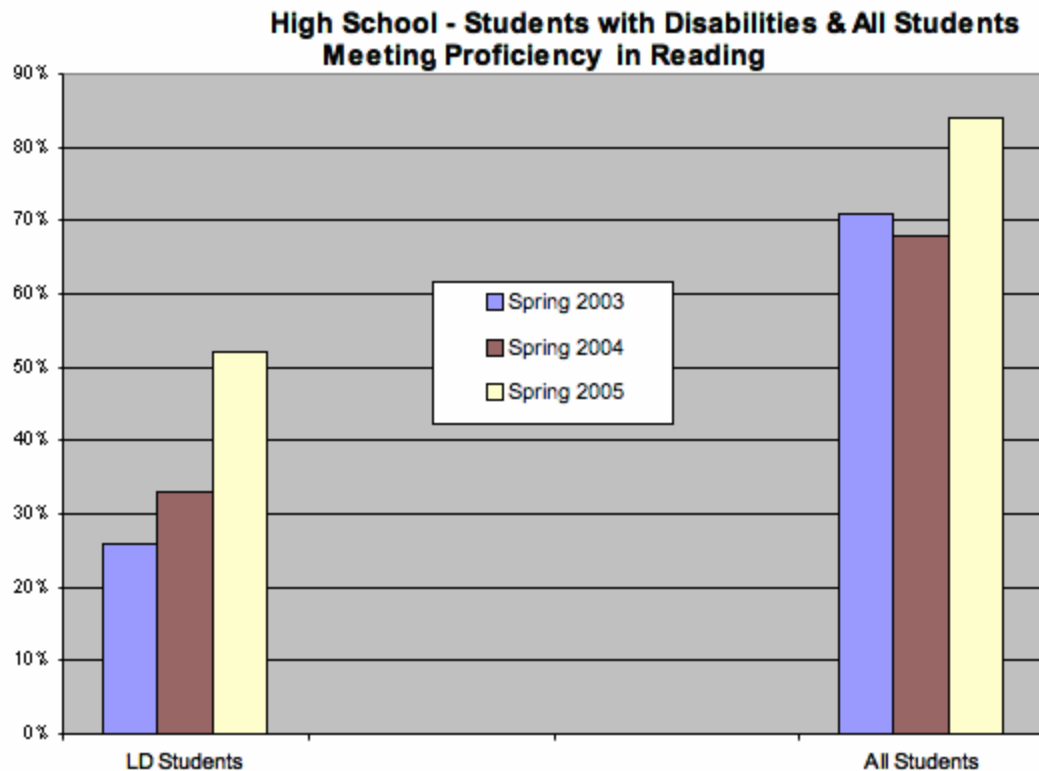


## High School Example

**Description:** In 2003, a High School staff decided to implement the CLC to improve reading scores for all students, but with a special emphasis on improving outcomes for students with disabilities because of poor AYP performance.

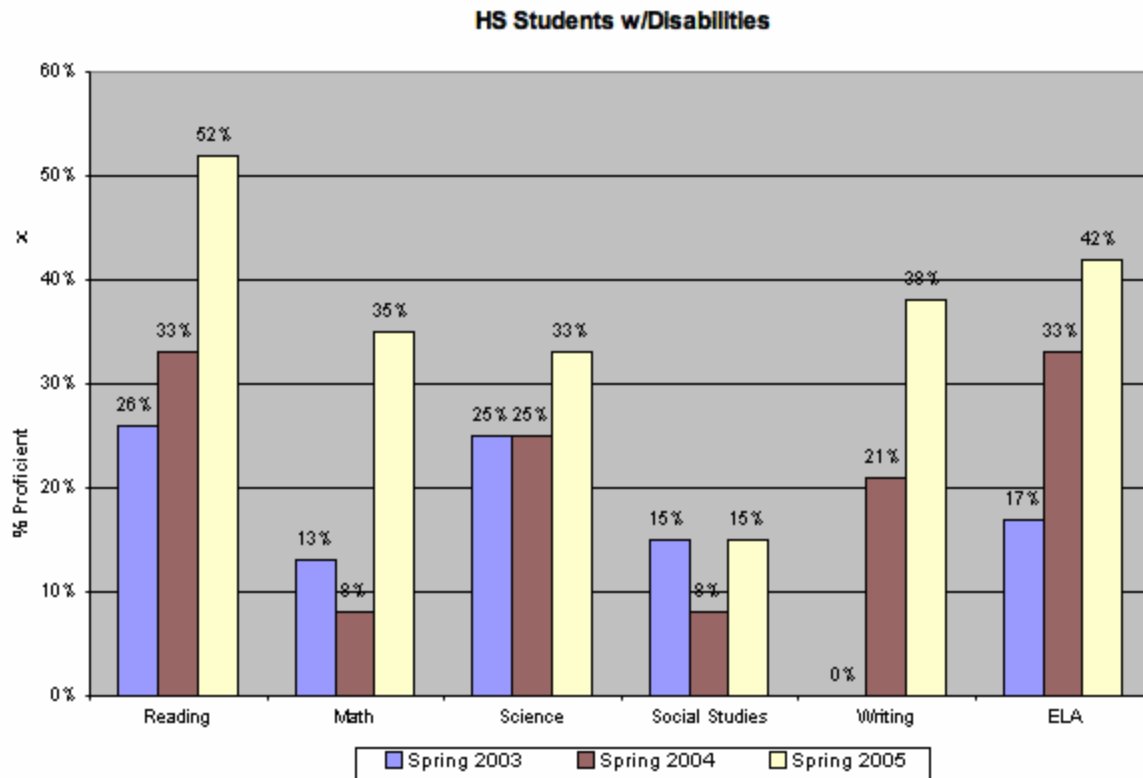
**Results:** Figure 11 shows the percentage of students meeting proficiency in 2003 before CLC components were introduced. 2004 scores are from the year when CLC components were first introduced to teachers and administrators. 2005 scores represent scores from the second year of implementation.

**Figure 11** Percentage of LD and non-LD students meeting proficiency in reading on state assessment



Special education staff at the High School made CLC implementation a major goal in both 2004 and 2005. The percentage of students who scored at the proficient level in the skill areas of reading, math, and writing increased, as did the percentage of students scoring at the proficient level in the core subject-matter areas of science, social studies and English/language arts (see Figure 12).

**Figure 12** Percentage of students with disabilities scoring at the proficient level on state assessments across skill and subject-matter areas



## Conclusion

In our continuing partnerships with schools to implement various components of the CLC or the CLC in its entirety, several lessons have been learned. These lessons are guiding our current R & D efforts. Additionally, they provide criteria that should be used in the selecting interventions to use at the various levels of the CLC. The lessons that have emerged from this research are summarized below.

**Lessons Learned From KUCRL Research on Level 1 Interventions:** This research has underscored the fact that effective Level I interventions are ones that can be readily incorporated into the ongoing instructional processes in subject-matter classes. To be effective, these interventions must be responsive to the unique (and generally very diverse) learning needs of low-, average-, and high-achieving students. They must be used on a consistent basis so students receive regular exposure to the interventions. Over time, this consistent exposure alters how students think about and process information. To enable students to effectively process the large amounts of complex information taught in most secondary subject matter classes, Level I interventions must be used in such a way that students observe how teachers think about and process information in an explicit fashion. This requires that the teacher give many demonstrations of how to think about, organize, learn, and remember critical information. To help students who lack the necessary literacy skills to successfully read the accompanying class text/reading materials, teachers must use instructional tools or devices (e.g., graphic organizers) that present information in alternative formats.

**Lessons Learned from CRL Research on Level 2 Interventions:** KUCRL research has shown that one of the most important roles that subject-matter teachers can play is to provide students with a “cognitive apprenticeship” in how to learn science (or history, or math, etc.). Subject-matter teachers know how historians or mathematicians or scientists think about, learn, and remember important information in their discipline. Most students do not “discover” how to process information independent of guidance from their teachers. Thus, when teachers regularly integrate within their lessons some models of how they process information they, in essence, are providing their students with an apprenticeship in “how to learn” critical information (in other words, they provide their students with a cognitive apprenticeship). Specifically, teachers can teach students how to effectively process their subject matter by regularly embedding instruction in targeted learning strategies within their classes. For example, if teachers want to teach students how to summarize chunks of subject matter, they can do so by figuratively “pushing the pause button” during a lecture and explicitly demonstrate for their students how they would quickly review the material just covered, decide what was most critical, and form a summary statement. When teachers do this on a regular basis, set expectations for students to do so as well, and provide opportunities for students to practice using the strategy, students begin to process information differently.

**Lessons Learned From KUCRL Research on Level 3 Interventions:** Research on Level 3 interventions has demonstrated that one of the main reasons that struggling adolescent learners have difficulty responding to the curriculum demands in subject matter classes is that they have not acquired a set of high-leverage learning strategies that they can use to help them understand and remember information. In order to be useful tools, learning strategies must be learned to a level that enables the learner to use them with proficiency in navigating challenging academic tasks. Central to students mastering these strategies to a sufficient level of fluency is teaching the strategies using an explicit, intensive instructional process that embodies several instructional phases: (a) pre-testing to determine current level of functioning on a targeted strategy; (b) goal setting to determine instructional targets and time to be spent in reaching mastery; (c) describing the new strategy to help students gain a clear understanding of how the targeted strategy works in relation to old learning habits; (d) demonstrating how proficient application of the strategy looks behaviorally and cognitively; (e) practicing to a level of proficiency that will enable students to apply the strategy with relative ease in rigorous materials; (f) formative testing to monitor progress and make instructional corrections, and (g) teaching to ensure generalization and maintenance of the strategy across settings and tasks. Typically, the intensity of instruction required for Level 3 interventions is more than can be provided by subject-matter teachers or within the general education classroom. In most instances, Level 3 instruction is provided by teachers with specialized professional preparation in how to individualize instruction and teach learning strategies with intensity. Since this instruction is generally provided in places where teacher-student ratios can be no larger than 1 to 12-15, deliberate attention must be given to ensure the effective generalization of strategies by students to various subject matter classes and settings.

**Lessons Learned From KUCRL Research on Level 4 interventions:** Adolescent learners who have not mastered foundational literacy skills to handle instructional materials and tasks at or above the fourth-grade level will have great difficulty succeeding in secondary subject-matter classes. Similarly, they will have difficulty benefiting from instruction on learning strategies taught through Level 2 and Level 3 interventions. Level 4 interventions generally target basic skills that are necessary to enable students to be strategic learners. Since these are skills that students should have mastered prior to leaving the third grade, teachers need to minimize the time that students spend mastering these skills because of the exposure that they will miss due to critical subject matter content. Hence, Level 4 interventions must be implemented in a highly intensive, explicit fashion to small groups of students (in settings where one teacher can teach 4-6 students).

**Lessons Learned From KUCRL Research on Level 5 Interventions:** In every school (regardless of the nature of the school or its composition) are some students who have not mastered the underlying language competencies that enable them to process text or oral material effectively. Students who experience these difficulties often have a specific disability or unique manner of processing information. The skills required to meet the needs of these students generally is beyond the skill sets possessed by general education teachers. Some of the professionals best prepared to provide this individualized, almost clinical intervention, are speech language pathologists. Level 5 instruction is effective when it is directly tied to the curriculum that students are expected to be learning in the general education classroom. Student gains result when highly knowledgeable professionals in the area of language functioning have an opportunity to conduct differential diagnosis of the learning patterns of these students and adjust instruction accordingly.