



Show Me the Research:

A Brief Review of the Underlying Factors in The Nine Essential Program Components (EPC)



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Abstract

The Academic Program Survey (APS) developed by the California Department of Education (CDE) provides the nine Essential Program Components (EPCs) to Program Improvement (PI) schools and districts to guide their improvement activities. Many schools and districts across California are actively using this survey to identify areas of strength and weakness. The process is an extensive one and some participants asked, “Where is the research that supports each of these components?” This document is a response to that question. The authors sought to investigate factors related to each EPC and provide primary and secondary research related to each component. A minimum of three articles was provided per EPC to document the research findings. The following is an overview of the findings on the Essential Program Components.

- 1. Instructional Program:** Use of current and aligned standards-based textbooks and high instructional program coherence are related to increases in student achievement in reading and mathematics.
- 2. Instructional Time:** Increase in instructional time is an important element related to student achievement. High school students with increased time in core English and mathematics classes yield significant gains in achievement.
- 3. Principals’ Instructional Leadership Training:** Principal training focused on how to lead a school in increasing student achievement is critical to meeting this goal.
- 4. Teachers’ Professional Development Opportunities:** Coherent professional development that provides teachers instructional strategies and pedagogical content aligned to standards-based curriculum increases student achievement.
- 5. Student Achievement Monitoring System:** Frequent monitoring of student performance and use of a data monitoring system are positively related to school effectiveness and student achievement. Feedback to students on errors made on assessments increases their achievement.
- 6. Ongoing Instructional Assistance and Support for Teachers:** Teacher support through coaching that is high quality, content-focused, and in classroom increases student achievement through greater use and application of professional development.
- 7. Monthly Teacher Collaboration by Grade/Content Level:** Regular teacher collaboration to analyze student assessment through professional learning communities raises student achievement.
- 8. Lesson Pacing Schedule:** Pacing guides increased consistency of teaching across schools and continuity of teaching across grades.
- 9. Fiscal Support:** Allocation and reallocation of funding to support student achievement are critical to successfully meet rigorous accountability standards.

The EPCs also correlate with nine characteristics of twelve schools that were identified in a study presented at the National Title I Conference, January 2002, “California’s High-Performing High-Poverty Schools.”

Show Me the Research: A Brief Review of the Underlying Factors in the Nine Essential Program Components

On January 8, 2002, President George W. Bush signed the No Child Left Behind (NCLB) Act. This act mandated stronger district and school accountability for student academic success. NCLB mandates that schools and districts show Adequate Yearly Progress (AYP) by moving all students to proficiency in reading and in math. By the year 2014, 100% of students are expected to be proficient in both subjects. NCLB also mandates that schools or districts that fail to meet AYP for two consecutive years in the same content area or on the same indicator, such as participation rate, graduation rate, or percent proficient, are to be identified as “in need of improvement” In California, “in need of improvement” translates to Program Improvement (PI).

District Program Improvement in California

Districts identified as PI in California are urged to revise the Local Education Area (LEA) Plan based on results of a self-assessment. Assembly Bill 2066 (Chapter 579, Statutes of 2004) requires that districts conduct a self-assessment using materials and criteria based on current research provided by the CDE. The assessment identifies deficiencies in district operations, programs, and services. The California State Board of Education (SBE) endorsed two self-assessment tools to aid in this process, the Academic Program Survey (APS) and the District Assistance Survey (DAS). The Nine Essential Program Components (EPCs) contained in both the APS and DAS were identified to assist PI schools and provide them areas of focus for improvement. Academic Program Surveys and Rating Descriptions for Elementary, Middle and High Schools can be found online at:

<http://www.cde.ca.gov/ta/lp/vl/improvtools.asp>

The Academic Program Survey

The APS, the first CDE assessment tool, allows schools and districts to examine implementation of the EPCs for improvement of student achievement in reading/language arts and mathematics. The nine components include:

1. **Instructional Program:** Use of State Board of Education (SBE)-adopted (K-8) or standards-aligned (9-12) English-language arts and mathematics instructional programs, including reading intervention programs.
2. **Instructional Time:** Adherence to instructional minutes for reading/language arts and mathematics (K-8) and access to standards-aligned courses in reading/language arts and mathematics and pacing guides (9-12).
3. **Principals’ Instructional Leadership Training:** Assembly Bill (AB) 75 training on SBE-adopted instructional programs in reading/language arts and mathematics.
4. **Teachers’ Professional Development Opportunities:** Fully credentialed teachers and teacher participation in AB 466 training on SBE-adopted instructional programs in reading/language arts and mathematics.
5. **Student Achievement Monitoring System:** Use of data to monitor student placement/progress through curriculum-embedded assessments used to modify instruction.
6. **Ongoing Instructional Assistance and Support for Teachers:** Use of content experts and instructional coaches.
7. **Monthly Teacher Collaboration by Grade/Content Level:** Collaboration on results from common curriculum-embedded assessments.
8. **Lesson Pacing Schedule (K-8)/ Intervention (9-12):** Use of pacing schedules/intervention classes in ELA and Math.
9. **Fiscal Support:** Funding to support all nine EPCs.

District Assistance Survey

The Essential Program Components from the APS are embedded in the second SBE-adopted district assessment tool used in PI districts, the DAS. The DAS is designed to assess how a district supports schools in seven categories that directly impact student achievement in reading/language arts and mathematics:

1. **Standards-based Curriculum, Instruction, and Assessment**
2. **Professional Development**
3. **Human Resources**
4. **Data Systems/Data Analysis/Ongoing Monitoring**
5. **Parent and Community Involvement**
6. **Fiscal Operations**
7. **Governance and Leadership**

Districts using the APS at school sites and the DAS at the district level have a unique opportunity to align school plans to district plans.

Original APS/DAS Research Base

CDE provided evidence that these components are research-based (next column). The research cited here is more global and does not tie a particular finding to a single component found in the surveys. While the state adopted these two instruments, some districts questioned the degree to which the components in these instruments are research-based. Please see CDE's response to Question 18 at:

<http://www.cde.ca.gov/ta/ac/ti/piwebcastquest.asp>

The APS Nine Essential Program Components (EPCs) and DAS were developed based on Reading First Components, research conducted in various parts of the nation, and from the following resources:

- *Earl, Levin, Leithwood, Fullan and Watson: Preliminary Findings of National Literacy and Numeracy Strategies: reported in a paper presented at AERA, Chicago, 2003 and later published in Earl, L., Levin, B. Leithwood, K, Fullan, M. and Watson, N. (2003) Watching and Learning 3. London: Department for Education and Skills.*
- *Legters, N.E., Balfanz, R., Joradan, W. and McPartland, J. (2002) Comprehensive Reform for Urban High Schools. Teachers College Press, New York*
- *Marsh, D.D. and Coddling, J.B. (1999) The New American High School Corwin Press, Thousand Oaks, California*
- *National Clearinghouse for Comprehensive School Reform: Identifying Research-Based Solutions for School Improvement at <http://www.csrrclearinghouse.org/>.*
- *Stiggins, R. (2001) Student Involved Classroom Assessment (3rd edition). Ohio: Merrill Prentice Hall*
- *Stodolsky, S.S. (1988) The Subject Matters: Classroom activity in Mathematics and Social Studied University of Chicago Press, Chicago*

Impetus for this Study

Although the research above supports the nine EPCs, many teachers and administrators involved in the PI process requested more evidence showing that implementing specific components will result in improved student achievement. One concern that we heard from many educators is that the research cited by the SBE and CDE may be politically motivated. While we take no stance on this assertion, we examined additional primary research examining the underlying factors in each of the nine EPCs to determine the degree to which they are related to performance. Findings from these studies were summarized in a tabular form for ease of understanding and use by teachers and administrators. In addition to the brief summary of the study characteristics and key findings, the full citation is also provided.

Criteria for Selection

In most cases, research from 1990¹ to 2005 was examined to assess the impact of the major factors behind each of the nine EPCs on various academic indicators. In order to be included in this report, the publication had to be readily accessible in its entirety. The primary sources used in this literature search were ERIC, Google Scholar, UC Library Catalog, and Psych Info. In some cases, it was difficult to access research on a

¹In some cases, research prior to 1990 had to be considered. Once a given research topic has been examined, and results published, subsequent research is not generally continued. The main reason for setting a timeline on this report is that we had a concern by some teachers and administrators who suggested that older research is too dated to be meaningful. In most cases, research using sound methodology should not be minimized due to when it was published. After research has confirmed the effectiveness of a given topic/theory, it sometimes takes years to make it into practice, which might explain the necessity to look at the research prior to 1990.

given factor. For this report, the literature search continued until a minimum of three publications for each factor was found. In cases where more publications were readily accessible, more than three were reviewed and summarized.

Once the researchers obtained the publication, they determined if there was a match between the factor in the publication and one of the nine EPCs. In order to do this, they created operational questions for each EPC. For example, EPC 3 deals with principals' leadership training. The researchers converted this EPC into the question, "Is instructional leadership training related to student achievement?" When looking at studies, the authors used the EPC research questions to determine if the study could answer the question. This task was more difficult for some components. If it was determined there was a match, the factor was identified, and the basic study's characteristics and key findings were briefly summarized in a matrix. Specific quantifiable findings were included in the summary whenever the study provided them. More direct research of the impact of implementation of the EPCs is needed, especially about the impact of intervention programs for students two or more years behind in mathematics and reading/language arts.

Only research using experimental, correlational, case study quasi-experimental, and meta-analytic designs were considered for this report. No research was excluded due to the direction of the finding. In other words, research was not excluded if it showed the factor to be negatively related to performance. The only exclusion criterion was a lack of match to a particular EPC (e.g., if the factor in the study was not close enough to any of the EPCs or was not defined well enough to match to a particular EPC). Below are the tables summarizing the research.

EPC 1: Use of State Board of Education (SBE) adopted (K-8) or standards-aligned (9-12) English/language arts and mathematics instructional programs, including intervention programs

Research Question: What is the relationship between use of current, state adopted standards-based instructional programs and student achievement?

Researcher(s)	Factor	Study Characteristics	Finding	Citation
Ai, 2002	Standards-based textbooks, Professional development	This report studied the relationship between DMP (District Mathematics Plan) initiatives such as standards-based textbooks and professional development and improved classroom practices and student achievement. 160 elementary and secondary classes in 40 randomly chosen LAUSD schools were studied.	Following the DMP, SAT/9 2001-02 math scores increased more than 2000-01 in 2 nd , 3 rd , 4 th , 5 th , 10 th , and 11 th grades. Improvements were mainly in the domain of mathematics procedures rather than problem solving.	<i>Ai, X. District Mathematics Plan Evaluation: 2001-2002 Evaluation Report.</i>
Wise, et. al., 2004	Updated textbooks and standards alignment	This study surveyed high school principals and teachers, and principals and teachers at schools feeding into those high schools. A total of 298 high schools completed the surveys. Additionally, researchers conducted site interviews at 45 high schools and 17 middle schools, resulting in 499 total interviews.	Researchers found a clear relationship between how recently the textbook was adopted and the likelihood that the course would be rated as having very good alignment to standards. 67% of ELA courses with textbooks adopted in 2002-03 rated having very good standards' alignment, vs. only 37% with textbooks adopted prior to 1999. 72% Mathematics courses with textbooks adopted in 2002-03 were rated having very good standards' alignment, versus only 50% with textbooks adopted prior to 1999.	<i>Wise, et. al. (2005). Independent Evaluation of the California High School Exit Examination (CAHSEE): Second Biennial Report.</i>

EPC 1: Use of State Board of Education (SBE) adopted (K-8) or standards-aligned (9-12) English/language arts and mathematics instructional programs, including intervention programs

Research Question: What is the relationship between use of current, state adopted standards-based instructional programs and student achievement?

Researcher(s)	Factor	Study Characteristics	Finding	Citation
Newmann, et. al., 2001	Program coherence and student achievement	<p>Surveys of instructional program coherence were given to all Chicago public elementary school teachers. The data were then merged with Iowa Tests of Basic Skills (ITBS) in Reading and Math for all students in grades 2 through 8.</p> <p>5,358 teachers participated in the first year of the study, and 5,560 teachers participated in the second year across 222 elementary schools.</p>	<p>The study showed that schools demonstrating high instructional program coherence were more likely to improve than schools with lower program coherence. Average growth on the ITBS was calculated from 1993 to 1997. Across the state, students showed an average increase of 12% in both reading and math. However, schools with high levels of improved program coherence (as measured by teacher surveys) showed an average of 19% increase in reading and 17% increase in math. This gain is equivalent to about two additional months of schooling per year.² Schools that either declined in program coherence or showed no change in program coherence had smaller gains than the schools that showed higher levels of improved coherence.</p> <p>Overall, the research showed that schools ranking high on program coherence tend to have stronger principal leadership, while lower ranking schools allow teachers more individual autonomy and discretion to select their own curriculum materials, instructional strategies and assessment.</p>	<p><i>Newmann, F.M., Smith, B., Allensworth, & Bryk, A.S. (2001). School Instructional Program Coherence: Benefits and Challenges. Improving Chicago's Schools: Consortium on Chicago School Research, IL.</i></p>

² The authors used item response theory to account for the different forms and levels of the achievement test. They determined that .6 logits corresponded to approximately one year of learning. Students in schools with high program coherence showed improvements of nearly one full year of learning (.52 logits in reading and .59 logits in math) relative to students in schools with low program coherence.

EPC 2: Adherence to instructional minutes for reading/language arts and mathematics (K-8) and high school student access to standards-aligned core courses and pacing schedules

Research Question: How are adherence to protected instructional time and student access to standards-aligned core courses related to student achievement?

Researcher(s)	Factor	Study Characteristics	Finding	Citation
Cotton, 1989-1990	Instructional time	The author conducted a comprehensive review of the educational literature on the impact of time, its many definitions, and how it affects student achievement.	<p>General findings suggest that there are positive correlations between:</p> <ol style="list-style-type: none"> 1. Allocated time and student achievement. More time was related to greater student achievement, though this relationship was not statistically significant. 2. Time on-task and student performance. More on-task time was related to better performance. 3. Academic learning time and student achievement. This relationship demonstrated the strongest positive correlation and was statistically significant. The greater the academic learning time, the greater the student achievement. <p>The general conclusion was that time was an important element related to student achievement. Recommendations were made by the author to teachers and administrators to decrease time spent on non-academic activities and to ensure that instructional time was used in the most effective ways to target the areas of greatest value.</p>	<p><i>Cotton, K. (1989-1990)</i> <i>Educational time factors. Regional Educational Laboratories, School Improvement Research Series IV.</i> http://www.nwrel.org/scpd/sirs/4/cu8.html.</p>
Letgers, Balfanz, Jordan, McPartland 2002	Core classes	Freshmen in an experimental group were placed into core English and mathematics courses in the second semester. These students also took Freshman	<p>In every case, the students in the experimental schools outperformed the students in the control schools.</p> <p>In nearly every case, the students in the</p>	<p><i>Letgers, N.E., Balfanz, R., Jordan, W. & McPartland, J. (2002)</i></p>

EPC 2: Adherence to instructional minutes for reading/language arts and mathematics (K-8) and high school student access to standards-aligned core courses and pacing schedules

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Researcher(s)	Factor	Study Characteristics	Finding	Citation
		<p>Seminars paired with social studies and science courses, so that they spent almost all class time during the ninth grade in core academic courses.</p> <p>Ninth-grade students in both types of schools were given standardized tests in English and mathematics.</p>	<p>experimental schools had substantial gains in standardized test scores.</p> <p>The gains were of magnitudes that indicated that students made significant progress in closing academic achievement gaps.</p>	<p><i>Comprehensive Reform for Urban High Schools. A Talent Development Approach. Sociology of Education Series. Teachers College Press, New York</i></p>
Jorgensen, et. al., 1997	Standardized classes for all students	<p>A case study was performed on two New England high schools - one with a curriculum and scheduling that is distinct for honors, college prep, general, basic, and special education students, and the other with a broadened curriculum used for all students.</p>	<p>The school with differentiated curriculum granted diplomas to students regardless of amount or type of knowledge learned. Curriculum was different for each student; each student was held to a different standard of achievement.</p> <p>Students in the second school were all exposed to the same material, but the interpretation and relevance of the subject was left up to the student. Students who would have been in honors classes were able to synthesize and analyze the material. Students who would have been in special education were able to learn and connect to material not usually provided to them.</p> <p>Establishing one standards-based curriculum that is broadened to fit the needs of all students was found to be more effective.</p>	<p><i>Jorgensen, C.M., Fisher, D., & Roach, V. (1997). Curriculum and its impact on inclusion and achievement of students with disabilities. Consortium on Inclusive Schooling Practices Issue Brief, 2 (2), CISP Publications and Resources.</i></p>

EPC 3: Principals' Instructional Leadership Training**Research Question: Is instructional leadership training related to student achievement?**

Researcher(s)	Factor	Study Characteristics	Finding	Citation
Hughes, 2005	Principal leadership	<p>This research examined the role of school leadership in improving school performance.</p> <p>The study used background interviews, focus groups, and informal surveys.</p>	<p>The study revealed connections between strategic ends and operational excellence are much looser in education than in other professions.</p> <p>The study found that many principals did not feel prepared to lead their schools to higher student achievement.</p> <p>Principals were spending only 15 to 30 percent of their time on improving instruction in their schools.</p> <p>The study recommended principal leadership training in attempt to fix and focus on higher student achievement.</p>	<p><i>Hughes, R.C. (2005). Creating a New Approach to Principal Leadership: The National Institute of School Leadership has Borrowed from the Leadership Practices of Other Professions to Build an Innovative Program for Principals; v84 n5 p34-39 May-Jun 2005</i></p>
Waters, Marzano, McNulty, 2003	Principal leadership	<p>This study outlines a leadership framework based on a quantitative analysis of 30 years of research, a review of the theoretical literature on leadership, and the research team's 100+ years of combined professional experience on school leadership.</p> <p>A meta-analysis was performed using 70 studies on the effect of leadership on student performance involving approximately 1.1 million students and 14,000 teachers.</p>	<p>The average effect size between principal leadership and student achievement was found to be a notable .25.</p> <p>The two primary variables in whether leadership has a positive or negative impact are: the leader identifies and focuses on changes most likely to have a positive impact on student achievement, and the leader understands magnitude of change-leading and adjusts leadership accordingly.</p>	<p><i>Waters, T., Marzano, R.J., & McNulty, B. (2003). Balanced Leadership: What 30 years of research tells us about the effect of leadership on student achievement. Aurora, CO: Mid-continent Research for Ed. and Learning.</i></p>

EPC 3: Principals' Instructional Leadership Training

Research Question: Is instructional leadership training related to student achievement?

Researcher(s)	Factor	Study Characteristics	Finding	Citation
Cotton, 2003	Principal leadership	The author reviewed 81 research articles on the topic of principal leadership skills and student achievement. The research investigated spanned 20 years. Through this review the author was able to identify 26 essential traits and behaviors of successful principals.	<p>Primary principal leadership factors related to student achievement success are commitment to teacher development and student discipline.</p> <p>Although emphasis on professional development for teachers may suggest the impact of leadership is indirect, this is to be expected. The nature of leadership is indirect as many decisions and policies are carried out by others. This is not an indication of weakness within the relationship. Teachers are the front line in interactions with students; they directly support student learning. The principal facilitates that arrangement.</p> <p>Here are the remaining factors: goals focused on high levels of student learning; high expectations of students; self-confidence, responsibility, and perseverance; visibility and accessibility; positive and supportive school climate; communication and interaction; interpersonal support; community outreach and involvement; rituals, ceremonies, and other symbolic actions; shared leadership and staff empowerment; instructional leadership; norm of continuous improvement; classroom observations and feedback to teachers; teacher autonomy; and support of risk taking.</p>	<p><i>Cotton, K. (2003). Principals and Student Achievement: What the Research Says. Alexandria, VA: Association for Supervision and Curriculum Development,</i></p>

EPC 4: Teachers' Professional Development Opportunities

Research Question: What is the relationship between teacher professional development and teacher knowledge, practices, and/or student achievement?

Researcher(s)	Factor	Study Characteristics	Key Finding(s)	Citation
Firestone, Mangin, Martinez, & Polovsky, 2005	Professional development	<p>Research examined development and implementation of teacher professional development programs with focus on coherence and content focus.</p> <p>Case studies were performed on three similar districts; four schools were chosen in each district for focused data collection: one high school, one middle school, and two elementary schools.</p>	<p>A district that prioritizes teacher training can develop a coherent program that improves teacher instruction and pedagogical content knowledge. The district with the highest coherence, as compared to the districts with less coherence, had more teachers report that they learned the subject matter (11/28 versus 3/17) and found the training useful (11/28 versus 2/17). The district that allowed teacher choice with respect to professional development had teachers report feeling a lack of support from the district and few teachers reported implementing the program.</p>	<p><i>Firestone, W.A., Mangin, M.M., Martinez, M.C., & Polovsky, T. (2005). Content and coherence in district professional development: Three case studies. Educational Administration Quarterly; v41 n3 p413-448.</i></p>
Cohen & Hill, 2000	Framework-related professional development	<p>This study described the relationship between instructional policy (assessment, curriculum, and professional development), teaching, and learning in relation to mathematics.</p> <p>Data were collected from a 1994 survey of elementary school teachers and 1994 California Learning Assessment System scores.</p>	<p>It was found that two-thirds of teachers attended some specific professional development in math, but the majority only spent a day or less in training.</p> <p><i>Professional Development and Practice:</i> A positive relationship was found between time spent in curriculum related workshops and increased reform-oriented practices ($r = .17$), whereas time spent in workshops not closely related to curriculum showed virtually no relationship with practice ($r = .03$).</p> <p><i>Professional Development and Student Achievement:</i> A positive relationship was found between teachers' opportunities to learn and students' math performance. More</p>	<p><i>Cohen, D.K. & Hill, H.C. (2000). Instructional policy and classroom performance: The mathematics reform in California. Teachers College Record; v102 n2 p294-343.</i></p>

EPC 4: Teachers' Professional Development Opportunities

Research Question: What is the relationship between teacher professional development and teacher knowledge, practices, and/or student achievement?

Researcher(s)	Factor	Study Characteristics	Key Finding(s)	Citation
			<p>specifically, a positive relationship was found between teacher use of framework related instruction and scores on the California Learning Assessment System (CLAS; $r = .16$), even after controlling for major demographics, including socio-economic status. It was also found that students who had teachers that used replacement units scored about one-fifth of a standard deviation higher than students with teachers that did not use replacement units. Finally, it was found that students that had teachers who learned about the CLAS in their professional development performed about one-third a standard deviation higher than students with teachers that did not.</p>	
<p>Whitehurst, 2002</p>	<p>Teacher preparation, Professional development</p>	<p>A meta-analysis was performed on research regarding what makes a teacher well-prepared and more effective.</p>	<p>Focused, standards-aligned training of teachers is ranked second only to teacher cognitive ability in terms of student academic achievement.</p> <p>Additionally, in order for standards-based reform to work, teachers must have standard-aligned curriculum and professional development to deliver the curriculum.</p>	<p><i>Whitehurst, G.J. (2002). Research on Teacher Preparation and Professional Development. Whitehouse Conference. http://www.ed.gov/admins/tchrqual/learn/preparingteachersconference/whitehurst.html</i></p>

EPC 5: Student Achievement Monitoring System				
Research Question: What is the impact of student testing and monitoring of student data on student achievement?				
Researcher(s)	Factor	Study Characteristics	Key Finding(s)	Citation
Levine & Lezotte, 1990	Frequent monitoring	Case study reviewed unusually effective elementary schools.	Frequent monitoring of student performance is positively related to school effectiveness.	<i>Levine, D.U. & Lezotte, L.W. (1990). Unusually Effective Schools: A Review and Analysis of Research and Practice. Madison, WI: National Center for Effective Schools Research and Development.</i>
Schmoker 2001	Information management systems	Research includes a case study of a low performing district in Michigan that started using data from a monitoring system to guide instruction and set goals among other things.	Large increases on state-wide assessments in ELA and math at all grade levels were found; went from an average of 17% to 58% of students scoring at the proficient level.	<i>Schmoker, M. (2001). The Results Fieldbook: Practical Strategies from Dramatically Improved Schools. Virginia: Association for Supervision and Curriculum Development.</i>
Bangert-Drowns, et. al, 1991	Student assessment feedback	Study consisted of a meta-analysis of 40 studies (58 effect sizes) on instructional effects of feedback in tests.	Timing and type of feedback have strong impacts on the relationship between feedback and increased achievement. Slightly delayed feedback showed greater effects than feedback given after each question (mean	<i>Bangert-Drowns, R.L. et. al. (1991). The Instructional Effect of Feedback in Test-Like Events.</i>

EPC 5: Student Achievement Monitoring System				
Research Question: What is the impact of student testing and monitoring of student data on student achievement?				
Researcher(s)	Factor	Study Characteristics	Key Finding(s)	Citation
			<p>effects = .74 for day after and .53 for week after versus .19 immediate). Programmed feedback (e.g., drill and practice, and software tutorial) have a smaller effect on achievement than other types of feedback. Studies where students were given explanations surrounding the error had a larger effect on achievement than those that gave only the correctness or incorrectness of the response (mean effects = .53 versus -.08).</p> <p>Students who made more initial errors benefited more from feedback than those who made fewer initial errors.</p> <p>Subject matter was unrelated to the relationship between feedback and achievement.</p>	<i>Review of Educational Research; v61 n2 p213-38.</i>
Bangert-Drowns, et. al, 1991	Student testing and achievement	Study consisted of a meta-analysis of 40 studies looking at effects of frequent classroom testing on students.	<p>Students who were tested at least once over a 15 week period performed about a half standard deviation better than untested students on summative measures/criterion tests. However, improvement was much smaller, about one-tenth of a standard deviation, when frequently tested students were compared to other students who also received tests, only less frequently.</p> <p>Frequently tested students rated their classes more favorably than did students who were less frequently tested.</p>	<i>Bangert-Drowns, R.L. et al. (1991). Effects of Frequent Classroom Testing. Journal of Educational Research; v85 n2 p89-99.</i>

EPC 6: Ongoing Instructional Assistance and Support

Research Question: What is the relationship between teacher support and/or instructional coaching on student achievement?

Researcher(s)	Factor	Study Characteristics	Finding	
Ross, 1992	Coaching and teacher efficacy	This study investigated the interaction between student achievement, teacher efficacy, and coaching contacts. The sample consisted of 18 grade 7 and 8 history teachers across 36 classes with the help of six coaches.	<p>Students of teachers with more coaching demonstrated greater student achievement gains relative to students of teachers with less coaching.</p> <p>Students of teachers with greater confidence in the “effectiveness of education,” showed greater achievement relative to students of teachers with less confidence.</p> <p>Teachers who relied on school administrators for information and guidance reported less involvement with their coaches, and these teachers obtained lower student achievement.</p>	<p><i>Ross, J.A., (1992). Teacher Efficacy and the Effects of Coaching on Student Achievement, Canadian Journal of Education, 17:1.</i></p>
Bush, R.N. 1984 (Joyce & Showers, 1980)	Coaching and level of Implementation	The author tested the model proposed by Joyce and Showers (1980) that suggested professional development should consist of five components, yet most programs tend to focus on the first component and fail to implement the remaining four. The five components are: presentation, demonstration, practice, feedback, and	<p>It was found that implementation of the descriptive or presentation component resulted in only 10 % of the teachers trained using that new knowledge in the classroom. If the teachers were exposed to the first two components, presentation and demonstration, 2 to 3 % more teachers could implement the new skill in the classroom. Inclusion of the third and fourth components, practice and feedback, resulted in 2% to 3% more implementation each. The first four components combined resulted in 16-19% of</p>	<p><i>Bush, R.N. (1984). Effective staff development. In making our schools more effective: Proceedings of three state conferences. San Francisco: Far West</i></p> <p><i>Joyce, B. & Showers, B. (1980). Improving</i></p>

EPC 6: Ongoing Instructional Assistance and Support

Research Question: What is the relationship between teacher support and/or instructional coaching on student achievement?

Researcher(s)	Factor	Study Characteristics	Finding	
		coaching. Research examined the contribution of all five components to implementation of new skills and strategies in the classroom.	trained teachers using their new skills. Adding the fifth component, coaching, resulted in an increase of 76% to 79%. When teachers were exposed to all five components, 95% of them were able to apply what they learned in their classrooms. Coaching was determined to be the most critical component in long term use and application of their professional development training.	<i>inservice training: The messages of research. Educational Leadership, 37(5), 379-385.</i>
Grinder, 1996	Cognitive coaching	A three-year longitudinal study examined the impact of cognitive coaching on student achievement.	Students of teachers in the intervention group implementing cognitive coaching, nonverbal classroom management and monthly dialogue groups showed significant improvement over the course on the Iowa Test of Basic Skills relative to a comparison group. Increased scores were on total score, integrated writing total score, math advanced skills, integrated writing advanced skills, and math total score. In addition, teachers in the intervention group also referred fewer students to special education relative to comparison teachers.	<i>Grinder, M. (1996). ENVoY: A personal guide to classroom management. Battle Ground, WA: Michael Grinder & Associates.</i>

EPC 7: Teacher/Department and Subject Matter Collaboration**Research Question: What is the relationship between teacher collaboration and improvement of student achievement?**

Researcher(s)	Factor	Study Characteristics	Key Finding(s)	Citation
Louis & Marks, 1998	Collaboration	<p>The study examined to what extent the variation in student achievement that occurs among schools is associated with the organization as a professional community. A professional community is defined by the study as a school organizational structure that practices the following five elements: shared values, focus on student learning, collaboration, deprivatized practice, and reflective dialogue.</p> <p>Data were collected between 1991 and 1994 from eight elementary, eight middle, and eight high schools. The data were collected from teacher questionnaires, teacher interviews, classroom observations, student surveys, and student assessments in mathematics and social studies.</p>	<p>Adjusting for grade level and student background, with no classroom-level predictors, it was found that the student achievement level is significantly higher to the extent that schools are strong professional communities (.26, $p \leq .001$).</p> <p>The study found that professional community strongly predicts the school's level of teaching quality as measured by pedagogy, and this directly boosts student achievement.</p>	<p><i>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(4) 532-575.</i></p>
Little, 1982	Collegiality	<p>The researchers studied three elementary and three secondary schools for insight into staff development's contribution to school success. Four of the</p>	<p>At one elementary school that was ranked as 'high success,' teachers participated in inservice meetings once a week, spent time during faculty meetings to discuss research or classroom practice, and work in grade-level</p>	<p><i>Little, J.W. (1982). Norms of Collegiality and Experimentation: Workplace Conditions of School</i></p>

EPC 7: Teacher/Department and Subject Matter Collaboration

Research Question: What is the relationship between teacher collaboration and improvement of student achievement?

Researcher(s)	Factor	Study Characteristics	Key Finding(s)	Citation
		<p>schools were ranked as relatively more successful, while the other two were ranked as relatively less successful. Schools were ranked on the basis of aggregate standardized achievement scores over a three-year period in reading, language arts, and mathematics.</p> <p>Over 19 weeks, interviews were conducted with 105 teachers and 14 administrators in six schools, as well as 14 members of the district's central administration. Observations were also conducted in various places on the grounds of the six schools.</p>	<p>teams to create lesson plans and prepare materials.</p> <p>At one high school, departments reported that when teachers met often to work together on curriculum and classroom approaches, student performance and discipline were improved.</p> <p>The study concludes that clear expectations for teacher participation in observation, shared planning, and learning lead to a greater prospects that interaction will influence teachers' practices and school success.</p> <p>The most adaptable and successful of the schools studied achieved continuous improvement as a shared undertaking.</p> <p>When collegiality prevailed, staff development appeared to have the greatest prospects for influence.</p>	<p><i>Success. American Educational Research Journal, 91(3) 325-340.</i></p>
Friedkin & Slater, 1994	Teacher interactions	Relationship between teacher interactions and student achievement in 17 elementary schools was studied.	Researchers found a positive relationship between teacher to teacher discussions and teachers giving advice with student achievement ($r_s = .326$ & $.22$) and a negative relationship between teacher friendships/social interactions and achievement ($r = -.252$).	<i>Friedkin, N.E., & Slater, M.R. (1994). School leadership and performance: A social network approach. Sociology of Education, 67, 139-157.</i>

EPC 7: Teacher/Department and Subject Matter Collaboration**Research Question: What is the relationship between teacher collaboration and improvement of student achievement?**

Researcher(s)	Factor	Study Characteristics	Key Finding(s)	Citation
Schmoker & Wilson, 1993	Collaboration	Profiles of schools that have successfully applied collaboration strategies are provided. Student achievement is examined after teachers began to meet routinely to analyze scores, identify strengths and weaknesses, and develop ways to effectively address them.	<p>Johnson City School District of New York saw the following gains after implementing a based improvement program in 1972:</p> <ul style="list-style-type: none"> • K-12 composite scores rose from 45% - 50% students at or above grade level in 1972 to 70% in 1977 and 80% - 90% in 1984. • Scores for six months or more above grade level according to the California Achievement Tests rose from 44% in reading and math in 1976 to 75% and 79%, respectively, in 1984. <p>Daniel Webster Elementary School of California achieved the following after beginning an Accelerated Schools program that focused on team building during the initial year:</p> <ul style="list-style-type: none"> • The school showed the greatest gains in language arts during the 1990-91 school year out of 72 elementary schools in the San Francisco system. • From 1991-1993, it went from being ranked 69th among the district's schools to 23rd. • The average increase across all five grades in mathematics was 19 percentile points, with all grades performing above grade level. <p>Hollibrook Elementary School of Texas</p>	<p><i>Schmoker, M.J. & Wilson, R. (1993). Total Quality Education: Profiles of Schools That Demonstrate the Power of Deming's Management Principles. Phi Delta Kappa Educational Foundation. Bloomington, IN.</i></p>

EPC 7: Teacher/Department and Subject Matter Collaboration

Research Question: What is the relationship between teacher collaboration and improvement of student achievement?

Researcher(s)	Factor	Study Characteristics	Key Finding(s)	Citation
			<p>adopted the Accelerated Schools program in 1989 and saw the following gains:</p> <ul style="list-style-type: none"> • Fifth-graders were scoring at the 4.8 grade level on composite scores on the SRA standardized tests in 1988; fifth-graders were achieving at the 5.8 grade level three years later. • Fifth-graders were scoring at the 3.7 grade level in reading and language arts in 1988; three years later, reading and language arts scores rose to 5.2 and 5.6 respectively. <p>Northview Elementary School of Kansas saw the following gains after implementing a program with a primary focus on teacher teamwork:</p> <ul style="list-style-type: none"> • Fourth-grade reading scores (percentile) on district achievement tests rose from 59.5% to 100%. Sixth-grade reading scores rose from 41.7% to 97%. • In math, fourth-grade test scores rose from 70.3% to 98.6%. Sixth-grade math scores rose from 31.9% to 97.1%. 	

EPC 8: Lesson Pacing Schedules (K-6)

Research Question: Do lesson pacing schedules improve student achievement?

EPC 8: Intervention Programs for Students Performing Below Grade Level Standards (9-12)

Research Question: Do intervention programs for students 2 or more years below grade level in reading and/or mathematics improve student achievement?

Researcher(s)	Factor	Study Characteristics	Finding	
Marsh, et al. (2005)	Implementation and perceived usefulness of curriculum guides	The researchers used a comparative case study design across three urban school districts. The data collection methods included field interviews, focus groups, surveys, and document review over a two-year period.	<p>Teachers and principals reported implementation of curriculum guides was helpful for planning purposes, increased consistency of teaching across schools and increased continuity across grades (almost 75% of teachers and more than 95% of principals).</p> <p>More than 80% of principals reported the guides helped them better observe and provide feedback to teachers.</p> <p>In spite of benefits reported by teachers, many teachers also reported that guides were sometimes unrealistic with respect to amount of content expected to be covered (about 70% of teachers). They also reported that such guides do not allow them to meet the needs of all students, especially those with LEP and IEPs (about 70% of teachers).</p> <p>No data were presented showing impact of pacing guides on student performance or achievement.</p>	<p><i>Marsh, J.A., Kerr, K.A., Ikemoto, G., Darilek, H., Suttorp, M., Zimmer, R.W., & Barney, H. (2005) The Role of Districts in Fostering Instructional Improvement: Lessons from Three Urban Districts Partnered with the Institute for Learning.</i></p> <p>Full Document: (http://www.rand.org/pubs/monographs/2005/RAND_MG361.pdf)</p>
Codding & Tucker, 1999	Intervention	Findings based on work done at Pasadena High School (1988-93) using a case study-type approach.	<p>Pasadena High School saw improvements from the bottom quartile on the SAT to 57th percentile in mathematics.</p> <p>Note: Pasadena High School used a</p>	<p><i>Codding, J.B. & Tucker, M. (1999). A New High School Design Focused on Student Performance.</i></p>

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Researcher(s)	Factor	Study Characteristics	Finding	
		Over four semesters, students took two different, but complementary math classes each day: one focused on computation and concept, the other focused on application. An intensive tutoring program was provided during and after school, as well as on Saturday mornings. Students' parents signed contracts to have their child attend the extra classes if necessary. Grades consisted of A, B, or no credit, and the school provided an extended school year program for students not passing with an 80% or higher score.	comprehensive approach to school change, thus math intervention was accompanied by other elements considered to be essential to high school reform. However, math scores showed large gains over the five year span, whereas ELA scores did not. Thus, it is reasonable to expect that the highly structured math intervention program played a significant role in increasing achievement in math.	<i>In Marsh, D.D., Coddling, J.B., and associates (Eds.), The New American High School (pp. 137-165). Corwin Press, Thousand Oaks, California</i>
Bangert-Drowns, Hurley, Wilkinson, 2004	Writing intervention and academic achievement	Meta-analysis of 48 school-based writing-to-learn programs, with the bulk of the studies between 1985 and 1995 (85%). Writing-to-learn (WTL) activities are usually short, informal writing tasks that help students think through key concepts or ideas	The writing intervention program typically produced small, positive effects on school achievement. Many factors, such as grade level, moderated the program achievement effects. Treatment length may moderate intervention effects. There is some evidence in this review that longer interventions yield more positive	<i>Bangert-Drowns, R. I., Hurley, M.M., & Wilkinson, B. (2004). The effects of school-based writing-to-learn interventions on academic achievement. A meta-analysis. Review of</i>

EPC 8: Lesson Pacing Schedules (K-6)

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Research Question: Do intervention programs for students 2 or more years below grade level in reading and/or mathematics improve student achievement?

Researcher(s)	Factor	Study Characteristics	Finding	
		and access higher order thinking.	effects.	<i>Educational Research, 74(1) 29-58.</i>

EPC 9: The general and categorical funds of the school or district are used appropriately to support the reading/English-language arts and mathematics program goals in the school plan.

Research Question: Does student achievement in reading and mathematics improve with appropriate funding?

Researcher(s)	Factor	Study Characteristics	Finding	
Bond, Boyd, and Montgomery, 1999	Fiscal Support	This qualitative study of 17 school districts across the nation compiled best practices in the coordination of resources and fiscal support of standards-based math programs. Extensive interviews and profiles were created to capture a comprehensive picture of what these districts were “doing right.”	Districts often seek out additional funds to support mathematics improvement efforts, while overlooking federal resources that are available. Proper coordination of Title I money with other local, state, and federal funds can result in improved student achievement.	<i>Bond, S.L., Boyd, S.E., & D.L. (1999). Coordinating Resources to Support Standards-Based Mathematics Education Programs. Prepared for U.S. Dept. of Ed. & Nat’l. Science Foundation by Horizon Research, Inc.</i>
Reschovsky, and Imazeki, 2003	Fiscal Support	Researchers conducted a study using data on per-pupil school expenditures, student performance, and several demographic variables to perform a cost/function	Some schools are improperly financed because equations that determine allocation of resources ignore the fact that characteristics of schools and students require some schools spend more than others to achieve any given performance standard. Thus, coordination of resources in areas of greatest need and solicitation of	<i>Reschovsky, A. & Imazeki, J. (2003). Let No Child Be Left Behind: Determining the Cost of Improving Student Performance. Public Finance</i>

EPC 9: The general and categorical funds of the school or district are used appropriately to support the reading/English-language arts and mathematics program goals in the school plan.

Research Question: Does student achievement in reading and mathematics improve with appropriate funding?

Researcher(s)	Factor	Study Characteristics	Finding	
		analysis.	additional funding streams are extremely important if schools are to meet rigorous accountability standards.	<i>Review, 31: 263-290.</i>
Bell, 2002	Fiscal Support	This research used a qualitative analysis of 12 high-performing, high-poverty schools. A best practices review.	Regardless of size of their budgets, principals that were given latitude to use innovation and flexibility to procure funding from multiple resources (private, state, federal) and refused to use lack of funds or the backgrounds of their students as excuses for poor achievement, were more likely to produce successful results.	<i>Bell, J.A. (2002). California's High-Performing, High-Poverty Schools, National Title I Conference.</i>

**California’s High-Performing High-Poverty Schools
Presented at the National Title I Conference, January 2002**

Research on high-poverty, high performing (HP2) schools was synthesized and related to existing research on academic achievement. Several factors found in the research were common across all 12 schools in the study. Nine of the factors found to be common across the HP2 schools could be directly linked to the nine EPCs. It should be noted that the development of the EPCs did not occur until 2002, almost two years after the research was collected on the HP2 schools. The close alignment between the HP2 schools research and the nine EPCs suggests that using the constellation of practices identified with the EPCs is related to high academic performance.

Factor in Research Literature and HP2 Schools	EPC
High-quality teaching and learning of rigorous standards	<p>EPC 1: Instructional Program: Standards-aligned English-language arts and mathematics textbooks and SBE - adopted Pre-Algebra and Algebra I textbooks</p> <p>EPC 2: Student Access to High School Standards-aligned Core Courses (master schedule and pacing schedule)</p>
Collegial and collaborative faculty; teamwork	EPC 7: Teacher/Department and Subject Matter Collaboration
Staff development linked to teaching of standards	<p>EPC 4: Teachers’ Professional Development Opportunities</p> <p>EPC 6: Ongoing Instructional Assistance and Support (Coaching)</p>
Use of state and local standards and/or accountability systems to drive school improvement efforts and student academic achievement	EPC 1: Instructional Program: Standards-aligned English-language arts and mathematics textbooks and SBE - adopted Pre-Algebra and Algebra I textbooks
Use of research and/or data to promote continuous improvement	EPC 5: Student Achievement Monitoring System
Strong site leadership	EPC 3: Principals' Instructional Leadership Training
Sufficient resources to pursue and sustain site goals	EPC 9: Fiscal Support
Extended learning time and early interventions	EPC 8: Intervention Programs for Students Performing Below Grade Level
Frequent monitoring of student progress	EPC 5: Student Achievement Monitoring System