Improving Rigor and Relevance in the High School Curriculum

September 2005

IOWA
High Schools
BRIGHTER FUTURES

State of Iowa
Department of Education
Grimes State Office Building
Des Moines, Iowa
50319-0146

IOWA
High Schools
BRIGHTER FUTURES

September 2005

Improving Rigor and Relevance in the High School Curriculum

Even a cursory review of the literature on secondary school reform makes a compelling case for why Iowa's secondary schools need to change. Experts agree that all youth will need to leave high school capable of taking advantage of post-secondary educational opportunities if they are to expect "economic success – even survival – in an economy where the exchange of information dominates the world of work" (*On Course for Success*, 2004, p. 1). Information from the U.S. Department of Labor (2003) shows dramatic financial benefits gained through graduation from college, with college graduates earning nearly twice as much as those with only high school degrees and being much more likely to find employment and adapt to the changing workforce. Even those with associate degrees can expect to earn at least 20 percent more than their peers with only high school diplomas.

Although the state has experienced a slight improvement in its high school graduation rate (from 87 percent in 1996 to 89.8 percent in 2004), more than 10 percent of all Iowa high school students fail to graduate. The statistics are more dismal for American Indian, Hispanic, and African-American students, whose rate of graduation in 2004 was 62.7 percent, 72.4 percent, and 73.6 percent respectively (Iowa State Report Card for No Child Left Behind, 2005). Also, students in Iowa's largest school districts are less likely to graduate than those in smaller districts. While the graduation rate in districts with an enrollment between 400 and 599 was 95.5 in 2003, the rate in districts of more than 7,500 students was 82.8 (Iowa Condition of Education Report, 2004).

Among those who do graduate, too many leave high school without the skills necessary for college-level course work. In fact, an estimated 14.1 percent of Iowa's high school students fail to take college-preparatory mathematics courses like Algebra or Geometry, opting instead for applied or basic mathematics courses. Algebra I was once thought to be the traditional mathematics course selection for high school freshmen, but in the 2003-2004 school year, 45.3 percent of Iowa ninth graders took a lower level course. Data collected by the American College Testing (ACT) Assessment presents even more reason for concern. Of the 67 percent of Iowa's high school graduates who took the ACT in 2004, only 66 percent of them expected to complete a high school program consisting of at least four years of English and at least three years of mathematics, natural science, and social studies (Iowa Condition of Education Report, 2004).

Further examination of data collected by the Department demonstrates that not all Iowa high school students have rigorous learning experiences. In some instances, rigorous coursework may not be available. In 2003 while nearly 60 percent of all U.S. high schools participated in the Advanced Placement (AP) program, slightly more than 45 percent of Iowa high schools participated. That

year Iowa's school participation rate ranked 38th among the 50 states and the District of Columbia; also, Iowa ranked 46th in the nation in the number of AP examinations taken per thousand of 11th and 12th graders. In addition, the coursework required for graduation from Iowa's high schools varies considerably. Thirty-seven districts require graduates to complete at least four years of English and at least three years of mathematics, science, and social studies, but two districts require less than two years of English, 14 require less than two years of social studies, 10 require less than two years of science, and five require less than two years of mathematics to graduate. Also, the depth of curricular offerings varies, often dependent upon the district's size. In districts with an enrollment of 7,500+, students selected from among an average of 24.3 units of English, 19.9 units of math, 15.3 units of science, and 15.7 units of social studies during the 2003-04 school year; during that same year in districts with enrollments between 250-399 students, an average of only 8.3 units of English, 7.7 units of math, 6 units of science, and 6.2 units of social studies were available (Iowa Condition of Education Report, 2004).

Disengagements compounds the problem

If problems related to post-secondary education do not offer compelling reasons for change, certainly the malaise that research reports as evident in secondary school today should prompt attention. "Tourists in the classroom" is what two researchers (Rogers & Freiberg, 1994) termed the nearly 40 percent of high school students who are simply "going through the motions" (Steinberg, Brown, & Dornbusch, 1996, p. 67). Instead of playing an active role in acquiring knowledge and skills, they passively sit and watch as the teacher delivers the lesson for the day. An observer would notice little that would evidence their involvement, understanding, and commitment to education.

The impact of this widespread disengagement has been dramatic: "Across the country, whether surrounded by suburban affluence or urban poverty, students' commitment to school is at an all time low..." (Steinberg, Brown, & Dornbusch, 1996, p. 13). Disengagement appears to be prevalent among high school students. Nationally, 25 percent of all student disengage completely by dropping out of school, another 10 to 15 percent disengage through inconsistent attendance, and yet another third trade attendance and compliant behavior for minimal teacher academic expectations (Stevenson & Stigler, 1992). Researchers predict that substantial change will be needed to re-engage students in their learning: "My tentative conclusion is that with the forces of adolescents' work and social lives competing with their academic life, it will take even greater, unending effort on the part of the faculty to capture the students' commitment to their education" (Riedel, 1995, p. 12).

Is raising graduation requirements the solution?

Problems with engagement and post-secondary education point to a clear need to reconsider not only what is taught in Iowa's high schools, but also how it is taught. One response debated by many districts in Iowa is to increase graduation requirements. ACT score results demonstrate that 2004 graduates

who took four years of English and three years of mathematics, science, and social studies outscored their peers who did not by 2.5 points on average. Taking coursework beyond that netted even higher scores. Students who took Trigonometry in addition to Algebra I and II and Geometry outscored their peers who did not by 2.6 points on average.

But even increasing the number or the depth of college preparatory coursework may not solve the problem. According to the Education Trust, while more students are taking and completing college preparatory courses, corresponding improvements in student achievement have not been noted. Reading achievement among 17-year olds as demonstrated by the National Assessment of Educational Progress (NAEP) is slightly down. NAEP also shows that gaps between Hispanics and African Americans and their white and Asian peers have widened since the 1980s in reading and mathematics. This apparent contradiction raises questions about the rigor of some college preparatory courses.

Also, conversations with local school districts indicate that raising graduation requirements may be difficult for many districts. In the spring of 2005 Director Judy Jeffrey met with representatives from virtually every public school district to discuss issues like graduation requirements and academic achievement. In those conversations, several local school leaders expressed concern about the implications of raising graduation requirements. Many felt their districts provided high quality learning in a variety of curricular areas and increasing the number of required English, mathematics, science, or social studies courses would negatively impact course enrollments in areas like career and technical education and fine arts. Others were concerned that co-curricular programs like music, Future Farmers of America, or Peer Helpers would suffer if graduation requirements in English, mathematics, science, or social studies were raised. These co-curricular programs, they felt, were important features of their schools and communities. Still others worried that tight school budgets and difficulty finding appropriately licensed teachers might limit their ability to provide high-level courses in some curricular areas.

These issues were reinforced through twelve Community Conversations, small group discussions sponsored by local districts and the Department of Education, held throughout Iowa in March and April 2005. Parents, students, business leaders, community members, and educators were invited to come together to review high school reform issues and discuss their implications for local communities and schools. One finding of these conversations was that not all participants agreed that preparedness for post-secondary training is an important objective of a high school education. Some participants felt that expecting all students to pursue a four-year post-secondary degree is unrealistic. Director Jeffrey also heard a similar concern from some educators with whom she met who voiced concerns about parents or community members not supporting a more rigorous academic experience for all students in their high schools.

If the key to improving achievement among high school students is increasing rigor, it appears that simply increasing graduation requirements is not

the best solution. Instead Iowa's educators must look for ways to provide rigorous learning experiences in all curricular areas and all classrooms.

What is rigor and how is it achieved?

Efforts to improve teaching and learning in secondary schools are rife in the literature and have involved nearly all aspects of schooling. But three widely agreed upon principles have been demonstrated to create rigorous learning experiences: 1) good teaching is central to improving achievement; 2) teachers must identify rigorous, well-defined curriculum standards, benchmarks, and corresponding assessments; and 3) all stakeholders must hold high expectations for student performance.

Good teaching is no simple matter; knowing an academic discipline well does not make someone a good teacher. "Subject matter expertise requires more than an academic major. Subject matter expertise requires deep, structural understanding of content accompanied by the pedagogic skills to get students to understand this content," contend researchers Donovan, Bransford, and Pellegrino (1999). Good teachers understand learning styles and intelligences and teach in ways that respond to them (Darling-Hammond and Synder, 2000; Stodolsky, 1988; Grossman and Stodolsky, 1995). But a high quality education is not insured by teachers possessing expertise in research based strategies and content knowledge. Ron Edmonds (1979), a significant researcher on the Effective Schools movement in the 1970s, identified that high expectations, particularly for students of a low socioeconomic status, was a cornerstone in effective schools. Furthermore, Reynolds and Teddlie (2000) found that the importance of high expectations was one of the most consistent findings in all the literature, whether the research was done in America, Great Britain, or Holland. In one extensive study on teenagers, researchers found that "students behaved better and performed better in schools where teachers were supportive but firm, and maintained high, well-defined standards for academic work" (Steinberg, Brown, and Dornbursch, 1996, p. 50).

Daggett's Rigor and Relevance Framework

A secondary school reformer whose work has received much attention is W. R. Daggett of the International Center for Leadership in Education. Daggett (2005) asserts that secondary schools can no longer afford to teach only a discrete set of facts, but instead must teach students how to think. It is insufficient to teach students how to do things by rote; now schools must teach people how to do things with deeper levels of understanding. He recommends that school work that most benefits students is that which revolves around high levels of cognitive knowledge applied to real-world situations, that is academic rigor applied in open-ended relevant and unpredictable ways. Daggett advises educators to use the Rigor/Relevance Framework to move beyond the *what of curriculum* to the *how of instruction*. Students will learn more and work harder if the content is related to something they already know something about and are interested in, he contends. (See page 14.)

Because of its versatility and simple, straightforward structure, the Rigor/Relevance Framework is a tool that the Center encourages schools to use to review curriculum, instruction, and assessment. Another advantage of the tool is that it engages all teachers, regardless of the discipline they teach, in a school-wide effort to improve instruction. Academic improvement cannot be the sole responsibility of English, mathematics, science, and social studies teachers. All teachers must be engaged if significant improvement is to take place. Also, its creators maintain, the Rigor/Relevance Framework is an effective companion to other high school reform efforts. Many Iowa high schools have already undertaken significant reform efforts. The Rigor/Relevance Framework can offer further support to those initiatives.

The Rigor/Relevance Framework is based upon two continuums: Bloom's taxonomy describing increasingly complex levels of thinking and an Application Model that describes five increasingly complex levels of putting information into action.

Bloom's taxonomy ranges from the low end of being aware of information and able to recall or locate it to the more complex skills of synthesizing multiple pieces of information or applying it to evaluate additional information. For example, students in a Family and Consumer Sciences class might be asked to demonstrate the increasingly more complex levels of thinking through performing the following tasks in learning basic nutrition:

Basic Nutrition

Level	**Performance**
Level 1 – Knowledge	Label foods by nutritional groups
Level 2 – Comprehension	Explain nutritional value of individual foods
Level 3 – Application	Make use of nutrition guidelines in planning meals
Level 4 – Analysis	Examine success in achieving nutrition goals
Level 5 – Synthesis	Develop personal nutrition goals
Level 6 – Evaluation	Appraise results of personal eating habits over time

From *Rigor and Relevance Handbook,* International Center for Leadership in Education

The Application Model depicts levels of information use ranging from information acquired for its own sake to the use of knowledge to solve complex real-world problems. The five levels of student performance described in the Application Model are illustrated by the following example, which again is on the topic of basic nutrition.

Basic Nutrition

Level	Performance
Level 1 – Knowledge in one Discipline	Label foods by nutritional groups
Level 2 – Application in One Discipline	Rank foods by nutritional value
Level 3 – Interdisciplinary Application	Make cost comparisons of different foods considering nutritional value
Level 4 – Real-world Predictable Situations	Develop a nutritional plan for a person with a health problem affected by food intake
Level 5 – Real-world Unpredictable	Devise a sound nutritional plan for a group of three-year olds who are picky eaters

From *Rigor and Relevance Handbook,* International Center for Leadership in Education

The framework is divided into four quadrants. Quadrant A is at the low end of both continuums; in it students gather and store information and knowledge and are expected only to remember and understand the information. Quadrant B is at the same level of Bloom's taxonomy but students are asked to design solutions to solve problems. In Quadrant C students are asked to complete tasks that involve higher level thinking skills in lower level applications; that is, they are asked to refine and extend their knowledge to analyze and solve problems. Quadrant D of Daggett's Rigor/Relevance Framework is the highest level of both academic rigor and engaging relevance. In it, students must think in complex ways and apply knowledge and skills. Students confront perplexing unknowns and create solutions and take actions that further develop their knowledge and skills. (See page 15.) The International Center for Leadership in Education advocates that teachers use the Rigor/Relevance Framework to plan instruction, select and develop local assessments, and review and revise curriculum.

The following identifies activities students might be asked to do in a high school Social Studies course to illustrate the types of learning that takes place in each of the quadrants:

Quadrant Descriptions
with Examples of Student Activities in High School Social Studies

Quadrant A: Acquisition involves simple recall and basic understanding.
Examples:

- Observe local government proceedings.
- Complete interactive mapping activities on European geography.
- Report on a complex historical event.
- Complete an in-depth geographic study of a world region by analyzing demographic data.
- Research key aspects of the state constitution.

Quadrant B: Application requires students to use acquired knowledge to solve problems, design solutions, and complete work.
Examples:

- Be a juror on a local youth court.
- Conduct a school/community survey on a social issue and analyze results.
- Write letter of support for a proposed local or state policy.
- Complete an income tax form.
- Draw from memory a map of the world; indicating the relative location of continents, oceans, major river systems, nations in the news, and important cities.

Quadrant C: **Assimilation** embraces the acquisition of higher levels of knowledge.
*Example*s:

- Compare/contrast how ancient civilizations valued women, social responsibility, and equality.
- Research and give a presentation on an historical example of nationalism.
- Answer data-based questions using copies of original historical documents.
- Participate in a Socratic seminar on a policy issue, such as privacy.
- Use case studies to investigate how economic systems affect people's incentive for economic gain.

Quadrant D: Adaptation entails accessing information from a number of sources and using it to solve complex problems
Examples:

- Conduct a survey and analyze results on First Amendment issues related to the Internet use.
- Analyze a local, state, or national issue and prescribe a response that promotes the public interest or general welfare (e.g., a voter registration campaign).
- Research and debate economic issues and public policy related to the Internet, such as sharing of online music.
- Evaluate a common practice or proposed legislation for consistency with the Constitution/Bill of Rights and write your opinion in a letter to an elected official.

From *Rigor and Relevance Handbook,* International Center for Leadership in Education

Rigor and relevance link with relationships

Daggett further contends that the third R – relationships – is as critical as relevance in producing optimal learning. "While rigor and relevance are critical to the success…they are not sufficient. Rigor and relevance are linked with relationships," he maintains (2005, p. 5). Just as relevance encourages a level of motivation that is necessary for students to engage deeply, relationships are critical because students are much more likely to make substantial personal investment in learning if they know teachers, parents, and other students care about how well they do. He compares the support students receive to that which an exerciser receives from his/her personal trainer. He identifies the guiding principles of respect, responsibility, honesty, trustworthiness, compassion, loyalty, optimism, adaptability, courage, contemplation, initiative, and perseverance as the driving force of relationship building. If these guiding principles are emphasized, students will develop a sense of security, personal responsibility, and the shared respect that fosters learning. The more deeply they are embedded, the higher the school ascends on the relationship framework.
(See page 16.)

Common elements of content

In the Center's study of highly effective secondary schools, common elements were found in terms of what was taught. For over half of the schools, literacy supporting students to read, write, speak, listen, and observe well was at the top of the list. Additionally ninth graders not proficient in reading and/or writing were identified and provided with intensive remediation in this area. Reading instruction was incorporated into all courses and delivered by all teachers who were trained in reading strategies appropriate to their disciplines. The 11th and 12th grade years were significantly different in these schools than in many other high schools across the country in that advanced mathematics, science, language arts, and social studies courses replaced many other electives. A senior project, too, was often required for graduation.

Additional considerations for secondary curriculum

Selecting effective strategies for instruction is critical if achievement is to be improved. Too often students fail to learn because teachers use strategies that simply do not work. Good teachers understand that matching the learner, the content, and the strategy is critical if learning is to be achieved. The Rigor/Relevance Framework can help teachers identify effective strategies to use to deliver curriculum. Too many high school teachers rely on strategies like lecture, demonstration, worksheets, and memorization. Although there are times when any of these can be effective instructional strategies, most often they fall into Quadrant A with low rigor and relevance. Strategies like problem-based learning, work-based learning, inquiry, research, presentation/exhibitions, and simulation/role-playing push students into working in Quadrants B, C, or D. Those are the strategies that are most likely to result in long-term learning that results in deep understanding. The following are brief descriptions of some of these strategies:

Contextual Teaching and Learning

A practice that emphasizes the connections between knowledge and skills of a particular curriculum to a meaningful context that deepens understanding for students is contextual teaching and learning (CTL). Within this practice, students relate subject matter to real world situations; seeing the connections between knowledge and its application to their lives motivates students to learn. Examples of this contextual support include the following:

- Relating principles of chemistry to reactions occurring while baking
- Exploring the history of a particular era by looking at what happened in students' local community during that period
- Linking mathematical properties to writing a musical score or developing a computer model to predict the weather
- Illustrating concepts in advanced biology by applying them to medicine and biomedical engineering (Contextual Teaching and Learning, 2000)

CTL supports a number of practices in instruction in middle and high schools that have significant research bases. One such practice is curriculum integration, such as joining academic and vocational curriculum, linking

classroom-based learning with work-based learning, and connecting different domains of academic curriculum (mathematics and science, for example). (Bonds, Cox, and Gantt-Bonds, 1993; Grubb, Davis, Lum, Plihal, and Morgaine, 1991; Bodilly, Ramsey, Stasz, and Eden, 1992). Another is service learning that fulfills a bona fide need within the community and intentionally connects the academic curriculum to the service activity (McPherson, 2001; Cairn and Kielsmeier, 1991). In addition to performing the service activity, students prepare for it through research and investigation and reflect upon it to identify what they've learned through the experience. CTL also supports project-based and problem-based learning (Buck Institute for Education, 2001; Moffitt, 2001; Barrows and Myers, 1993; Esch, 1998).

Collaborative Work and Choice

Any high school teacher can attest to the need that secondary students exhibit for working in collaboration with their teachers and other students. Research has demonstrated that engaging students in working with one another has positive results; they often become more energetic and involved (Robinson, Silver, and Strong, 1995; Brewster and Fager, 2000). Johnson and Johnson found that students working in cooperative learning groups were more intrinsically motivated (1989). In these groups, students were assigned specific roles and lessons in team building and consensus building were taught. These skills were critical in encouraging students to become more engaged learners. Another factor that contributes to higher levels of involvement for secondary students is allowing them to monitor their behavior and evaluate their progress (Brewster and Fager, 2000). Additionally, students benefit when they are given opportunities to make choices in structuring their learning (Anderman and Midgley, 1998). Consequently, teachers are more effective when they work with students to develop criteria and establish deadlines (Temple and Rodero, [cited in Abdullah, 2001]).

Interdisciplinary Approaches to Curriculum and Instruction

The literature suggests that participation in an interdisciplinary curriculum can result in positive changes for both students and teachers. Several studies indicate that many types of students including low achieving and economically disadvantaged students (Archer, 1989; Martinez and Badeaux, 1992), minorities, and English Language Learners (Garcia, 1990) demonstrate improved self-esteem, attendance rates, and academic achievement while involved in interdisciplinary course work (Adler and Flihan, 1997). Teachers, too, experience positive changes including increased enthusiasm for teaching (Muncey and McQuillan, 1996) and opportunities to develop new interests, learn new content and methods, and receive constructive feedback (Adler and Flihan, 1997; Ashbaucher and Herman, 1991; Beck, Copa, and Pease, 1991; Panaritis, 1995).

Inquiry Training

Another model of instruction that has some support in literature is inquiry training, developed by Suchman (1962) in teaching students to investigate and

explain unusual phenomena. This model is based upon the approach used by scientists and scholars in conducting research. Students are presented with a perplexing event or situation and are taught a multi-step process to analyze the puzzling information and develop explanations about it. Then students are asked to reflect upon the process they have just experienced to become aware of and master the inquiry process. Studies have found this approach improves students' understanding of science, produces high levels of creative thinking, and promotes the development of skills in research and analysis (Schrenker, 1976).

Thinking Inductively

This approach to teaching inductive thinking is based upon the work of Taba (1966) who demonstrated that inductive thinking skills should be taught using specific sequential strategies. Each task represents a phase in the inductive thinking process:

Stage 1: Concept Formation: a) identifying and enumerating data that are relevant to the problem; b) grouping these data into categories based upon common elements; and c) developing labels for the categories.

Stage 2: Interpretation of Data: a) identify relationships between the data, b) infer the relationship that exists between discrete pieces of data, and c) build generalizations.

Stage 3: Application of Principles: a) predict consequences, explain unfamiliar phenomena hypothesize; b) support predictions and hypotheses; c) verify the prediction.

The research supports that the use of these sequential strategies will result in not only students learning the process and improving their ability to think inductively (Bredderman, 1981; El Nemr, 1979), but in improving retention of the information discovered (Worthen, 1968).

Concept Attainment

Concept attainment is "the search for and listing of attributes that can be used to distinguish exemplars from non exemplars of various categories" (Bruner, Goodnow, and Austin, 1967, p. 233). Students are asked to identify the pre-determined categories by reviewing positive and negatives examples to identify common attributes. Through the review of a series of examples students develop hypotheses about the category and test those hypotheses through continued review. Once the category has been determined, students are asked to review their thinking process.

Professional Development is critical

Research has also provided a clear roadmap to create professional development designed to increase student achievement. The eight tenets of the

Iowa Professional Development Model comprise the foundation of such professional development:

1. The **focus is on instruction and curriculum**. Theory is present underlying the instructional strategy or model selected for staff development. The strategy or model:
   - directly addresses student achievement in an academic area (deep content knowledge in reading, math, science, etc.)
   - has a research base (evidence of improved student achievement across settings, across time, and for all students). (Bransford, Brown and Cocking, 1999; Calhoun, 1994; Kennedy, 1999; Joyce and Showers, 2002; Schmoker, 1996; Slavin and Fashola, 1998)

2. The **study of implementation** is built in as a routine. The faculty studies student data related to the content of professional development. The faculty regularly studies implementation data to know what students are experiencing. (Joyce and Calhoun, 1996; Joyce and Showers, 2002; Slavin, Madden, Dolan, and Wasik, 1996)

3. **All site and district personnel** responsible for instruction participate in the professional development. All teachers are included and the principal is heavily engaged in all aspects of the initiative. District administrative personnel and the approved provider are involved in training and in providing follow-up. (Operationally, this looks different at the elementary and secondary levels.) Research is clear that when increased student achievement is the goal, it is the collective efforts of educators that accomplish these goals. (Elmore, 2000; Joyce and Calhoun, 1996; Joyce and Showers, 2002; Newmann and Wehlage, 1995; Rosenholtz, 1989; Slavin, Madden, Dolan, and Wasik, 1996; Wallace et al, 1984, 1990)

4. **Goals focusing on student learning** provide the direction for staff development efforts. There is a clearly identified need based on student data and the district's long-range and annual improvement goals as described in the Comprehensive School Improvement Plan. The strategy or model selected for staff development can be interpreted/applied in classroom settings. The desired teacher behaviors and the desired student behaviors are described. (Bernhardt, 1998; Rosenholtz, 1989; Schmoker, 1996)

5. **Intensive professional development** is provided. In addition to presentations of information and theory about the instructional strategy, participants are provided with multiple demonstrations modeling the use of the strategy and opportunities to practice using the instructional strategy demonstrated. Professional development is sustained over time. The initiative is designed to last until implementation data indicate that the

teachers are implementing the strategy accurately and frequently and student performance goals are met. (Joyce and Showers, 1983, 2002; NSDC, 2001; Odden, et al., 2002; Wallace, LeMahieu, and Bickel, 1990)

6. **Collaboration** is built in with opportunities for teachers to work together on a regular basis. The professional development initiative is part of the day-to-day work of teaching. The focal point of professional development planning and implementation is at the building level. Adequate time is provided for workshop experiences and workplace supports, i.e., planning together, rehearsing and observing lessons (coaching), practicing strategies in the classroom, and collecting, analyzing and discussing data. (Fullan and Hargreaves, 1991; Lieberman and Miller, 1999; Little, 1997; Rosenholtz, 1989; Showers, 1982, 1984, 1985; Showers and Joyce, 1996; Showers, Joyce and Bennett, 1987)

7. The initiative has built in **ongoing follow-up, support, and technical assistance**. An LEA or AEA consultant or other approved provider provides ongoing technical assistance. This technical assistance occurs regularly in classrooms and in the workshop setting. Joyce and Showers, 2002; Rosenholtz, 1989; Showers, 1982, 1984)

8. **Formative evaluation** ensures the regular and systematic collection of data relevant to stated goals (student progress, implementation of innovations, etc.) and **summative evaluation** provides information about the cumulative impact of a planned change on student learning. Data collected during the formative evaluation process may also be used in the summative evaluation. When student need is driving the planning and design of staff development, data on student response to the content of staff development is essential throughout the process. Calhoun, 2001; Hertling, 2000; Yap et al., 2000)

What can you do?

Future expectations and needs of today's high school students require a higher level of preparation than ever before. If teachers are to adequately prepare students to meet these expectations they need support. Districts need to provide quality professional development to ensure that all high schools deliver rigorous curriculum and high standards for learning so that all graduates of Iowa high schools are prepared to fill the state's emerging workforce needs. By becoming a community of learners, high school teachers and administrators can meet the challenges inherent in preparing our youth for tomorrow.

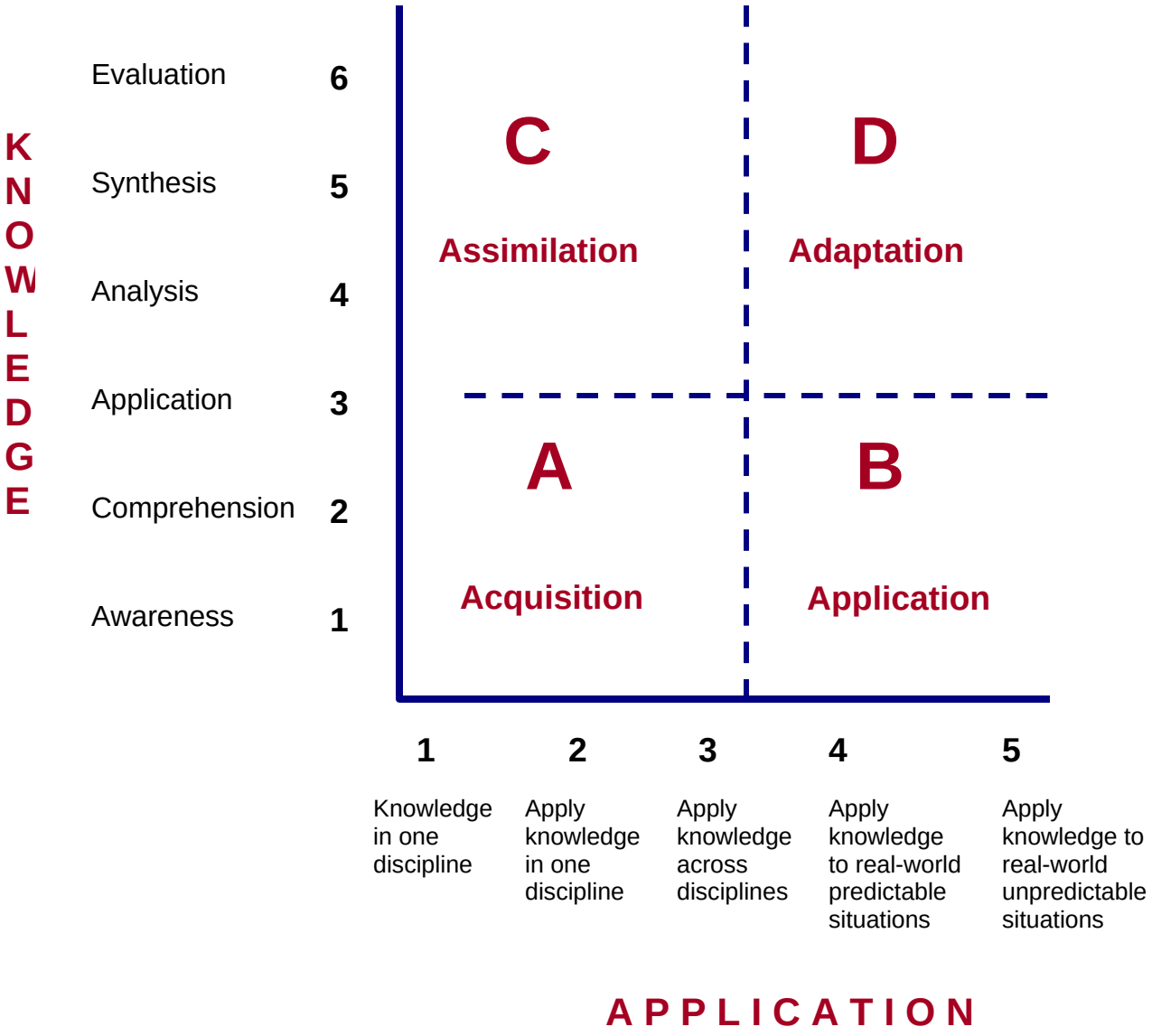
To accomplish this, districts are encouraged to take the following steps:

- Review local standards and benchmarks to determine if they are written to reflect high levels of rigor and relevance.
- Ensure that teachers have professional development in aligning instructional strategies to content.

- Review the need for potential redesign of curriculum to support increased rigor and relevance.
- Engage teams of teachers in discussions about what constitutes rigorous and relevant curriculum and instruction and quality student work.
- Reconsider assessment, emphasizing performance based assessments that are locally developed, student-driven, and used to inform local decision-making.
- Support learning as an individual and social activity by reviewing current school environments and promoting relationships that support learning.

Graphic 1

Rigor and Relevance Framework



From **Rigor and Relevance Handbook** (p. 2), International Center for Leadership in Education (2002).

Graphic 2

Rigor & Relevance Explained

Quadrant C – Assimilation Students extend and refine their acquired knowledge automatically and routinely to analyze and solve problems and create solutions.	**Quadrant D – Adaptation** Students have the competence to think in complex ways and to apply their knowledge and skills. Even when confronted with perplexing unknowns, students are able to use extensive knowledge and skill to create solutions and take action that further develops their skills and knowledge.
Quadrant A – Acquisition Students gather and store bits of knowledge and information. Students are primarily expected to remember or understand this knowledge.	**Quadrant B – Application** Students use acquired knowledge to solve problems, design solutions, and complete work. The highest level of application is to apply knowledge to new and unpredictable situations.

From **Rigor and Relevance Handbook** (p. 3), International Center for Leadership in Education (2002).

Graphic 3

THE RELATIONSHIP FRAMEWORK

Students	Relationship Framework	Teachers
Mutually supported leading to self-assurance	**5** **Mutually Beneficial**	Work as balanced community toward school goals
Fully supported on continuing basis	**4** **Enduring**	Collaborate on ongoing basis
Moderately supported	**3** **Mentoring**	Planned collaborations at moderate level
Sporadically supported	**2** **Assisting**	Sporadic examples of collaboration
Minimally supported	**1** **Knowing**	Minimal collaboration
Unsupported	**0** **Isolation**	Work in isolation

From **Reforming American High Schools – Why, What, and How** (p. 5) by Willard R. Daggett of the International Center for Leadership in Education (2005).

Bibliography

Abdullah, M.H. (2001). *Self-directed learning.* ERIC Clearinghouse on Reading, English, and Communication. (ERIC Identifier: EDU-CS-01-10).

ACT & The Education Trust. (2004). *On course for success: A close look at selected high school courses that prepare all students for college.* Iowa City, IA: Author.

Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns and bachelor's degree attainment.* Washington, DC: U.S. Department of Education.

Adler, M. & Flihan, S. (1997). *The interdisciplinary continuum: Reconciling theory, research and practice.* Report Series 2.36, National Research Center on English Learning and Achievement, Albany, NY.

Anderman, L., & Midgley, C. (1998). *Motivation and middle school students.* ERIC Clearinghouse on Elementary and Early Childhood Education. Champaign, IL. (ERIC Identifier: ED 421281).

Archer, E. et al. (1989). *Partnerships for learning: School completion and employment preparation in the high school academies.* New York: Academy for Educational Development, Inc.

Aschbacher, P. R. & Herman, J. L. (1992). *Humanitas: A synthesis of four years of evaluation findings.* Los Angeles: UCLA Center for the Study of Evaluation.

Barrows, H.S. & Myers. A.C. (1993). *Problem-based learning in secondary school.* Unpublished monograph. Springfield, IL: Problem-Based Learning Institute, Lanphier High School and Southern Illinois University Medical School.

Beck, R. H., Copy, G. H., & Pease, V. H. (1991). Vocational and academic teachers work together. *Educational Leadership 49*(2): 29-31.

Berger, J. (2000, January). Does top-down, standards-based reform work? A review of the status of statewide standards-based reform. *NASSP Bulletin 84,* 612, 57-65.

Bernhardt, V. (1998*). Data analysis for comprehensive school wide improvement*. Larchmont, NY: Eye on Education, Inc.

Bodilly, Sl, Ramsey, K., Stasz, C., & Eden, R. (1993). *Integrating academic and vocational education: Lessons from eight early innovators.* Berkeley, CA: National Center for Research in Vocational Education.

Bonds, C., Cos, C, III, Gantt-Bonds, L., (1993). Curriculum wholeness through synergistic teaching. *The Clearing House,* 66(4), 252-254.

Bransford, J., Brown, A., and Cocking, R. (1999). *How people learn.* Washington, DC: National Academy Press.

Bransford, J., Pellegrino, J. W., and Donovan, S.. (1999). *How people learn: bridging research and practice.* Washington, DC: National Academy Press.

Bredderman, T. (1983). Effects of activity-based elementary science on student outcomes: A quantitative synthesis. *Review of Educational Research, 53* (4), 499-518.

Brewster, C., & Fager, J. (October, 2000). Increasing student engagement and motivation: From time-on-task to homework. Northwest Regional Educational Laboratory, [Online] Retrieved June 6, 2002 from *http://www.nwrel.org/request/oct00/textonly.html*.

Bruner, J., Goodnow, J. J., & Austin, G. A. (1967). *A study of thinking.* New York: Science Editions, Inc.

Buck Institute for Education, The. Project based learning. Available: *http://www.bie.org/pbl/overview/index.html* [July 10,2002].

Cairn, R.N., & Kielsmeier, J. (Eds.) (1991). *Growing hope: A sourcebook on integrating youth service into the school curriculum,* Roseville, MN: National Youth Leadership Council.

Calhoun, E. (1994). *How to use action research in the self-renewing school.* Alexandria, VA: Association for Supervision and Curriculum Development.

Calhoun, E. (2001). *Building capacity to support student achievement from the state department to the classroom and the classroom to the state department*. Paper presented at the Annual Meeting of the American Educational Research Association (Seattle, WA, April 10-14).

Cluck, M. & Hess, D. (2005). *Improving student motivation through the use of the multiple intelligences.* Action research project, Saint Zavier University, Chicago.

Daggett, W. (2002). *The rigor and relevance handbook*. New York: International Center for Leadership in Education.

Daggett, W. (2005). *Reforming American high schools – why, what, and how.* New York: International Center for Leadership in Education.

Darling-Hammond, L, & Snyder, J. (2000). Authentic assessment of teaching in context. Available: http://www.contextual.org [July 9, 2002].

Edmunds, R. (1979). *A discussion of the literature and issues related to effective schooling.* St. Louis, MO: CEMREL.

Elmore, R. (2000). *Building a new structure for school leadership*. Washington, DC: The Albert Shanker Institute.

El-Nemr, M.A. (1979). Meta-analysis of the outcomes of teaching biology as inquiry. Unpublished doctoral dissertation, University of Colorado, Boulder.

Esch, C. (1998). *Project-based and problem-based: The same or different?* Challenge 2000 Multimedia Project: San Mateo County Office of Education. Available: http://pblmm.k12.ca.us/PBLGuide/PBL&PBL.htm [October 29, 2002].

Fullan, M. and Hargreaves, A. (1991). *What's worth fighting for in your school.* New York, NY: Teachers College Press.

Garcia, E. E. (1990). *An anlysis of literacy enhancement for middle school Hispanic students through curriculum integration.* Miami, FL: Annual Meeting of the National Reading Conference. (ED 331 008).

Gratz, D. (2000). High standards for whom? *Phi Delta Kappan 81,* 681-87.

Grossman, P. & Stodolsky. S. (1995, November). Content as context: The role of school subjects in secondary school teaching. *Educational Researcher; 24*(8), 5-11, 23.

Grubb, W., Davis, G., Lum, J., Plihal, J., & Morgaine, C. (1991). *The cunning hand, the cultured mind: Models for integrating vocational and academic education.* Berkeley, CA: National Center for Research in Vocational Education.

Hertling, E. (2000). *Evaluating the results of whole-school reform*. Eugene, OR: ERIC Clearinghouse on Educational Management.

Iowa Department of Education. (2004). *Iowa condition of education report, 2004.* Des Moines, IA: Iowa Department of Education, Bureau of Planning, Research, and Evaluation.

Johnson, T., & Johnson, D.W. (1989). The cooperative learning center. Retrieved January 21, 2003 from http://www.clerc.com/index.html.

Joyce, B. and Calhoun, E. (Eds.) (1996). *Learning experiences in school renewal.* Eugene, OR: ERIC Clearinghouse on Educational Management. (ERIC Document Reproduction Service No. ED 401 600).

Joyce, B. and Showers, B. (1983*). Power in staff development through research on training.* Alexandria, VA: Association for Supervision and Curriculum Development.

Joyce, B. and Showers, B. (2002). *Student achievement through staff development (3rd ed.).* Alexandria, VA: Association for Supervision and Curriculum Development.

Joyce, B., Weil, M., & Showers, B. (1992). *Models of teaching.* Needham Heights, MA: Allyn and Bacon.

Kennedy, M. (1999). *Form and substance in inservice teacher education.* (Research monograph No. 13). Madison: University of Wisconsin-Madison, National Institute for Science Education.

Lieberman, A. & Miller, L. (1999). *Teachers – transforming their world and their work.* Alexandria, VA: Association for Supervision and Curriculum Development.

Little, J. (1997). *Excellence in professional development professional community.* Berkeley, CA: OERI U.S. Department of Education.

Martinez, R. L. & Badeaux, A. J. (1992). Sparking interest in academics: Welding class helps students improve English, math grades. *Vocational Education Journal (November/December):* 34-35, 71.

McPherson, K. (2001). *Service learning.* A Web-based System for the Professional Development of Teachers in Contextual Teaching and Learning Project. Bowling Green, OH: Bowling Green State University.

Medrich, E., Calderon, S., Hoachlander, G. (2003). Contextual teaching and learning strategies in high schools: Developing a vision for support and evaluation. In Brand, B (Ed.). *Essentials of high school reform: New forms of assessment and contextual teaching and learning* (pp. 35-71). Washing, DC: American Youth Policy Forum, 2003.

Moffitt, M. (2001). *Problem-based learning.* A Web-based System for the Professional Development of Teachers in Contextual Teaching and Learning project. Bowling Green, OH: Bowling Green State University.

Muncey, D. E. & McQuillan, P. J. (1996). *Reform and resistance in schools and classrooms: An ethnographic view of the Coalition of Essential Schools.* New Haven, CT: Yale University Press.

National Center for Education Statistics. (1999). Remedial education at higher education institutions. *The condition of education, 1999* (NCES Publication No. 1999-022). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

National Staff Development Council. (2001). *Standards for staff development revised.* Oxford, OH.

Newmann, F. and Wehlage, G. (1995). *Successful school restructuring: A report to the public and educators*. Madison, WI: Center on Organization and Restructuring of Schools.

Odden, A., Archibald, S., Fermanich, M., and Gallagher, H.A. (2002). How to figure the cost of professional development. *Journal of Staff Development,* 23 (2), 53-58.

Panaritis, P. (1995). Beyond brainstorming: Planning a Successful Interdisciplinary Program. *Phi Delta Kappan* 76(8):623-628.

Riedel, J. (1995, April). *A longitudinal study of students' engagement and perceptions in a RE: Learning High School.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Rogers, C. & Freiburg, H.J. (1994). *Freedom to learn.* New York: Macmillan College Publishing Company.

Robinson, A., Silver, H.F., & Strong, R. (1995, September). What do students want and what really motivates them? *Educational Leadership.* [Online] Available: *http://www.middleweb.*

Rosenholtz, S. J. (1989). *Teacher's workplace: The social organization of schools.* White Plains, NY: Longman.

Schmoker, Mike (1996). *Results*. Alexandria, VA: Association for Supervision and Curriculum Development.

Schrenker, G. (1976). *The effects of an inquiry-development program on elementary school children's science learning.* Ph.D. thesis. New York University.

Showers, B. (1982). *Transfer of training: The contribution of coaching*. Eugene, OR: Center for Educational Policy and Management.

Showers, B. (1984). *Peer coaching: A strategy for facilitating transfer of training.* Eugene, OR: Center for Educational Policy and Management.

Showers, B. (*1985).* Teachers coaching teachers. *Educational Leadership,* 42 (7), 42-49.

Showers, B. and Joyce, B. (1996). The evolution of peer coaching. *Educational Leadership*, 53 (6), 12-16.

Showers, B., Joyce, B., and Bennett, B. (1987). Synthesis of research on staff development: A framework for future study and a state-of-the-art analysis. *Educational Leadership,* 45 (3), 77-87.

Slavin, R. and Fashola, O. (1998). *Show me the evidence: Proven and promising programs for America's schools.* Thousand Oaks, CA: Corwin Press.

Slavin, R., Madden, N., Dolan, L., and Wasik, B. (1996). *Every child, every school: Success for all.* Thousand Oaks, CA: Corwin Press.

Steinberg, L., Brown, B., & Dornbusch, S. (1996). *Beyond the classroom: Why school reform has failed and what parents need to do.* New York: Simon & Schuster.

Stevenson, J. & Stigler, J. (1992). *The learning gap: Why our schools are failing.* New York: Summit Books.

Stodolsky, S. (1988). *The subject matters: Classroom activity in math and social studies.* Chicago, IL: The University of Chicago Press.

Suchman, R. J. (1962). *The elementary school training program in scientific inquiry.* Report to the U.S. Office of Education, Project Title VII. Urbana: University of Illinois.

Taba, H. (1966). *Teaching strategies and cognitive functioning in elementary school children.* (Cooperative Research Project 2404). San Francisco: San Francisco State College.

Teddlie, C. and Reynolds, D. (2000). *The international handbook of school effectiveness research.* London, New York; Falmer Press.

Thompson, S. (1999). Confessions of a 'standardisto'. *Education Week on the Web,* 5 pages, October 6.

Wallace, R., Lemahieu, P., and Bickel, W. (1990). The Pittsburgh experience: achieving commitment to comprehensive staff development. in Joyce, Bruce, ed. *Changing School Culture through Staff Development*. Alexandria: Association for Supervision and Curriculum Development.

Wallace, R. C., Young, J. R., Johnston, J., Bickel, W. E., & LeMahieu, P. G. (1984). Secondary educational renewal in Pittsburgh. *Educational Leadership*, 41 (6), 73-77. Alexandria, VA: Association for Supervision and Curriculum Development.

Worthen, B. (1968). A study of the discovery of expository presentation: Implications for teaching. *Journal of Teacher Education, 19,* 223-242.

Yap, K, Aldersebaes, I., Railsback, J., Shaughnessy, J., and Speth, T. (2000). *Evaluating whole-school reform efforts: A guide for district and school staff, 2nd ed*. Portland, OR: Northwest Regional Educational Lab.