James W. Keefe   John M. Jenkins

James W. Keefe is an education writer, consultant, and the former director of research for the National Association of Secondary School Principals. He has served on various national boards and committees. He is the president of Learning Environments Consortium International (LEC) and the coordinator of the LEC Forum of distinguished educators committed to school redesign and personalized education.

Keefe is a frequent conference presenter and the author of more than 50 books, book chapters, monographs, and articles. He is the major author of the NASSP Learning Style Profile and the project director of the groundbreaking Comprehensive Assessment of School Environments Information Management System (CASE-IMS).

John M. Jenkins is vice president of Learning Environments Consortium. He served as principal of Wilde Lake High School in Columbia, Maryland, and later as director of the P.K. Yonge Developmental Research School on the campus of the University of Florida in Gainesville. He also was a member of the Carnegie/NASSP Commission on the Restructuring of the American High School, which produced the report, Breaking Ranks.


Series Editor, Donovan R. Walling
Table of Contents

Introduction .................................................. 7

What Is Personalized Instruction? ................. 9
  Renewal, Rather Than Reform ..................... 10
  Systems Thinking ...................................... 10
  School as Knowledge-Work Organization .... 13

Basic Elements of Personalized Instruction .... 15
  Dual Teacher Role .................................. 16
  Diagnosis of Student Learning
    Characteristics .................................... 18
  Culture of Collegiality ............................. 21
  Interactive Learning Environments ............. 22
  Flexible Scheduling and Pacing ................. 26
  Authentic Assessment .............................. 27

Strategies and Tactics for Personalizing
  Instruction ........................................ 29

Improving the Future of Education ............... 39

A New Accountability ................................. 43

Resources .................................................. 46
Albert Einstein once lamented that "it is, in fact, nothing short of a miracle that the modern methods of instruction have not yet entirely strangled the holy curiosity of inquiry; for this delicate plant, aside from stimulation, stands mostly in the need of freedom; without this it goes to wreck and ruin without fail. It is a very grave mistake to think that the enjoyment of seeing and searching can be promoted by means of coercion and a sense of duty" (Schlipp 1951). Einstein particularly scorned the tests that were a part of "modern education." He said, "One had to cram all this stuff into one's mind for the examinations, whether one liked it or not. This coercion had such a deterring effect on me that, after I passed the final examination, I found the consideration of any scientific problems distasteful to me for an entire year" (Hoffman 1972). Einstein, of course, was talking about graduate education; but the principles he suggests — freedom of inquiry, thought, and reflection, rather than pressure and memorization — apply equally well to undergraduate and other segments of schooling.
Certainly many great scholars and creative thinkers were excellent students. We must be careful not to indict traditional education on the basis of personal testimonials (Simonton 1999). But the reality is that much of contemporary education — what Einstein referred to as "modern" and we would characterize as conventional — is heavy on standardization and regimentation, teacher domination, and testing and more testing. In this fastback we describe a clear alternative to this coercive state of education, an approach to schooling that is both less restrictive and more productive for students and decidedly more professional for teachers. We call this approach "personalized education" and its pedagogical component "personalized instruction."
What Is Personalized Instruction?

Personalization of instruction and learning is the effort on the part of a school to take into account individual student characteristics and needs and interactive and thoughtful instructional practices in organizing the learning environment. Personalized instruction is predicated on caring, but it is more than that. It is a mindset committed to student initiative in the pursuit of meaning. Personalized instruction also is a set of strategies. The strategies are many and will be discussed in this fastback. In general, teachers committed to personalizing instruction help their students develop personal learning plans, assist in diagnosing student cognitive strengths and weaknesses and other style characteristics, adapt the learning environment and instruction to learner needs and interests, and mentor authentic and reflective learning experiences for their students. Before we address personalized instruction in detail, however, it is important to explore the broader compass of systemic school renewal and to discuss some of the forerunners of personalization.
Renewal, Rather Than Reform

Kenneth Sirotnik and John Goodlad caution educators to think in terms of school "renewal," rather than "reform." Sirotnik (1999) tells us that reform usually is preoccupied with accountability, rather than evaluation. For example, much of contemporary high-stakes reform is aimed at rewarding or punishing schools and educators. Renewal, on the other hand, urges a new accountability more akin to "responsibility." Goodlad points out that "The language of reform carries with it the traditional connotations of things gone wrong that need to be corrected, as with delinquent boys or girls incarcerated in reform schools. This language is not uplifting. It says little or nothing about the nature of education, the self, or the human community. . . . School renewal is a much different game. . . . the language and the ethos of renewal have to do with the people in and around schools improving their practice and developing the collaborative mechanisms necessary to better their schools" (1999, pp. 574-75). Renewal is all about learner growth in knowledge and self-awareness leading to wisdom, personal happiness, and collective responsibility. Only a minority of schools achieve these kinds of reflective and exploratory environments. Most schools are average and are satisfied with maintaining or perhaps fine-tuning traditional school organizational patterns and pedagogy. The 21st century demands more.

Systems Thinking

An optimal learning environment must be both fluid and well-organized if it is to make the best use of the
limited time available each day for formal schooling. Systems thinking can provide the template for this design. A system is a group of parts that operate together and influence the operation of the whole. Deming calls a system "a network of independent components that work together to accomplish the aim of the system" (1993, p. 50).

The essential characteristics of a system are properties of the whole and not of the individual parts. Human bodies are systems. A building is a system. An automobile is a system. "The essential property of an automobile is that it can take us from one place to another. No single part of an automobile — a wheel, an axle, a carburetor — can do that. Once we take a system apart, it loses that fundamental characteristic. If we were to disassemble a car, even if we kept every single piece, we would no longer have a car. Why? Because the automobile is not the sum of its parts; it is the product of their interactions" (Wardman 1994, p. 2, emphasis in original).

Schools can be like that. If you analyze the elements of many schools, you will find that they do not fit together very well. They are merely loose collections of parts that do not really mesh. They were never designed to work together. They just happened that way because of long tradition and periodic addition or subtraction of components. Schools, like all systems, operate according to the first principle of systems thinking: structure influences behavior. A system functions in a certain way because of its structure. In a very real sense, a system causes its own behavior. Conventional
schools function in traditional ways because their systemic components make it hard to do otherwise. Their systemic structure is the pattern of their interactions — the relationships — not among people, but among the key components of the school organization (Keefe and Jenkins 1997). For example, urban schools are thought to be the victims of poor teachers and unruly students, but the reality is that the structures and processes of these schools do not support learning for their particular students. Often it is the schools that are dysfunctional, not the students or teachers.

The aims of public schooling at the turn of the 20th century were to socialize and provide basic skills training for scores of immigrants, using assembly-line technology to produce standard products. Teachers were the workers, students the products.

Based on faith in rationalistic management, in the power of rules to direct human behavior, and in the ability of administrators to discover and implement common procedures to produce desired outcomes, 20th century education policy has assumed that continually improving the design specifications for schoolwork — required courses, textbooks, testing instruments, and management systems — will lead to student learning. Knowledgeable teachers were not part of the equation because the bureaucratic model assumed that important decisions would be made by others in the hierarchy and handed down in the form of rules and curriculum packages. (Darling-Hammond 1997, pp. 16-17)
School as Knowledge-Work Organization

One could argue that such schools were functional 100 years ago, but the circumstances for which they were designed no longer exist. Yet many contemporary schools still operate according to that earlier design. And because structure influences behavior, many of these schools are highly dysfunctional in the contemporary environment. The old factory metaphor saw teaching as the transmission of organized knowledge, the curriculum as a delivery system, and the core functions of teaching as lecturing, questioning, giving assignments and homework, correcting papers and giving tests, awarding grades, and so forth.

Peel and McCary (1997) argue that a more functional metaphor for the contemporary school is a “knowledge-work organization.” In this concept, teaching involves presenting students with opportunities to do high-quality work. This kind of teaching provides information and ways to apply it to relevant tasks. Learning is an active process, beginning with basic skills but emphasizing effective problem solving, productive teamwork, and the skills of lifelong learning.

Conceptualizing the school as a knowledge-work organization invokes a systems design for schooling, one better suited to the needs of 21st century students. Because the rationale is very different, school as a knowledge-work system encourages teachers to act very differently:

1. To design work for students that will capture their interest and motivate them.
2. To assist students in decision making with suitable tasks, solutions, and timetables for the work to be performed.

3. To serve as facilitator and motivator of students, using their knowledge to suggest ways to complete the learning tasks.

4. To act as student performance coaches, providing feedback so that students can judge and improve their own performance (Peel and McCary 1997).
Linda Darling-Hammond argues that we must put students first, that all children have a right to learn. She cites four factors that are important for powerful teaching and learning: 1) structures for caring and structures for serious learning, 2) shared exhibitions of student work, 3) structures that support teacher collaboration focused on student learning, and 4) structures for shared decision making and dialogue about teaching and learning (Darling-Hammond 1996).

These structures are not a model to be imposed on schools but a broad blueprint for ongoing improvement in school organization and good practice. With this important caveat in mind, we propose six basic elements of personalized instruction that should be cultivated if a school wishes to develop powerful teaching and learning for student success (see Figure 1). We think of these six basic elements as constituting the culture and context of personalized instruction. The cultural components — teacher role, student learning characteristics, and collegial relationships — establish the founda-
tion of personalization and ensure that the school prizes a caring and collaborative environment, student diversity, and individual development. The contextual factors—interaction, flexible scheduling, and authentic assessment—promote and support student engagement, thoughtful growth, and proficient performance.

Figure 1. Basic Elements of Personalized Instruction

1. A dual teacher role of coach and advisor.
2. The diagnosis of relevant student learning characteristics, including developmental level, cognitive/learning style, and prior knowledge/skills.
3. A culture of collegiality in the school, characterized by a constructivist environment and collaborative learning arrangements.
4. An interactive learning environment characterized by small school or small group (class) size, thoughtful conversation, active learning activities, and authentic student achievement.
5. Flexible scheduling and pacing, but with adequate structure.
6. Authentic assessment.

Dual Teacher Role

The indispensable catalyst in the personalized instruction environment is the teacher, the instructional specialist who is closest to the learning situation and
best understands the needs and interests of students as well as the policies of the school and the district. Personalized instruction demands that the teacher assume the dual roles of subject-matter coach and teacher/advisor to a select group of students.

**Teacher/Coach.** Teacher/coaches offer the same kind of instruction, demonstration, practice, and feedback to their students that athletic coaches and student activity advisors have modeled in the most successful of their programs. The needs of today’s students are quite different from those of their counterparts two or three generations ago. The world has experienced several social revolutions and a knowledge explosion that makes it almost impossible to “cover” more than a small part of what students need to know for a reasonably successful life. Cognitive and problem-solving skills, what some call metacognitive skills, are more important today than any single piece of knowledge. The teacher/coach in the school environment must be a facilitator of learning, a learning guide who helps students find appropriate resources and engage in suitable learning activities. Members of the Learning Environments Consortium International (Georgiades et al. 1979) describe such a teacher as “not so much educational broadcaster as academic troubleshooter. He devotes fewer hours to lecturing in front of a class and more to working with students individually and in small groups.”

**Teacher/Advisor.** Advisement is the other facet of the new teacher job description — a helping role. As teacher/advisor, the teacher provides advice, counsel, and
guidance to 15 to 20 students on academic and school-adjustment issues. In advisement, teachers, counselors, and other adults work as a team to promote student adjustment and success in school. Professional counselors serve as advisors to a group of teacher/advisors and help them to learn their role and its functions. Over the years, advisement programs have been called by many names. The programs have varied from place to place, but generally call for a teacher to assume school guidance functions that are narrowly limited to academic program planning, career or college information, school adjustment issues, and personal-social guidance. In middle schools, many advisor programs take on the character of group guidance; but these applications are usually limited in scope and often in success. The most successful advisement programs emphasize personal contact between students and advisors and continuing support of the student in his or her academic program and personal adjustment to school. The NASSP Breaking Ranks report (1996) specifically mentions the role of the advisor (personal adult advocate) in helping students personalize the education experience.

Diagnosis of Student Learning Characteristics

Instruction must begin with knowledge of the learner if the goal is to build a learning environment suited to the aptitudes, needs, and interests of each student. The foundation of any personalized instruction approach is some form of diagnosis — determining the learning-
related characteristics of individual learners. Diagnosis is concerned with discovering student learning traits, such as developmental level, learning style, and learning history.

Developmental characteristics are those specific stages in individual maturation when certain capacities for learned behavior appear (for example, visual perception, language pronunciation, and cognitive thinking skills). Examining these characteristics of students can tell us when they are developmentally ready to learn something — their individual readiness for learning. Certain capabilities appear only after the appropriate stage in individual development occurs. If not exercised then, the capacities are not likely to develop later (for example, skills in athletics, peer relations, language learning, and so on). Darling-Hammond (1997) calls for "developmentally attentive schools." Students, particularly in the lower grades, need hands-on learning with concrete and active learning activities. Also, developmental attentiveness should not end with primary schooling. Braddock and McPartland (1993) argue that many problems that teenagers have in school are a result of a mismatch between their developmental needs and the learning environments of many junior and senior high schools. Just when teenagers need close relationships, they get large, impersonal schools. Just when they need to experience some autonomy, they get rigid rules, academic tracking, and large doses of memorization.

Student learning style is the second broad diagnostic element. Learning style encompasses information-processing habits, attitudinal tendencies, and biologi-
cally based responses that are typical of the ways a given student learns and prefers to learn. There are three broad categories of learning style characteristics:

- **Cognitive** styles are preferred ways of perception, organization, and retention. Diagnosing perceptual modality preferences, for example, is basic to understanding a student’s visual, auditory, or psychomotor learning style.
- **Affective** styles embrace the motivational dimensions of the learning personality. Each learner has a personal motivational approach.
- **Physiological** styles are traits deriving from a person’s gender, health and nutrition, and reaction to the physical surroundings, such as preferences for levels of light, sound, and temperature in the learning environment.

The Learning Style Profile (Keefe 1988), for example, assesses independent scales representing four factors: perceptual responses, cognitive styles, study preferences, and instructional preferences. The Learning Style Profile and other comprehensive style instruments can help teachers identify student style strengths and weaknesses and organize instruction more efficiently and effectively.

**Student learning history** is the third broad area of diagnosis. “Student learning history” was coined by Benjamin Bloom and his colleagues in mastery learning research to describe the aggregate of personal learning that each student brings to a particular course,
class, or school program. A learner’s “history” tells us what a student knows and can do at a given point in his or her learning career — the knowledge, skills, and attitudes that the student possesses before beginning a new learning experience. Observation, surveys, inventories, teacher and counselor reports, and curriculum-referenced tests (rather than standardized tests) best assess these knowledge or skill levels.

Culture of Collegiality

A third essential ingredient of personalized instruction is a school culture of collaboration, where teachers and students work together in a cooperative social environment to develop meaningful learning activities for all students. A collegial culture is characterized by a constructivist environment and collaborative learning arrangements.

Constructivist environment. Constructivism holds that individual learners construct knowledge by giving meaning to their current experiences in the light of their prior knowledge. Opportunity and time for reflective dialogue are critical elements of such a learning environment. Constructivist teachers build a knowledge-work environment on existing student learning styles and skills, and they encourage students to expand on and to look for meaning in their current experiences. Constructivist teachers encourage student reflection, problem solving, and initiative.

Collaborative learning arrangements. An important goal of schooling is to create learning communities in which students can confront important ideas and apply
these ideas to real-world experiences that they can understand and use. Collaborative learning arrangements provide an opportunity for students and teachers to work together to verbalize their ideas, to sharpen their thinking, to capitalize on differences. Considerable evidence exists, for example, that students learn better in cooperative groups than when alone (Slavin 1991, 1995). Cooperative small groups encourage more useful collaboration and better socialization than do traditional classrooms, yet they produce solid achievement gains. Glasser (1986) believes that small learning teams offer a good chance of motivating almost all students. Stronger students, Glasser argues, find it fulfilling to help weaker students, and weaker students find it fulfilling to contribute to the team effort. Students learn to depend not only on the teacher but also on their teammates and their own creativity.

Interactive Learning Environments

Interactive learning environments are designed to foster collaboration and reflective conversation. Recent studies have found that high schools restructured to provide interactive learning arrangements produce higher student achievement gains, which are also more equitably distributed among socioeconomic subgroups (Lee and Smith 1995). These studies found that collective responsibility for student learning, an academic emphasis, and high morale are important features of a successful school learning community. Successful practices include school-within-school units, interdisciplinary teaching teams, and common teacher planning.
Interactive learning environments are characterized by small school or group size, thoughtful classrooms, active learning experiences, and authentic student achievement.

**School or group size.** Darling-Hammond reports that more than 30 years of studies on school organization “have consistently found that small schools (with enrollments of roughly 300 to 600) promote higher student achievement, higher attendance, lower dropout rates, greater participation in school activities, more positive feelings toward self and school, more positive behavior, less violence and vandalism, and greater post-school success. These outcomes are also found in settings where students have close sustained relationships with a smaller than average number of teachers throughout their school careers” (1997, p. 136). Smaller class size invariably is the better choice when the group is 20 or less; but in the range from 20 to 40 students, class size makes little or no difference (ERS 1978; Glass and Smith 1978). The real issue is what kind of grouping best serves the students in a particular content area or activity. A choir or a band usually benefits from a larger size. Skill learning, discussion, and reflective conversation demand small groups. Research and reading often are best done alone. The size of the group should be a function of its purpose.

**Thoughtful environments.** Smaller schools and small group size can better support thoughtful conversation, learning by doing, apprenticeship experiences, and authentic student achievement. Schrag (1992) argues for more “thoughtfulness” in classrooms. Researchers
at the University of Wisconsin National Center on Effective Secondary Schools developed a set of rating scales for "thoughtful lessons" in social studies based on Schrag's conception of good thinking. Instruction is thoughtful when it focuses on a few important topics with coherence and continuity, provides plenty of time for investigation and interactive dialogue, raises challenging issues that require students to produce new knowledge, and stresses the quality of supporting explanations and reasons over the need for "right" answers. Barry Beyer (1992, pp. 94-95) argues that at least four elements must be present for a thoughtful learning environment:

- Classroom layout that invites thinking — not in traditional rows, but students facing each other in groups, working in learning centers or in meaningful clusters.
- Classroom interactions that involve information processing, rather than information receiving or repeating.
- The use of precise, thoughtful language, rather than vague terminology or generalizations.
- The organization of classroom study and courses around thoughtful questions — real inquiry built on questions of real interest to students themselves.

Active learning experiences. Susan Kovalik and Karen Olsen (1998) contend that prior learning experiences are critical to the success of active forms of learning. The human brain continuously searches for patterns in
incoming information as it attempts to find meaning in the data. The more active the learning experience, the more likely that the input will be rich in meaning. Kovalik and Olsen suggest two rules of thumb to enhance learning: 1) Provide real-life richness and context in all learning situations; the less the input, the harder the learner will struggle to find meaning; and 2) design curriculum and instruction to use all of a learner’s prior experience and to maximize the amount of sensory input during learning. Human learning is rarely linear or neat or orderly or typically logical. Rather, learning is multilinear, multisensory, and seemingly illogical until the learner perceives clear patterns in the information that are personally meaningful.

**Authentic student achievement.** Instruction is authentic when it focuses on the kind of mastery found in successful adults. Authentic *human* achievement is concerned with what is significant, worthwhile, and meaningful in the lives of successful adults from all walks of life. Authentic *academic* achievement is concerned with accomplishments that are significant, worthwhile, and meaningful for learners preparing for adulthood (Keefe and Jenkins 1997). The Center on Organization and Restructuring of Schools (CORS) at the University of Wisconsin-Madison devoted five years of research to the formulation and study of criteria and standards for authentic academic achievement, authentic instruction, authentic assessment tasks, and authentic performance (Newmann, Secada, and Wehlage 1995). The center characterized authentic academic achievement in terms of three criteria: construction (not reproduction) of
knowledge, disciplined inquiry (mastery of a field), and value beyond school. Newmann, Secada, and Wehlage argue that, in traditional programs, the "absence of meaning breeds low engagement in schoolwork and inhibits transfer of school learning to issues and problems faced outside the school."

Flexible Scheduling and Pacing

The schedule of a school makes the education philosophy of the school visible. If the philosophy is traditional, the schedule will likely be quite structured. If the philosophy is constructivist or learner-centered, the schedule will almost necessarily be personalized, or at least very flexible. Two ingredients seem necessary to the development of more personalized student schedules. First, both students and teachers must have input into the use of time. Teachers can accomplish this by making requests through team leaders or department chairs, and teacher/advisors can meet with individual students to guide their scheduling decisions. Second, achievement must be judged on a performance basis. Placing the emphasis on performance, rather than time, increases the opportunities for student choices in defining curriculum and instruction. Continuous progress and block schedules seem to best facilitate performance-based assessment. For example, the longer time periods in block schedules permit students to take part in community service and other extended experiences (Sizer 1992). Teachers have time under both scheduling options to plan with colleagues; to serve as advisors to
students; to work on curriculum, instruction, and assessment; and to contact parents.

**Authentic Assessment**

Assessment is the process of gathering information about students. Assessment is *authentic* when it focuses on real performance and mastery of a field of knowledge. The improvement of student learning, not sorting or grading, is the primary purpose of assessment. Assessment and testing are often used interchangeably, but tests are only one form of assessment. Assessment goes beyond testing and includes such activities as demonstrations, oral and written presentations, performances, contests, projects, and problem-solving activities. Athletic competitions are assessments of how well a team or an individual has prepared for a contest. A dramatic performance is an assessment of the cast's talents and readiness. (The audience response is one measure of the quality of the performance.)

In all cases, the method of assessment should fit the purpose of instruction. If students are expected to learn to write well, the competency can hardly be measured by multiple-choice questions on grammar. Having students actually write or develop responses to open-ended questions is a more suitable device. Even better would be to give them time to write and then revise their writing.

The various types of authentic assessment can be grouped under naturalistic assessment, performance assessment, and portfolio assessment (Case 1992).

*Naturalistic assessment* is the kind of appraisal that takes place during normal learning activities. The
teacher as “participant-observer” systematically collects information about students and records it for later analysis and summation.

*Performance assessment* is an omnibus term that “refers to evaluating what students can do by examining them in the process of demonstrating some skill, by performing a specified task, or [creating] a product that students construct and develop in response to a set of directions” (Ryan and Miyasaka 1995). The object of this kind of assessment is a student-developed performance or product, such as an essay, script, or story; a science experiment; or a piece of art or technology. The merit-badge system in scouting is a form of performance assessment. Some educators call the more formal versions of these performance assessments, “exhibitions,” in which students present their academic efforts for review and discussion or to certify their competencies.

*Portfolio assessment* involves students as compilers, with teachers as supervisors. Portfolio assessment has its origins in the practices of artists, architects, and designers, who assemble key examples of their work for employment interviews or for display. Students collect and select pieces of their work over a period of time as evidence of completing their learning objectives. Typically, they also write a rationale to explain why they selected these pieces as their best work (Case 1992; Ryan and Miyasaka 1995).
Strategies and Tactics for Personalizing Instruction

Instructional strategies tend to be more personalized when they are more interactive and promote thoughtful reflection in learners. The more intense the interaction between the sources of instruction and the student, the more likely the student will learn. Students in personalized learning environments engage thoughtful material at their particular levels of development and then advance to more challenging levels.

Keefe and Jenkins (2000) rated approaches to personalized instruction on two continua: 1) the interactive nature of the instruction (whether from teacher, mentor, materials, or other aspects of the learning environment) and its responsiveness to different learner characteristics, and 2) how thoughtfully learners apply knowledge and skills in different circumstances. Each of these criteria is considered in terms of a four-point Likert scale, with 1 the lowest and 4 the highest. Figure 2 combines these two characteristics in a two-dimensional matrix and locates each of 20 strategies in a cell depicting where it lies on both continua. Ten of these strategies
### Figure 2. Personalized Instructional Strategies

<table>
<thead>
<tr>
<th>Interaction Level</th>
<th>Thoughtfulness Level 1</th>
<th>Thoughtfulness Level 2</th>
<th>Thoughtfulness Level 3</th>
<th>Thoughtfulness Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Individualized instruction</td>
<td>Accelerated learning, mastery learning, direct instruction</td>
<td>Independent study, Montessori approach</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Experiential learning</td>
<td>Style-based instruction</td>
<td>Technology-assisted learning</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cognitive skill development, inquiry approaches</td>
<td>Contract learning, peer tutoring</td>
<td>Authentic pedagogy</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dewey's project learning, reciprocal teaching</td>
<td></td>
<td>Cooperative learning, cognitive apprenticeship, guided practice, topic study</td>
<td>(storyline)</td>
</tr>
</tbody>
</table>
are discussed here, along with their levels of interaction and thoughtfulness. A complete description of all 20 strategies can be found in *Personalized Instruction: Changing Classroom Practice* (Keefe and Jenkins 2000).

Any attempt to classify strategies into one category or another is tenuous. Placement clearly involves subjective judgment and cannot account for the level of implementation. We postulate four levels primarily to help school practitioners gain a sense of the status quo and the scope of developing strategies. Level one strategies are an initial step toward personalized instruction; level four are considered current state of the art.

**Individualized instruction** (I-1, T-1). This strategy was initially associated with Skinnerian programmed instruction. Students are able to work through pre-packaged materials at their own speed. Individualized instruction has been updated with computer-assisted instruction and other self-instructional techniques. It is usually linear in its approach, with all students expected to learn the same material in the same sequence. Branching techniques are used in some programs to teach or reteach information based on students' incorrect responses.

**Direct instruction** (I-1, T-2). Direct instruction is a systematic method of teaching that emphasizes proceeding in small steps, checking for student understanding, and achieving active participation of all students. According to Bruer (1999), explicit instruction is most effective when used with students who exhibit serious deficiencies and who appear less able to make wise instructional choices and to function independently.

Direct instruction involves six teaching functions:
1. Beginning the lesson with review and check of previous work.
2. Presenting new material.
4. Providing feedback and correctives.
5. Independent practice.

*Style-based instruction* (I-2, T-2). In style-based instruction, the learning environment is adjusted to accommodate student differences. Usually a formal assessment is conducted with a generic learning-style instrument. Student profiles are generated that give information about perceptual modalities, cognitive skills, and instructional and study preferences. Teachers confirm the results of the assessments by observing students at work, interviewing individual students, and administering more intensive diagnostic instruments. The results are used to plan and implement appropriate teaching strategies geared to individual differences (Keefe 1991).

Style-based approaches use learning guides, contract activity packages (CAPS), and other types of individualized learning units created by teachers to offer students choices for achieving common objectives. These materials replace whole-class instruction. For example, contract activity packages contain a variety of resources to accommodate student style differences (Dunn and Dunn 1992). Comprehensive style-based instruction models also attempt to accommodate student cognitive skill weaknesses by offering skills training either in special resource rooms or in regular classroom instruction.
Technology-assisted learning (I-2, T-3). The skillful use of technology can enable students to advance through a curriculum at their own rate or to pursue a topic in depth. The Internet permits students to investigate topics of special interest or to research specific content. E-mail allows student researchers to interact with experts in a field, other researchers, or university professors. Students also can collaborate with other students or mentors in different parts of the country or the world. For example, students in one Florida high school collaborated with students in a Japanese high school to construct a space station prototype. And videodiscs, such as “The Adventures of Jasper Woodbury,” developed at Vanderbilt University’s Learning Technology Center, are available to teach problem finding and problem solving in middle school mathematics.

Contract learning (I-3, T-3). Contract learning is an instructional approach in which a teacher and a student design a learning activity that the student implements independently, with teacher supervision. Contracts offer students the opportunity to accelerate their learning, to study a topic in depth, or to pursue a special interest. Teachers monitor students’ progress on their contracts, but students also exercise a good deal of responsibility for their own learning. The degree of responsibility or structure depends on the individual student and usually is determined in consultation with the teacher. A contract typically includes statements about the content to be included, the learning objectives, a list of activities to be conducted, resources to be consulted, a timeline with due dates, and a description of how the work will
be assessed and evaluated. The student, teacher, and sometimes the parents sign the contract.

**Authentic pedagogy** (I-3, T-4). Researchers at the University of Wisconsin have developed three principles for determining the degree to which instruction can be labeled "authentic." First, instruction is authentic if it focuses on what people do in the *real* world, that is, construct, produce, or apply knowledge to resolve a real or simulated problem. Second, authentic instruction is grounded in one or several domains of knowledge rooted in high standards of intellectual quality. Third, authentic instruction has personal or utilitarian value beyond what students typically do in school. Authentic student work must influence an audience of peers or others, result in a product, or communicate ideas in a way that demonstrates deep understanding of a domain of knowledge (Newmann, Marks, and Gamoran 1995).

Teachers who practice authentic pedagogy assess an individual student’s knowledge and create a learning environment that emphasizes higher-order thinking and in-depth understanding. The teachers serve as coaches, mentors, and facilitators, stressing collaboration among students and higher expectations for intellectual accomplishment.

**Guided practice** (I-4, T-4). Guided practice is widely used in the arts and athletics. Usually the teacher or coach demonstrates a skill to be learned. The student then attempts to do what has been demonstrated while the teacher or coach watches carefully. Mistakes are noted, and the process continues until the student attains mastery.
The transfer from athletics or the performing arts to teaching as coaching involves the student practicing a target behavior under the supervision of a teacher/coach. The teacher/coach asks appropriate questions during the process to gain insight into the student’s level of skill or attainment. Often the student is asked to verbalize the steps of the process so that the teacher can assess competence and determine next steps. In some cases, students are encouraged to perform a skill or solve a problem as completely as they can so that the teacher/coach can determine the point at which intervention is appropriate. One commonly used support is scaffolding, a “process that enables a child or a novice to solve a problem, carry out a task, or achieve a goal which would be beyond their unassisted effort” (Wood, Bruner, and Ross 1976, p. 91). Prompts and scaffolds are gradually removed as a student becomes more self-sufficient.

Cooperative learning (I-4, T-4). Cooperative learning occurs in small groups where students work together to accomplish a common academic task. Each student is accountable for both the successful completion of the academic task and the working relationships within the group. The teacher sets the task, establishes the procedure, provides resources, encourages a healthy interdependency among all group members, and monitors the group’s progress.

Four elements appear necessary for a small group to work together effectively: positive interdependence among the learners, face-to-face interaction, individual accountability, and interpersonal and small-group skills.
David and Roger Johnson at the University of Minnesota and Robert Slavin at Johns Hopkins University have developed the most frequently used cooperative group strategies. These include such techniques as student teams-achievement division (STAD), group investigation, and jigsaw. In the last, students are assigned to six-member teams to work on subject matter divided into five sections. Each student studies his or her section thoroughly, meets with members of other teams who are studying the same section, and returns to his or her home team to teach the other members of the team about the section.

**Topic study or storyline (I-4, T-4).** Topic study was developed in the late 1960s and early 1970s in Scotland in response to an Office of Education report that stated that a child's growth and development depended on an awareness of home, school, and neighborhood. This strategy begins with a storyline, establishes a time and place, introduces the main characters, and identifies problems to solve. Using the general strategy of inquiry and discovery, students learn that ideas are negotiable if they supply evidence to support them. Heterogeneous groups of students are assigned tasks commensurate with their prior knowledge, skills, and experience. When topic study immigrated to the United States in the 1990s, its name was changed to "storyline."

One topic, or storyline, for the intermediate grades has students design the inside of a space vehicle that could be used to transport others to colonize a planet other than Earth. Students brainstorm answers to the question, "What do people need to survive?" A list of
items is generated, categorized, and used to form work crews. Students then select the group in which they wish to work. The work crews search for information associated with their areas by browsing the Internet, consulting library resources, and talking with experts. Ultimately, a space vehicle is constructed in accordance with specifications developed by the various work groups. Students then plan and execute a simulated day in space (Creswell 1997).

Differentiated instruction. Differentiated instruction, not considered in our original 20 strategies, has been popularized recently by the work of Carol Tomlinson (1999, 2000) at the University of Virginia. Ironically, it is not a new approach but one based on the venerable one-room schoolhouse. In that earlier era, the teacher was challenged to find ways to work effectively with students of different ages and differing needs. The contemporary approach draws heavily on best practices employed in special and gifted education, as well as research in learning styles, multiple intelligences, and authentic assessment.

Tomlinson (2000) warns that differentiation is not a recipe for teaching, nor is it an instructional strategy. Rather, it is a way of thinking about teaching and learning based on beliefs of student readiness to learn, their styles of learning, and their life circumstances. In a differentiated classroom, the teacher typically offers two to four different learning options for students or may give students opportunities to make their own choices. In many ways, differentiated instruction resembles a grouping strategy called “directed study”
used in the NASSP Model Schools Project (1969-74) to introduce entering students to the concepts and skills of continuous progress learning. In this sense, differentiated instruction may well be a useful transitional strategy for schools as they move toward schoolwide personalized instruction. We would rate it as intermediate to high in interaction and thoughtfulness.

In a “differentiated” high school pre-calculus class, for example, students select from among a group of activity folders to enhance their understandings and skills. While students work on the folder activities, the teacher works with individuals, assisting them with problems, monitoring their progress, and challenging them with questions. Although the teacher often uses whole-class instruction, most of the class is organized into small groups of three to four students. Students are assigned to the groups based on their levels of readiness for the concept being studied. Students work together, helping each other to understand and correct their work while the teacher monitors.
Improving the Future of Education

Educators committed to the development of personalized education and personalized instruction in schools must become change agents. Instructional design or redesign is an exercise in the change process. Traditionally, schools have been resistant to comprehensive redesign efforts because coherent processes for school improvement and suitable instruments for data collection and management have not been widely available. That is no longer true.

A process for implementing design-based, strategic change is summarized in Figure 3 (Keefe and Howard 1997). A design-based, strategic change process differs from the traditional process because a new design is developed for the school and, after that point (Step F in the change process), change is design-driven, rather than needs- or problems-driven. This design process combines the most practical features of strategic thinking and systemic approaches to change management. The steps of the process are more interactive — less sequential — than the traditional process.

Design statement. A key component of the change process outlined in Figure 3 is the school design state-
Figure 3. NAASSP School Improvement Process

A. Form Management/Design Team

B. Conduct Awareness/Commitment

C. Create Learning Organization

D. Initiate Planning Process

- Literature Search
- Predictions/Interventions and CAS-E-IMS Profile
- CAS-E-IMS Profile

E. Develop Basic Design

- Components
- Outline & Climate Statements
- Mission & Vision Statements
- Student Goals & Outcomes

F. Develop Systemic Design

- Components (Specification)
- First Draft (Writing)
- First Draft (Writing)
- Revised

G. Prepare Action Plan

- Task Force Formation
- Task Force Formation
- Priority Setting

H. Implement Action Plan

- Options
- Restudying (Partial)
- Total Design/Redesign (Systemic)

I. Evaluation and Reporting

- Continuous Update
- (2nd or 3rd Year)
- External Audit
- Annual Review
- Annual Review
ment, a set of specifications for a community's desired school of the future. All components defined in such a statement are interdependent and must be consistent with one another. The total design must be comprehensive — all components necessary for the operation of the school must be specified. Such a design statement provides the direction and focus for a school's systemic change process.

It is not our purpose here to treat the complete school improvement process or the design statement in detail, but some comment on its relevance to personalized instruction is necessary. (For more information on the total design process, see Redesigning Schools for the New Century: A Systems Approach by J.W. Keefe and E.R. Howard, NASSP, 1997.) The design statement includes 11 components, one of which is called instructional techniques. The design process calls for schools to write short descriptive paragraphs defining those teaching techniques chosen by the school because research or best practice suggests they will be successful in accomplishing the school's desired student outcomes. The descriptors spell out the roles of teachers in the program and recommended teaching methods and strategies.

A school that is considering implementing personalized instruction should first look seriously at the process of school design/redesign. Personalized instruction is a systems concept and requires a comprehensive and systematic implementation. School staff members must ask themselves what structure and programs they want and need for their students to become responsible and successful citizens of this information-age society.
School leaders must carefully evaluate their present practices and, in the light of their literature searches and assessment data, decide on a series of specifications for their desired school program — their program of the future. The instructional specifications they choose must be compatible with the school’s mission and vision and with its other basic and systemic components.

In *Redesigning Schools for the New Century*, Keefe and Howard (1997) characterize the school improvement process and the school design statement (Figure 3) as “a plan for the plan” that a school itself must develop and continually update if it hopes to implement and institutionalize a new school design/redesign. Whether a school envisions a self-contained classroom approach to personalization, such as directed study or differentiated instruction, or a comprehensive, schoolwide system using such strategies as project learning, guided practice, cognitive apprenticeship, and topic study, the need for a plan is compelling, even urgent. Any form of personalization is complex and demands careful planning. A school design statement is the first step, but one that must be reviewed on a regular basis and updated to ensure that its specifications have been enacted and, if successful, incorporated into the systemic structure of the school.
A New Accountability

Many educators, and most policy makers, have been more concerned in recent years with standards and standardization than with learning and its assessment, in rating schools rather than finding out what individual students know and are able to do. The more important issues of learning and assessment have taken a back seat, such issues as pre-instructional diagnosis, concern for core or essential knowledge and skills, flexible approaches to instruction, the uses of assessment in instruction, etc. Peel and McCary point out that “the unintended consequences of standardized testing have become more apparent (for example, a narrowed curriculum, frozen instructional practices, and a very limited picture of significant outcomes of schooling)” (1997, p. 704). Of course, traditional and standardized testing practices are used primarily for keeping score, rather than for feedback. Personalized instruction requires the latter. Accountability is important, but it must be viewed as responsibility — schools accepting real liability for student learning and intervening to provide adequate resources and help and alternatives to traditional instruction and testing.
Reform and restructuring efforts have become commonplace over the past three decades in response to various kinds of national and regional reports. Yet much of what has evolved is fine-tuning, an attempt to modify or regulate the existing structure of schooling. John Dewey (1902) thought of the child as an active organism in search of stimuli that will promote its growth. He stressed the experiential nature of learning as problem solving and the local nature of schooling, emphasizing active community participation in the process. He stated that “the manner in which the machinery of instruction bears upon the child really controls the whole system.” A controversial study of American education commissioned by the U.S. Department of Energy and conducted by the Sandia National Laboratories (Carson et al. 1992) drew on existing national databases to profile the current status of schooling. The report pointed out that many of the current recommendations for education reform were in conflict. The report urged that our education priorities should emphasize improving the education of minority and inner-city students, adjusting to immigration and demographic changes, and enhancing the status of teachers. These recommendations suggest a more focused and personalized approach to schooling. They argue for more attention to inner-city and rural schools, learner differences, and the developmental needs of teachers.

Today we know quite a bit about what makes schools exemplary and what makes instruction successful. And we know that exemplary schools support exemplary learning environments. They set out deliberately to
design or redesign themselves with an eye to providing the most supportive learning environments for all their students. Jerome Bruner (1996) says that “culture is probably biology’s last great evolutionary trick. It frees *homo sapiens* to construct a symbolic world flexible enough to meet local needs and to adapt to a myriad of ecological circumstances.” The best schools redesign themselves with teachers acting as guides and resources in a process of shared exploration with students who are active in thinking about their own learning and in planning and implementing their own projects. Bruner argues that this kind of learning requires the active construction of knowledge through social interaction—a culture of reflection, collaboration, and personalization. It is our strong conviction that this kind of learning can be supported only when a school commits itself to the elements of personalized instruction—a dual teacher role, a diagnostic approach to learning, a collegial school culture, an interactive school learning environment, a flexible school schedule, and a strategy for authentic student assessment.
Resources


Rosenshine, B. “Direct Instruction.” In Instructional Leadership Handbook, edited by James W. Keefe and John M.


Recent Books Published by the Phi Delta Kappa Educational Foundation

Public Education, Democracy, and the Common Good
Donovan R. Walling, ed.
Trade paperback. $34.95 (PDK members, $26.95)

The Nation’s Report Card: Evolution and Perspectives
Lyle V. Jones and Ingram Olkin, eds.
Cloth, with dust jacket. $69.95 (PDK members, $52.95)

Improving Classroom Questions, 2nd Edition
Kenneth R. Chuska
Trade paperback. $14.95 (PDK members, $11.95)

Proto-Fascism in America: Neoliberalism and the Demise of Democracy
Henry A. Giroux
Trade paperback. $17.95 (PDK members, $13.95)

Hazing in High Schools: Causes and Consequences
Kevin L. Guynn and Frank D. Aquila
Trade paperback. $13.95 (PDK members, $10.95)

Phi Delta Kappa International Advocacy Handbook
Donovan R. Walling
Saddle-stitched. 8½”x11” $6.95 (PDK members, $5.95)

Use Order Form on Next Page or Phone 1-800-766-1156

A processing charge is added to all orders.
Prices are subject to change without notice.
Complete online catalog at http://www.pdkintl.org
Order Form

SHIP TO:

STREET

CITY/STATE OR PROVINCE/ZIP OR POSTAL CODE

DAYTIME PHONE NUMBER PDK MEMBER ID NUMBER

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>TITLE</th>
<th>PRICE</th>
</tr>
</thead>
</table>

ORDERS MUST INCLUDE PROCESSING CHARGE

<table>
<thead>
<tr>
<th>Total Merchandise</th>
<th>Processing Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to $50</td>
<td>$5</td>
</tr>
<tr>
<td>$50.01 to $100</td>
<td>$10</td>
</tr>
<tr>
<td>More than $100</td>
<td>$10 plus 5% of total</td>
</tr>
</tbody>
</table>

Indiana residents add 6% Sales Tax

PROCESSING CHARGE

TOTAL

☐ Payment Enclosed (check payable to Phi Delta Kappa International)

Bill my ☐ VISA ☐ MasterCard ☐ American Express ☐ Discover

ACCT # ____________ DATE ____________

EXP DATE ____________ SIGNATURE ____________

Mail or fax your order to: Phi Delta Kappa International,
P.O. Box 789, Bloomington, IN 47402-0789. USA
Fax: (812) 339-5556. Phone: (812) 339-1156

For fastest service, phone 1-800-766-1156 and use your credit card.
Phi Delta Kappa Fastbacks

This series, published each fall and spring, offers short treatments of a variety of topics in education. Each fastback is intended to be a focused, authoritative work on a subject of current interest to educators and other readers. Since the inception of the series in 1972, the fastbacks have proven valuable for individual and group professional development in schools and districts and as readings in undergraduate and graduate teacher preparation classes. More than 500 titles in the series have been published, and more than eight million copies have been disseminated worldwide.

For a current list of available fastbacks and other publications, please contact:

Phi Delta Kappa International
P.O. Box 789
Bloomington, IN 47402-0789 U.S.A.
1-800-766-1156
(812) 339-1156
http://www.pdkintl.org
The Phi Delta Kappa Educational Foundation is focused on the future. Contributions to the Educational Foundation support scholarships, educational publications, and professional development programs — resources needed to promote excellence in education at all levels.

The Educational Foundation is pleased to accept contributions of cash, marketable securities, and real estate, as well as deferred gifts. The Educational Foundation is tax exempt under Section 501(c)(3) of the Internal Revenue Code, and contributions are tax deductible. PDK is more than willing to work with your estate planner, attorney, or accountant to find a plan that best meets your needs.

For more information about the Educational Foundation and how to make a contribution, please contact:

Phi Delta Kappa
Educational Foundation
P.O. Box 789
Bloomington, IN 47402-0789
USA

Toll-free: 1-800-766-1156
Voice: (812) 339-1156
Fax: (812) 339-0018
E-mail: headquarters@pdkintl.org
http://www.pdkintl.org

ISBN 0-87367-914-8