Ten Faulty Notions About Teaching and Learning That Hinder the Effectiveness of Special Education

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Ten Faulty Notions About Teaching and Learning That Hinder the Effectiveness of Special Education

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Commonly held notions about teaching and learning influence and reflect the practice of many classroom teachers. This article discusses 10 such notions that the author believes limit the effectiveness of special education by impeding the adoption of research-based instructional practices. Each notion is described, and then the author briefly discusses why or how it hinders effective instruction. Reasons why many educators subscribe to these faulty notions are suggested, and three recommendations that may increase the adoption of research-based teaching practices are offered.

Certain contemporary notions about teaching and learning hinder the effectiveness of special education as experienced by students and their families. The predominance of these notions in general education (cf. Bennett, Finn, & Cribb, 1999; Kramer, 1991) and their frequent appearance in the special education literature (e.g., Heshusius, 1992; Poplin, 1988a; Stainback & Stainback, 1992) suggest they are endorsed by a sizeable segment of college and university professors who train teachers. This pervasive influence is implicitly evident in the daily practice of many special educators and by what teachers say when asked to describe what they do and why they do it (Chard & Kame'enui, 2000; Purnell & Claycomb, 2001).

Discussion of and debate regarding most of these notions have appeared frequently in the special education literature over the past decade, and many of the perspectives offered in this article have been well articulated by others (Dixon & Carnine, 1992; D. Fuchs & Fuchs, 1994; Gersten, 1992; Kame'enui, 1994; Kauffman, 1993, 1998; Sasso, 2001; Stone, 1994). It is my hope that this discussion of the collective impact of these widely held ideas about teaching and learning will encourage special educators—and those who train and supervise them—to examine how they plan, implement, and evaluate instruction for students with disabilities.

Four Assumptions

The perspectives offered herein are based on four assumptions:

1. Students with disabilities have the right to an effective education.
2. Special education instruction should be individualized, intensive, and goal-directed.
3. Research has produced a useful and reliable knowledge base for special education.
4. Research-based instructional tools are underused in special education.

Students with Disabilities Have the Right to an Effective Education

The special educator's primary responsibilities are to design, implement, and evaluate instruction that helps students with disabilities acquire, generalize, and maintain knowledge and skills to improve the quality of their lives in school, home, community, and workplace settings. Special education is effective only to the extent that students with disabilities acquire and subsequently use knowledge and skills they did not have prior to instruction. What constitutes effective teaching in special education therefore cannot be evaluated in structural terms (i.e., by what it looks like). Instead, it must be evaluated by its outcome (i.e., the extent to which each student learned and used new knowledge and skills).

Special Education Instruction Should Be Individualized, Intensive, and Goal-Directed

Special education is a large, multidimensional enterprise that can be described and evaluated from a variety of perspectives. For example, it can be viewed as a legislatively governed activity whose practitioners are concerned primarily with issues such as due process procedures for informing parents about their right to participate in decisions concerning their children's education programs and the extent to which a school district's Individualized Education Programs (IEPs) include each component as required by the Individuals with Disabil-

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Dimension	Defining Features
Individually planned	• learning goals and objectives that are selected for each student based on assessment results and input from parents and student • teaching methods and instruction materials selected and/or adapted for each student • setting(s) where instruction will occur determined relative to opportunities for student to learn and use targeted skills
Specialized	• sometimes involves unique or adapted teaching procedures seldom used in general education (e.g., constant time delay, token reinforcement, self-monitoring) • incorporates variety of instructional materials and supports—both natural and contrived—to help student acquire and use targeted learning objectives • related services (e.g., audiology, physical therapy) • assistive technology (e.g., adapted cup holder, head-operated switch to select communication symbols)
Intensive	• instruction presented with attention to detail, precision, structure, clarity, and repeated practice • "relentless, urgent" instruction (Zigmond & Baker, 1995) • efforts made to provide with incidental, naturalistic opportunities for student to use targeted knowledge and skill
Goal-directed	• purposeful instruction intended to help individual students achieve the greatest possible personal self-sufficiency and success in present and future environments • value/goodness of instruction determined by student attainment of outcomes
Research-based methods	• recognizes that all teaching approaches are not equally effective • instructional programs and teaching procedures selected on basis of research support
Guided by student performance	• careful, ongoing monitoring of student progress • frequent and direct measures/assessment of student learning that inform modifications in instruction

FIGURE 1. Dimensions and defining features of special education. Source: From W. L. Heward. (2003). *Exceptional Children: An Introductory Survey of Special Education* (7th ed., p. 40). Upper Saddle River, NJ: Merrill/Prentice Hall. Used with permission.

ities Education Act (IDEA). From a sociopolitical perspective, special education can be understood as an outgrowth of the human rights movement, a discipline whose primary missions are ending segregated placements in school, work, and community; ensuring equal access to educational supports and services; and improving society's attitudes about people with disabilities.

The legal and sociopolitical perspectives play important roles in defining what special education is and how it is practiced. Neither view, however, reveals the fundamental purpose or essence of special education as instructionally based intervention designed to prevent (early intervention instruction), eliminate (remedial instruction), or overcome (compensatory instruction) the obstacles that might keep an individual with disabilities from learning and from full and active participation in school and the larger society.

At the level where students with disabilities most meaningfully and frequently come in contact with special education, it can be further defined as follows: "[W]hen practiced most effectively and ethically, special education is also characterized by the use of research-based teaching methods, the application of which is guided by direct and frequent measures of student performance" (Heward, 2003, p. 38). Figure 1 provides defining features for the six dimensions of this definition.

Research Has Produced a Useful and Reliable Knowledge Base for Special Education

Contrary to the conclusions of some critics, special education research has produced a significant and reliable knowledge base about effective teaching practices (Greenwood, 2001; Lloyd, Weintraub, & Safer, 1997). Empirical research has yielded a substantial body of knowledge consisting of strategic approaches (e.g., mediated scaffolding [Coyne, Kame'enui, & Simmons, 2001], functional assessment [Horner & Carr, 1997]) and tactical procedures (e.g., "think alouds" [Swanson & Hoskyn, 2001], constant time delay [Kratzer, Spooner, Test, & Koorland, 1993]) that special education teachers should know how to select and apply with professional expertise. The research base is not flawless, and it is far from complete. Many questions remain to be answered, and the pursuit of those answers will lead to still more questions.

Research-Based Instructional Tools Are Underused in Special Education

Although a significant gap exists between what is relatively well understood and what is understood poorly or not at all, a more distressing gap may be the one between what research has discovered about effective instruction and what is practiced in many classrooms. For example, research has discovered a great deal about topics such as features of early reading instruction that reduce the chances of children developing reading problems later (Coyne et al., 2001; National Reading Panel, 2000), enhancement of student success in overcoming learning problems in content-area classes (Deshler et al., 2001), and components of secondary special education programs that increase students' success in transitioning from school to work (e.g., Patton, Cronin, & Jairrels, 1997). Observations of classroom practice, however, have suggested that the education received by many students with disabilities does not take advantage of that knowledge (Kauffman, 1996; Moody, Vaughn, Hughes, & Fischer, 2000; Wagner, Blackorby, Cameto, & Newman, 1994).

Ten Misguided Notions About Teaching and Learning

I believe there are 10 notions about teaching and learning that impede the systematic use of research-based instructional practices and hinder the effectiveness of special education. They are as follows:

1. Structured curricula impede true learning.
2. Teaching discrete skills trivializes education and ignores the whole child.
3. Drill and practice limits students' deep understanding and dulls their creativity.
4. Teachers do not need to (and/or cannot, should not) measure student performance.
5. Students must be internally motivated to really learn.
6. Building students' self-esteem is a teacher's primary goal.
7. Teaching students with disabilities requires unending patience.
8. Every child learns differently.
9. Eclecticism is good.
10. A good teacher is a creative teacher.

Some readers will disagree with the viewpoints expressed herein. Some readers may believe I have missed the true purpose of education entirely and that these 10 notions and the instructional practices they support are essential to good teaching. Other readers will feel I have gone too far—that although several of these notions may be misguided and problematic, others serve as useful guides. Still others may think that I have failed to include some even more damaging notions.

Structured Curricula Impede True Learning

Proponents of this notion contend that curricula made up of standardized learning objectives organized in a predetermined scope and sequence place undesirable limits on students and teachers. Often associated with "progressive education," this notion is popular among many general education theorists and practitioners, and variations of the theme can be found in a wide range of contemporary school-reform literature (Kramer, 1991).

Supporters of this notion argue that there is no corpus of knowledge and skills that all children need to learn. For example, in their book recommending curricular adaptations to support the inclusion of students with disabilities in general education classrooms, Stainback and Stainback (1992) showed a clear disdain for standard curricular content, describing it as unnecessary, irrelevant, and boring to students and teachers. According to Stainback and Stainback, instead of learning specific knowledge and skills described by a preset curriculum, students should determine what and how much they will learn. "From a holistic, constructivist perspective, all children simply engage in a process of learning as much as they can in a particular subject area; how much and exactly what they learn will depend upon their backgrounds, interests, and abilities" (p. 72).

This position runs counter to the standards-based reform movement and the legislative requirements in IDEA that students with disabilities participate in the general education curriculum and in state- and district-wide assessments (Thurlow & Johnson, 2000; Thurlow & Thompson, 1999). It also stands in stark contrast to growing concern regarding the general ignorance of basic factual knowledge about the world by U.S. students and their insufficient facility with academic tool skills with which to manipulate that knowledge (Bennett et al., 1999; Hirsch, 1996).

Advocates of this notion contend that a structured curriculum forces the teacher to be a "sage on the stage" who requires students to learn things that adults have decided are important—knowledge and skills that may have no meaningful context for the student. As a result, freedom is limited and children become passive. Poplin (1988a, 1988b) discussed this theory: "Students' minds are allowed very little freedom when specific psychological processes, academic skills, and cognitive strategies are structured for them. . . . The more structured the curriculum, the more passive become our students" (Poplin, 1988b, p. 395). "This [holism] is incompatible with the myriad of manipulation techniques that are used to *force, coerce, or cajole* students to learn what others want them to learn" (Poplin, 1988a, p. 410, emphasis added).

Supporters of this notion argue that it is better for a teacher to be a "guide on the side" who encourages children to construct their own meanings from materials and activities: "[T]he task of schools is to help students develop new meanings in response to new experience rather than to learn the meanings others have created" (Poplin, 1988a, p. 401).

However, in his review of what research has shown that teachers can do to influence student achievement, Brophy (1986) concluded, "[A]ttainment of higher level learning objectives will not be achieved with relative ease through discovery learning; instead, it will require considerable instruction by a skilled teacher" (p. 1076). And in their review of research on effective teaching, Rosenshine and Berliner (1978) concluded that instruction in classrooms in which students made significant achievement gains was characterized by "a pattern of 'controlled practice' consisting of factual questions, student academic responses, and adult academic feedback. The frequency of factual, single-answer questions is positively related to achievement gain in most of these studies" (p. 10). Recent syntheses of instructional research with students with disabilities have also pointed to the importance of explicit instruction, guided practice, and feedback (Swanson & Hoskyn, 2001; Vaughn, Gersten, & Chard, 2000).

Another frequently voiced concern is that a structured curriculum limits the teacher's role to that of a manager who is unable to follow the students' lead: "[T]he teacher cannot act in a professional and intelligent manner, for much is forbidden, much prescribed, and much so rigid that personal initiative is impossible" (Heshusius, 1982, p. 11).

Advocates of a holistic/constructivist approach are especially vocal about what they believe are disadvantages of scripted curricula that specify what teachers should say and do. For example, Coles (1998) offered this assessment of the direct instruction (DI) model:

> [DI is a] do-as-you're-told-because-it-will-be-good-for-you form of instruction. Outcomes are narrowly instrumental, focusing on test scores of skills, word identification, and delimited conceptions of reading comprehension. It is a scripted pedagogy for producing compliant, conformist, competitive students and adults. It is not a pedagogy that explicitly asks, "How do children think, feel, and act; and how do we want them to think, feel, and act as they learn to read?"

Poplin (1988b) claimed that the more teachers control the content of curricula, the less students are likely to maintain and generalize the lessons:

> In order to most effectively control content, the teacher must diminish context, much like the designer of quantitative research. The more control, the less context; the less context, the less meaning. For this reason, I believe the more control *educators* have over the content, the less likely students will be to maintain and generalize skills and/or strategies. (p. 385, emphasis in original)

This claim reveals a nearly unbelievable bit of illogical thinking and offers very bad advice for teachers. It ignores what research has taught us about (a) the two variables that have produced the most reliable and robust correlations with student achievement—amount of curriculum content covered and students' active engagement with that content (Rosenshine, 1979)—and (b) how to design and deliver instruction for generalization and maintenance (Heward, 1987; Kame'enui, Carnine, Dixon, Simmons, & Coyne, 2002). Optimizing both outcomes requires teachers to control the selection and delivery of instructional content.

No empirical evidence has shown that structured curricula and teacher-led instruction lead to any of the negative outcomes asserted by advocates of child-centered, "progressive" education. To the contrary, research has found that academic achievement by students enrolled in child-centered, progressive curricula lags behind that of students in schools with clear-cut curricular outcomes and expectations (Bennett et al., 1999; Olson, 1999; Watkins, 1997).

Teaching Discrete Skills Trivializes Education and Ignores the Whole Child

This notion suggests that targeting and isolating specific skills for instruction render those skills trivial. To illustrate, Heshusius (1982) described an IEP objective calling for a girl to smile 4 out of 5 days when entering the classroom. As a result of this specification, Heshusius stated that "the children themselves seem secondary. . . . Teaching and learning are reduced to the level of rules and instrumentality, the most subordinate level in the hierarchy of ways by which we know" (p. 7).

Increasing the frequency of "smiling behavior" may very well have been trivial for the girl. If, on the other hand, smiling more often at appropriate times increased her opportuni-

ties for social interaction, making friends, and developing language, the girl's teachers were wise to include it on her IEP and target it for instruction.

This notion also rests on the belief that teaching specific skills is a form of reductionism that ignores or disregards the "whole" child. It is said that the whole of anything (e.g., reading) is more than the sum of its parts (e.g., decoding skills), and although the component skills may be isolated for instruction, it is neither useful nor wise to do so. Supporters of this notion believe that skills can be learned in a meaningful way only in the context of the whole activity: "There is little focus on practicing skills such as punctuation, capitalization, or noun-verb identification in isolated ways—these are learned in the context of writing activities" (Stainback & Stainback, 1992, p. 70).

Poplin (1988b) referred to the remediation of specific skill deficits as special education's "reductionistic fallacy," an approach she believed is responsible for the difficulties many students with disabilities have in generalizing and maintaining what they have learned. Poplin said, "For behaviorists, there are skills (often long lists of mechanical skills, Brigance assessments, DISTAR programs) that are necessary in order to read, though often they are divorced during assessment and instruction from the act of reading text itself" (p. 397).

Whether a particular behavior is an isolated "splinter skill" that is divorced from meaningful context outside of the lessons in which it is acquired and practiced or is a critically important prerequisite or component skill for more complex behavior cannot be determined by the form or topography of the behavior. The ultimate meaning a given skill has for a student is best determined by analyzing the effects that learning and using the skill has on his or her overall repertoire. For example, Koegel, Koegel, Harrower, and Carter (1999) described an early intervention program for children with autism that teaches pivotal behaviors (e.g., responding to multiple cues, initiating communication) that have been targeted because they have widespread positive effects across multiple areas of a child's life.

Recent advances in reading research have demonstrated that rhyming games and other activities focusing on phonemic awareness tasks (e.g., What is the first sound in *nose* [sound isolation]? What sounds do you hear in the word *fat* [phoneme segmentation]? What word starts with a different sound: *cat, couch, fine, cake* [odd word out]?) have positive effects on the acquisition of reading and spelling for nonreaders (National Reading Panel, 2000). Research has also suggested that a key to generalization and maintenance of any skill, whether it is taught as a component/tool skill or as part of a larger composite, is providing fluency-building practice that enables the student to perform the skill with accuracy and speed (Johnson & Layng, 1994).

Targeting specific skills for remedial instruction has also been criticized for being a deficit-driven approach to education (Kohn, 1998; Poplin, 1988b). This ignores the fact that deficits in learning and behavior are the very reason why students receive special education—and that recognizing and specifying those deficits is a prerequisite to meaningful intervention (Kauffman, 1999).

Drill and Practice Limits Students' Deep Understanding and Dulls Creativity

Today's teachers are told that drill-and-practice exercises on basic skills are not as important as was previously thought. Drill and practice, they are told, produces only rote memorization. When did educators decide that memorizing things is undesirable? Although we can debate which facts, relationships, and learning strategies are most useful to commit to memory, every educated person knows many things by memory. *Rote,* the word most frequently used to demean the outcomes of drill and practice, means to do something in a routine or fixed way, to respond automatically by memory alone, without thought. It is good to know some things by rote. Properly conducted drill-and-practice exercises help students develop fluency (the *routine* and *automatic* connotations of rote) in the knowledge and skills they already understand. For example, students doing drill-and-practice activities for addition and subtraction facts should already know *how* to add and subtract with accuracy; that is, they *understand* what they are doing. Drill-and-practice activities are designed to build students' fluency (accuracy and speed) with the math facts. Students who can perform basic tool skills (e.g., simple math facts, letter–sound relationships) with fluency are then able to apply those skills as components of more complex tasks and problem solving (e.g., long division, reading). Executing tool skills in rote fashion—without having to stop and think about them—enables students to attend to and solve larger, more complex tasks that require critical thinking (Johnson & Layng, 1994).

Today's teachers are also told that drill and practice dulls students' creativity. In fact, repeated practice leads to increased competence and confidence with the subject matter or skills being practiced, thereby providing students with the knowledge and tools with which they can be creative. In a major review of research on what teachers can do to influence student achievement, Brophy (1986) drew this conclusion on the relationship between drill and practice and creative performance:

> Development of basic knowledge and skills to the necessary levels of automatic and errorless performance requires a great deal of drill and practice, . . . drill and practice activities should not be slighted as "low level." Carried out properly, they appear to be just as essential to complex and creative intellectual performance as they are to the performance of a virtuoso violinist. (p. 1076)

Compare the attitudes and approaches to drill and practice by many academic teachers with the attitudes of educators who are held accountable for the competence of their students. The

basketball coach or the music teacher needs no convincing regarding the value of drill and practice on fundamental skills. No one questions the basketball coach's insistence that his players shoot 100 free throws every day or wonders why the piano teacher has her pupils play scales over and over. It is well understood that these skills are critical to future performance and that systematic practice is required to master them to the desired levels of automaticity and fluency. We would question the competence of the coach or music teacher who did not include drill and practice as a major component of his or her teaching.

Some say that drill and practice of basic skills does not contribute to the achievement of literacy or higher-order thinking skills and that class time can be better spent in activities that are more enjoyable and will contribute to a deeper understanding. Kohn (1998) contended that "a growing facility with words and numbers derives from the process of finding answers to their own questions" (p. 211). In other words, it is unnecessary to provide students with drill and practice on basic academic tool skills such as multiplication facts and letter–sound correspondences; instead, teachers need only to encourage children to ask and to solve questions they may have about fun math problems and interesting stories. In the process of constructing their own meanings from these activities, the students will become fluent readers and skilled calculators.

This sounds wonderful; I would welcome evidence of the phenomenon. It also places the cart before the horse, for it is facility with words and numbers that gives students the tools they need to solve problems and find answers to questions they or others may ask (Johnson & Layng, 1994; Simmons, Kame'enui, Coyne, & Chard, 2002).

Critics of drill-and-practice activities are so disdainful, one wonders what horrible malpractice they have witnessed. Kohn (1998) stated, "The educational crisis we are allegedly facing has occurred under a 'drill-and-skill,' test-driven system in which students are treated as passive receptacles rather than active learners" (p. 197). He went on to say, "A sour 'take-your-medicine' traditionalism goes hand in hand with drill-and-skill lessons (some of which are aptly named 'worksheets')" (p. 212).

Kohn (1998) does not like that what students do in school is referred to as *work*. He does not like the terms *seatwork* and *homework,* and he has suggested that referring to schooling with the metaphor of work has "profound implications for the nature of schooling" (p. 210). The implications are indeed profound if students do not receive regular drill and practice of critical academic tool skills because their teachers regard such activities as unimportant, demeaning, or just too much work for students (Sewall, 2000).

Of course, drill and practice can be conducted in ways that render it pointless, a waste of time, and frustrating for children. Research has shown, however, that when properly conducted, drill and practice is a consistently effective teaching method. For example, a recent meta-analysis of 85 academic intervention studies with students with learning disabilities found that regardless of the practical or theoretical orientation of the study, the largest effect sizes were obtained by interventions that included systematic drill, repetition, practice, and review (Swanson & Sachse-Lee, 2000). For procedural guidelines and suggestions for conducting fluency-building practice for academic skills, see Binder, Haughton, and Van Eyk (1990); Johnson and Layng (1994); and Miller and Heward (1992).

The current deemphasis on drill and practice goes hand in hand with the arguments against structured curricula with clearly identified sequences of learning objectives and the notion that teaching explicit skills results in fragmented, purposeless learning. To the extent that these three complementary and misguided notions influence classroom practice, they form a powerful front against systematic instruction.

Teachers Do Not Need to Measure Student Performance

Direct, objective, and frequent measurement of student performance is one of the hallmarks of special education (Greenwood & Maheady, 1997). Measurement is *direct* when the student is observed performing the behavior of interest in the natural context or environment for that skill (or a permanent product from the performance is assessed). Measurement is *objective* when the frequency and/or quality of student performance is recorded in standard units of number and/or time (e.g., number of words read correctly per minute). Measurement is *frequent* when it occurs on a regular basis, ideally each time instruction occurs. Special educators use the data derived from such measures to evaluate the effects of their instruction and to guide changes in teaching materials and procedures.

Curriculum-based assessment (CBA) is one form of direct and frequent measurement that enables teachers to make data-based instructional decisions (Deno, 1985). Nearly two decades of research has shown academic achievement gains by students with disabilities when their teachers use CBA (e.g., L. S. Fuchs, Deno, & Mirken, 1984; Jones & Krouse, 1988; Steeker & Fuchs, 2000).

Quantifying precisely defined aspects of student performance has been attacked vigorously in recent years. For example, Kohn (1998) chided educators who wanted to measure student performance as possessing a "prosaic mentality" (p. 198) and stated that "what matters most about learning may well be impossible to measure—and attempts to do so anyway may distort that which is quantified" (p. 199). Heshusius (1982) asserted that "because of the required quantification and measurement, teaching and learning often do not operate at the levels of what is meaningful to the child and what is worth doing" (p. 7). Heshusius also noted that "[measurement tactics are] superimposed on but are unrelated to the human phenomena they claim to assess" (1992, p. 315) and that "authentic learning does not occur in a stable, steadily progressing manner; rather, its visible outcomes are variable" (1992, p. 325).

These three excerpts suggest the following: (a) You may be able to pinpoint and measure a bit of behavior, but doing so will not tell you anything important; (b) if you measure student behavior, the behavior is no longer authentic; and (c) if it is authentic learning, you cannot measure it.

Of course, just because some aspect of a student's performance can be defined, quantified, and charted does not make it meaningful. Performance measures should systematically reflect the full range of natural (i.e., authentic) stimulus variations and response requirements the student will face. Heshusius (1992) also noted that measurement may be damaging or harmful to students: "[Students are] *put through* CBA/DI measurement and control procedures. . . . Measurement-driven ways of thinking about education thwarts authentic learning" (p. 325, emphasis added).

Admonitions that measurement of student performance is at best a waste of time and at worst an insult to students and an impediment to their learning may provide comfort and relief to some teachers. Obtaining student performance data is hard work, and once obtained, the data often suggest additional work will be necessary to modify instructional materials, restructure lesson plans, and so forth. In addition, as Bushell and Baer (1994) pointed out, measuring what one has taught requires a decision about what to teach. As discussed in the sections on the first two notions, however, some educators today are reluctant to specify curricular objectives and learning outcomes for their students.

Unfortunately, many special education teachers do not collect and use student performance data. Although three fourths of the 510 special education teachers in one survey indicated that it is "important" to frequently collect student performance data, many of them indicated that they most often relied on anecdotal observations and subjective measures (e.g., checklists, letter grades) to determine whether students were meeting IEP objectives, and 85% said they "never" or "seldom" collected and charted student performance data to make instructional decisions (Cooke, Heward, Test, Spooner, & Courson, 1991).

Special educators who make instructional decisions without being informed by data from direct and frequent measurement of their students may want to consider Kauffman's (1997) perspective on the issue:

> The teacher who cannot or will not pinpoint and measure the relevant behaviors of the students he or she is teaching is probably not going to be very effective. . . . Not to define precisely and to measure these behavioral excesses and deficiencies, then, is a fundamental error; it is akin to the malpractice of a nurse who decides not to measure vital signs (heart rate, respiration rate, temperature, and blood pressure), perhaps arguing that he or she is too busy, that subjective estimates of vital signs are quite adequate, that vital signs are only superficial estimates of the patient's health, or that vital signs do not signify the nature of the underlying pathology. The teaching profession is dedicated to the task of changing behavior—changing behavior demonstrably for the better. What can one say, then, of educational practice that does not include precise definition and reliable measurement of the behavioral change induced by the teacher's methodology? *It is indefensible.* (p. 514)

Students Must Be Internally Motivated to Really Learn

Although there is substantial evidence that contingent teacher praise, approval, and other forms of positive reinforcement have positive effects on student behavior and achievement (cf. Alber & Heward, 2000; Maag, 2001), some researchers have argued against the use of praise and rewards for student performance (e.g., Ryan & Deci, 1996). Kohn, who has gained considerable notoriety and popularity by giving speeches and writing papers and books for educators and business managers, has claimed that the use of "extrinsic motivators" such as incentive plans, grades, and verbal praise damage the "intrinsic motivation" of students and employees to learn and work (e.g., Kohn, 1993a, 1993b). Kohn has argued passionately and articulately—but without sound empirical bases—that not only is praise ineffective, it is actually harmful to students. He has claimed that praise increases pressure to "live up to" the compliment, insinuates unrealistic expectations of future success, insidiously manipulates people, establishes a power imbalance, insults people if awarded for unchallenging behaviors, and undermines intrinsic motivation.

For example, in a widely cited article published in the *Harvard Business Review,* Kohn (1993b) wrote,

> Do rewards work? The answer depends on what we mean by "work." Research suggests that, by and large, rewards succeed at securing one thing only: temporary compliance. When it comes to producing lasting change in attitudes and behavior, however, rewards, like punishment, are strikingly ineffective. Once the rewards run out, people revert to their old behaviors. Research shows that offering incentives . . . is not only less effective than other strategies but often proves worse than doing nothing at all. Incentives, a version of what psychologists call extrinsic motivators, do not alter the attitudes that underlie our behaviors. They do not create an enduring commitment to any value or action. Rather, incentives merely—and temporarily—change what we do. (p. 55)

A careful examination of the research conducted in both classrooms and the laboratory does not support Kohn's contention that students are "punished by rewards" (Cameron, Banko, &

Pierce, 2001; Cameron & Pierce, 1994, 1996, 2002). Cameron et al. (2001) concluded their meta-analysis of 145 experimental studies on the effects of reward on intrinsic motivation by stating the following:

> In terms of the overall effects of reward, our meta-analysis indicates no evidence for detrimental effects of reward on measures of intrinsic motivation. . . . These findings are given more importance in light of the fact that the group-design experiments on rewards and intrinsic motivation were primarily designed to detect detrimental effects. The reward contingencies examined in this literature can be viewed as a subset of the many possible arrangements of the use of reward in everyday life . . . . What is clear at this time is that rewards do not inevitably have pervasive negative effects on intrinsic motivation. Nonetheless, the myth continues. (pp. 21, 27)

Kohn and others (Deci, Koestner, & Ryan, 1999; Hintz & Driscoll, 1988; Lepper, Keavney, & Drake, 1996; Ryan & Deci, 1996) who have warned against the use of praise and other contingent rewards need not worry about teachers' praising students too often. Observational studies in general education and special education classrooms over the past 25 years have consistently found low rates of teacher praise. In a large-scale study of 104 teachers in Grades 1 through 12, White (1975) found that rates of teacher praise dropped with each grade level, and in every grade after second, the rate of teacher disapproval exceeded the rate of teacher verbal approval. More recent studies have reported similar low rates of teacher praise in special education classrooms (Baker & Zigmond, 1990; Deno, Maruyama, Espin, & Cohen, 1990; Gable, Hendrickson, Young, Shores, & Stowitschek, 1983; Nowacek, McKinney, & Hallahan, 1990; Shores et al., 1993; Ysseldyke, Thurlow, Mecklenburg, & Graden, 1984).

I believe that at least four factors contribute to the low rates of teacher praise observed in many classrooms. First, some teachers worry that students will come to expect to be praised or rewarded and that students should learn for "intrinsic" reasons. Certainly it would be wonderful if all students came to school prepared to work hard and to learn for so-called intrinsic reasons. The ultimate intrinsic motivator is success itself (Skinner, 1989)—using new knowledge and skills effectively enough to enjoy control over one's environment, be it solving a never-before-seen algebra problem or reading a mystery with sufficient fluency, endurance, and comprehension to find out who did it. It is naive and irresponsible, however, for educators to expect students who do not already have the skills needed for experiencing success to work hard without positive consequences. Contingent teacher praise (along with other "extrinsic motivators" such as points toward a grade or slips of paper as entries in the classroom weekly lottery) is a critical and proven method for helping students achieve the performance levels necessary to come into contact with and be maintained by the naturally existing reinforcement contingencies of success (Alberto & Troutman, 2003). Second, some teachers think that praising takes too much time away from teaching. Detecting and praising performance improvements by students, particularly low-achieving students who have experienced little academic success, is one of the most important and effective forms of teaching. It is unfortunate that some teachers believe they are not teaching when they are praising student accomplishments. Third, some teachers believe it is unnatural to praise. On this point, they are correct. The natural contingencies of the typical classroom undermine frequent teacher praise and strengthen reprimanding behavior. Although few teachers must be taught to catch students misbehaving and to issue reprimands, many teachers need help increasing the frequency with which they praise student behavior. Teacher reprimands typically produce an immediate change in student behavior (e.g., the child stops disrupting class), which negatively reinforces reprimanding (Maag, 2001). By contrast, when a teacher praises a student for behavior, such as working quietly in class, there usually is no immediate consequence to reinforce the teacher's praising behavior (e.g., the student just continues working as before). Although praising a student who is working quietly on an assignment may increase the future frequency of that behavior, no immediate consequences occur to reinforce the teacher's praising behavior. These naturally occurring contingencies are so pervasive that Foxx (1992) has suggested that praising one another is an "unnatural act" for humans. Fourth, the classroom is a very busy place, and many student behaviors worthy of praise and attention go unnoticed. Teaching students—especially at-risk students, low-achieving students, and students with disabilities—to politely recruit teacher attention and assistance is one strategy for effectively increasing the frequency of teacher praise in the classroom (e.g., Alber, Heward, & Hippler, 1999; Craft, Alber, & Heward, 1999).

Building Students' Self-Esteem Is a Teacher's Primary Goal

Many educators believe that children must feel good about themselves in order to learn. The notion is that if we build-up students' self-esteem, they will become excited about and open to learning and their abilities to read, write, and compute will blossom. Logical support for this notion can be found in the positive correlation between achievement and positive self-esteem: Children who are achieving academically and socially tend to have higher self-esteem than children who are failing and without friends.

The mistake is thinking that achievement is a by-product of high self-esteem (Ruggiero, 2000). It is more likely that self-esteem is a product of rising achievement and meaningful accomplishments, not a means by which to attain knowledge and skills. The nationwide Project Follow Through study that compared various curricular and instructional models,

including several programs that emphasized the development of self-esteem, found that the Direct Instruction model that focused on improving children's reading, math, and language skills produced the *highest scores* on measures of self-concept—higher even than for programs designed to enhance self-concept (Watkins, 1997). This is not surprising. Children who are competent readers, writers, and math calculators are more likely to feel better about themselves than are children whose academic difficulties make each day in school a hardship.

The belief that raising students' self-esteem is a teacher's first priority, along with the fear that something might happen in the classroom that could damage children's fragile self-esteem, may account, in part, for two kinds of ineffective instruction in the classroom: (a) using instructional materials that allow students to be "right for the wrong reason" and (b) not correcting students' errors (Heward & Dardig, 2001). Instructional materials that students can complete with 100% accuracy but without having to use the skill or knowledge the materials were intended to teach are widely used from the primary grades through high school. The following are a few examples:

- a language arts activity that does not require students to read the passages and think about the best choice for the fill-in-the-blank responses because the correct choices are made obvious by grammatical cues or common sense (e.g., "The mouse ate the _____ ." Choose from "red, seven, cheese, which");
- a science vocabulary worksheet that can be completed without reading the definitions—the student simply matches the number of letters in each term with the number of spaces provided next to the definitions;
- a language arts activity in which students can make compound words by drawing lines between the color-matched parts (e.g., *base* and *ball* are in blue boxes, *bath* and *tub* in green boxes) without reading the words and thinking about which ones go together.

Because students' answers on such poorly designed materials are under the faulty stimulus control of irrelevant features (e.g., color, size, position on the page), the materials provide no meaningful practice with the knowledge or skills they were intended to teach (Vargas, 1984). Instructional materials that allow students to be right for the wrong reason do them no favors. Although students may initially feel good about getting the right answers quickly and painlessly, the long-term effects on their self-esteem and their achievement are likely to be negative.

Another problem with the misplaced emphasis on self-esteem is the hesitation by some teachers to correct student errors. Some teachers allow students to repeat errors because they believe informing students that their work contains mistakes may harm the students' self-esteem, which in turn will negatively affect achievement. Allowing students to repeat mistakes is what harms their achievement and ultimately their self-esteem. In addition, it wastes valuable instructional time because of the reteaching and relearning that eventually must occur.

When handled properly, errors can provide good opportunities for teaching and learning. Engelmann and Bruner (1995) noted, "The major difference between the average Reading Mastery I teacher, who teaches *most* of the children, and the outstanding teacher, who teaches *all* of the children, is the ability to correct" (p. 11, emphasis in original). Error correction is likely to be more effective—the student is correct the next time—and efficient—not too time-consuming so that additional learning trials can occur—when it is *immediate* (conducted before going to the next item or problem instead of at the end of the lesson); *direct* (teacher tells, shows, and/or guides the student through the correct response); *quick* (taking just a few seconds to correct an error is usually better than providing an elaborate explanation of the mistake); and *ends with the student making the correct response* (Barbetta, Heron, & Heward, 1993; Barbetta, Heward, Bradley, & Miller, 1994; Dalrymple & Feldman, 1992; Drevno et al., 1994; Espin & Deno, 1989).

Teaching Students with Disabilities Requires Unending Patience

Conventional wisdom holds that an extra measure of patience is required to be a good teacher of children with disabilities. This faulty notion does a great disservice to students with special needs and to the educators who teach them. Although patience is a positive and valued trait, in the classroom the idea that teachers must be patient with special education students often translates into slowed-down instruction, lowered expectations for performance, fewer opportunities to respond, and fewer in-class and homework assignments.

A related piece of wisdom goes like this: Students with disabilities can learn, but they learn more slowly; therefore, they should be given extra time and instruction should be conducted at a slower pace. Although this reasoning possesses a degree of logic and common sense, research has found that slowing the pace of instruction makes things worse, not better, for students with learning problems. For example, Carnine (1976) conducted an experiment in which instruction was presented to four first-grade remedial reading students at two paces: slow (intertrial interval of 5 seconds) and fast (intertrial interval of 1 second or less). Fast-paced instruction resulted in more learning trials presented by the teacher, more responses per lesson by the students, better accuracy of student responses, and better on-task behavior. Systematic replications of this study have yielded a similar pattern of results (e.g., Carnine & Fink, 1978; Darch & Gersten, 1985; Ernsbarger et al., 2001; Koegel, Dunlap, & Dyer, 1980; Williams, 1993).

Grossen (1998a) shared the following experience in which she helped a student teacher see the importance of fast pacing:

> A student teacher was having trouble with a class of 7th graders. The kids could not write the fraction for the picture and their behavior was horrible for about 30 of the 35 of them. The supervising teacher from the university had apparently told the student teacher to slow down, since it was difficult for the kids. I was not aware this message had been communicated to him. I walked in, saw the situation, and took a turn teaching. I increased the pace dramatically, drawing pictures on the board and asking the kids the formatted questions: "How many parts in each unit? So what's the bottom number? How many parts are shaded? So what's the top number?" I repeated the first item over and over until the whole 35 of them were on task and responding, then we went through a whole bunch of those problems until they were getting them right the first time. Same four questions over and over. In a few minutes they had fractions figured out and were doing the independent work correctly. In the discussion with the teacher afterward, I told him he needed to pick up the pace. He indicated that his university supervisor had told him to slow down and expressed the reasonable frustration at receiving conflicting advice. I just said, "Well, in which situation do you think the kids were doing better, when the pace was slow or when it was fast?" The answer was clear. I just said he needs to look at the kids for the answers.

Just as teaching too slowly impedes learning, teaching with excessive sensitivity to and patience for students with disabilities may lead to lower expectations, fewer assignments, and students' participation only when the students "feel like it." Educational research is unequivocal in its support for the positive relationship between the amount of time children spend actively responding to academic tasks and their subsequent achievement (Brophy & Good, 1986; Fisher & Berliner, 1985; Greenwood, Delquadri, & Hall, 1984; Heward, 1994). When other key variables are held constant (e.g., quality of curriculum materials, students' prerequisite skills, motivation), a lesson in which students emit many active responses will produce more learning than will a lesson of equal duration in which students make few responses (e.g., Gardner, Heward, & Grossi, 1994; Sterling, Barbetta, Heward, & Heron, 1997).

Frequent opportunities to respond, high expectations, and fast-paced instruction are especially important for students with learning and behavioral problems, because

> for children who are behind to catch up, they simply must be taught more in less time. If the teacher doesn't attempt to teach more in less time . . . the gap in general knowledge between a normal and handicapped student becomes even greater. (Kame'enui & Simmons, 1990, p. 11)

Instead of patient teachers, students with disabilities need teachers who are *impatient*—impatient with instructional methods and materials that do not help their students acquire and subsequently use the knowledge and skills required for successful functioning in school, home, community, and workplace. Instead of waiting patiently for a student to learn, attributing lack of progress to some inherent attribute or faulty process within the child, a teacher should use direct and frequent measures of the student's performance as the primary guide for modifying instructional methods and materials to improve effectiveness.

Every Child Learns Differently

Every child learns differently. This is spoken and written so regularly in the education and psychological literature that it is accepted without question. Of course, every child *is* different from every other child. Sometimes those differences are substantial enough to warrant special attention. Indeed, interindividual differences in learning are the very basis for the field of special education. Children are identified for assessment and evaluation because of interindividual differences. They receive special education services aimed precisely at those differences, and the effectiveness of those services rests on how well they are responsive to those individual differences.

Still, the notion that all children learn differently, while unarguably true at several levels, may be the biggest misconception foisted upon teachers. What does this notion really mean? Does it mean teachers must find a unique way to teach each child? If that were literally true, there would be no point, indeed no possibility, of grouping students for instruction. If, in fact, teachers had to discover a unique way to teach every child, there could be no shared knowledge base of instructional methods, because every child taught would require a new and heretofore untested method. Research would be unable to contribute to a technology of replicable and reliable instructional tools.

At the level of fundamental instructional strategies, the reality is that the same basic principles appear to function in the learning of all children. The most fundamental of those principles of learning is that variations in children's behavior are selected, shaped, and maintained by the consequences that immediately follow those variations (Bijou & Baer, 1978; Cooper, Heron, & Heward, 1987). Other principles describe, for example, the processes by which various features of the environment acquire stimulus control over behavior and how newly acquired behavior is maintained and generalized. Many teaching strategies and tactics have been derived from a relatively few basic principles. The challenge facing all teachers, but especially teachers of children with disabilities, is discovering the combination of strategies and tactics most respon-

sive to the unique needs of each child. Fortunately, the number of children who need to be taught is far greater than the number of instructional strategies and tactics combinations needed to accomplish the task.

Eclecticism Is Good

Eclecticism—using a combination of principles and methods from a variety of theories or models—is based on the realization that no single theory or model of teaching and learning is complete and error-free. It is thought that incorporating components from a number of different models will cover the gaps or deficiencies found in any single model. The logic is reasonable and, superficially, much appears to be gained by eclecticism. The problems likely to arise from unbridled eclecticism, however, outweigh its logical appeal.

First, not all theories and models are equally trustworthy and valuable. The more models represented in the eclectic mix, the more likely it is that ineffective and possibly even harmful components will be included (Maurice, 1993, 2003). Second, teachers might not choose the most important and effective parts of each model, instead selecting weaker and perhaps ineffective components. Third, some strategies or components of a given model may not be effective when implemented in isolation, without other elements of the model. Fourth, elements from different models may be incompatible with one another. For example, children in a phonics-based program should practice reading with decodable text composed of previously learned letter–sound relationships and a limited number of sight words that have been systematically taught (Grossen, 2003). Using the less decodable and often predictable text typical of some language models limits the beginning reader's opportunity to integrate phonological skills with actual reading and encourages the use of prediction and context to comprehend a passage. Although prediction is a useful skill, children who must rely on the predictability of text will not become successful readers (Chard & Kame'enui, 2000). Fifth, an eclectic mix might prevent any of the included models from being implemented continuously or intensely enough to obtain significant effects. A little bit of everything and a lot of nothing often reduces eclecticism to a recipe for failure (Kauffman, 1997). Sixth, teachers who use elements of multiple models may not learn to implement any of the models with the fidelity and precision necessary for best results. The eclectic practitioner is likely to be an apprentice of many models but master of none.

Being skeptical of eclecticism is *not* the same as believing there is only one effective method of instruction. It signifies instead an understanding that not all models and approaches are equally effective, an awareness that some approaches may even have a deleterious effect on student learning, and a commitment to using only those instructional tools with empirical support for their effectiveness. A defining characteristic of a good special educator is knowledge and skill in using a variety of instructional methods (D. Fuchs & Fuchs, 2000; Lovitt, 1996).

A Good Teacher Is a Creative Teacher

There is widespread belief in education that creativity is a key to effective teaching. Who wants to argue against the value of creativity? Like patience, creativity is a desirable and positive characteristic in teachers. Many thousands of ineffective lessons have been turned into effective ones by teachers who have creatively adapted instructional materials; developed prosthetic devices; or changed the mode, form, timing, or other dimension of a stimulus prompt. The kind of creativity most often implied by this notion, however, has little to do with systematically monitoring and analyzing a student's interaction with carefully planned materials and lesson plans to detect flaws in the instructional design that the teacher might then repair in some creative fashion (Heward & Dardig, 2001).

It is one thing for a teacher to creatively design and adapt instructional materials, examples, and procedures to add an extra degree or two of effectiveness to an already effective set of teaching skills. It is quite another thing for a teacher to be "creative" in the absence of a sound curriculum and repertoire of critical instructional skills. Instead of being told that being creative is the key to good teaching, teachers should be trained to realize that the first and most important requisite to effective teaching is obtaining the knowledge and skills necessary to select and properly use research-based instructional tools (Lovitt, 1996).

Teachers often hear that their profession is an art, not a science, and that not only is it permissible to teach in different ways from time to time, but such change is good for students. Adding variety to instructional activities and materials in an attempt to make lessons more interesting and fun for students is one way in which teachers frequently try to be creative. A teacher being creative in this way, however, must be careful not to inadvertently reduce students' opportunities to practice the target skill(s). For example, consider the many "creative" materials/activities that have been developed to provide variety in spelling instruction: word searches, unscrambling words, and secret codes, to name just a few. The teacher who has assigned such spelling activities on Monday through Thursday should not be surprised when many of his or her students perform poorly on Friday's spelling test. Although the materials and activities the students worked on all week might be viewed by some as creative, they did not provide sufficient opportunities to actually practice spelling the words as the students would be required to do on Friday.

Telling teachers they must be creative may work against the systematic adoption of research-based curriculum and instructional tools. How? Because frequently changing methods and materials is a primary way for teachers to demonstrate their creativity. Some teachers feel that teaching the same way becomes boring and it is their right to be creative in the class-

room (see Purnell & Claycomb, 2001). Teachers are not in the classroom for their own enjoyment, however, they are in the classroom as professionals to do a job; children are not in the schools to be pawns for educators who want to try one unproven method after another because of fad, fashion, or creative whim (Engelmann, 1992). We may think that unlimited creativity is a good thing for teachers, but imagine how you would feel if the pilot on your next flight announced that he wanted to be creative and was going to try a new idea that he had heard about for landing airplanes. Teacher creativity will always have an important place in the classroom, but the need and direction for that creativity should be guided and subsequently evaluated by students' achievements, not the whims of teachers.

A Collection of "Worst Practices"

Collectively, adherence to the 10 notions discussed in this article could be used to endorse the following "worst practices" by teachers of students with disabilities:

- Do not teach toward any predetermined corpus of knowledge or curriculum objectives (and by all means, do not directly or intensely focus on specific skills). With support and encouragement, children will naturally discover and learn what they need to know.
- Let students find their own way (i.e., construct their own meanings), even if the absence of prerequisite skills relegates them to inefficient trial and error (mis)learning.
- Replace drill and practice with interesting activities in authentic context.
- Do not objectively measure student performance. Doing so is likely to detract from authentic learning and may send a message to the children that you devalue other things they do. (In addition, because the children will be constructing their own meanings from the lesson, you will not know what to measure.)
- Be patient. Do not expect too much from students with disabilities.
- Slow the pace of instruction to accommodate low achievers.
- Make the children feel good about themselves, even if that means letting them repeat errors, because correcting their mistakes may communicate to the children that their efforts are not valued.
- Because every child learns differently, be sure to include instructional methods and materials from many different learning theories, models, and approaches.
- Be creative.

Although some of these practices (e.g., supporting students' exploration of their environment, helping children learn to feel good about themselves) are not problematic in the proper context, others (e.g., do not target instruction toward specific learning outcomes, measurement is unnecessary) are so dubious that they are, in the words of Wolfgang Pauli, "not even wrong" (Kame'enui, 1994). None of these practices would contribute to special education that is focused, intense, urgent, precise, structured, and continually monitored for procedural fidelity and effects.

Compare the previous bulleted list with descriptions of instructional methods derived from empirical research with students with disabilities (e.g., Anderson & Romanczyk, 1999; Christensen, Ysseldyke, & Thurlow, 1989; Gersten, 1998; Heward, 1994; Kame'enui et al., 2002; Rosales & Baer, 1998; Swanson & Hoskyn, 2001; Vaughn et al., 2000; Wolery & Schuster, 1997), all of which have recommended practices such as the following:

- Assess each student's present levels of performance to help identify and prioritize the most important instructional targets.
- Define and task-analyze the new knowledge or skills to be learned.
- Design instructional materials and activities so the student has frequent opportunities for active response in the form of guided and independent practice.
- Use mediated scaffolding (i.e., provide and then fade prompts and cues so the student can respond to naturally occurring stimuli).
- Provide systematic consequences for student performance in the form of contingent reinforcement, instructional feedback, and error correction.
- Incorporate fluency-building activities into lessons.
- Incorporate strategies for promoting the generalization and maintenance of newly learned skills (e.g., program common stimuli, general case strategy, indiscriminable contingencies, self-management).
- Conduct direct and frequent measurements of student performance and use those data to inform instructional decisions.

A large and worrisome disparity exists between the teaching practices endorsed by the widely held notions discussed in this article and what research has told us about effective instruction. Indeed, studies of the education experienced by many students with disabilities have found that other than limiting class size, there is often little that goes on in many special education classrooms that can rightfully be called "special" (Moody et al., 2000; Vaughn, Moody, & Schumm,

1998; Ysseldyke et al., 1984). We should not be surprised that many students with disabilities do not achieve and that each school year they fall still farther behind their nondisabled classmates.

Of course, support for the 10 notions discussed here is not limited to special education. If, in fact, some of these notions have more widespread support in general education circles—and I believe they do—the inclusive schools movement means that increasing numbers of students with learning and behavior problems are being exposed to the weak instructional practices encouraged by these notions. Acknowledging this possibility is not intended as an indictment of either general education or inclusion. The reality is, however, that significant numbers of students with disabilities are spending large portions of the school day in classrooms with unstructured curricula, few requirements for academic productivity, and low expectations for achievement (Baker & Zigmond, 1990; Kauffman, & Hallahan, 1994; Klingner, Vaughn, Hughes, Schumm, & Elbaum, 1998).

Why Are These Notions Widely Held?

If the notions discussed in this article promote instructional approaches that run counter to what scientific research has shown to be effective, why do so many educators subscribe to them? I believe there are four reasons:

1. Each notion possesses some truth and logic.
2. Articulate and passionate advocates support the notions.
3. The notions shift accountability for learning to students.
4. Scientific research is devalued or ignored.

Some Truth and Logic

All 10 notions entail some degree of truth. Even the most carefully planned and well-articulated curriculum cannot describe or predict everything a student may need or want to learn. Targeting specific skills for instruction and measurement does not ensure that the skills will have meaning for the student's life. Children should be helped to feel good about themselves. *Some* truth and logic is not the same as sufficient truth and logic, however.

Advocates for each of the notions seek the same outcomes as those who support research-based instructional practices: to see students leave school as literate, knowledgeable, confident, self-directed problem solvers who have healthy self-esteem and get along with others. Fundamental differences exist, however, over the means most likely to achieve those ends.

Articulate and Passionate Advocates

Consider the language used by holistic/constructivist authors to describe the teaching practices and outcomes they prefer: *authentic, whole child, whole language, open-system, self-organizing, integrative, qualitative, cooperative, creative.* These terms are used to paint a romantic and wholly positive picture of the teaching and learning process: Intrinsically motivated children exploring a world of unlimited learning opportunities, unfettered by expectations and pressures to respond in the "correct way." Their teachers, unburdened from the bureaucratic onus of having to monitor and quantify students' progress toward narrow, predetermined learning objectives, are free to creatively follow their students' lead.

By contrast, the following words frequently appear in the same authors' descriptions of systematic and explicit instructional practices: *mechanistic, top-down, narrow, simplistic, fragmented, competitive, closed-system, reductionistic, rote, linear, rigid, compliance, predetermined, prediction, control.* These words are skillfully used to create a very different image of what goes on in the classroom: Uninterested children being cajoled, coerced, and/or bribed with unnecessary and harmful rewards to pursue isolated knowledge and skills that they will practice and use only until their harried, script-bound teacher can measure and record them on a chart. Based on such portraits, what prospective teacher wouldn't choose the first classroom over the second?

In addition to sprinkling their rhetoric with pejorative language, some advocates for the notions discussed in this article use disinformation and misinformation to perpetuate myths and misconceptions about explicit, systematic instruction. For example, in an article published in Education Week, Coles (1998) informed educators that all manner of horrible outcomes will befall children whose fate lands them with a teacher who uses explicit phonics instruction, in particular, the DI model.

> Achieving the outcomes of "direct instruction" pedagogy might be successful literacy education for some educators and parents, but it is an abomination to others. Within its standards, [DI] might "work," but who would want his or her child's early education to: discourage participation in initiating and creating written-language activities; discourage experience making choices and solving problems; discourage exploration of multiple views on stories read; discourage experience developing, expressing, and contesting a viewpoint; constrict emotions in learning experiences; constrict creativity in written language; and assume a "dog eat dog" outlook? These are hardly qualities to help children understand their own thoughts and emotions, feel secure about themselves, be creative, assess accurately the views of others, care about others, understand the world, and make sound judgments.

Even though the assertions and polemics of authors such as Coles bear no resemblance to the positive results of inde-

pendent research evaluating the effects of explicit, skills-based instruction (Gersten, 1992; Tarver, 1998; Watkins, 1997; Weisberg, 1994), this kind of disinformation and misinformation continues to find a voice in educational publications.

Accountability for Learning

In one way or another, most of the notions reduce the teacher's responsibility for student achievement. Just as a disability label can be used as a built-in excuse for failure to provide effective instruction (e.g., "José hasn't learned to read because he is [insert disability label of your choice]"), statements such as "How much and exactly what they learn will depend upon their backgrounds, interests, and abilities" (Stainback & Stainback, 1992, p. 72) shift accountability for lack of learning from the teacher and the school to the student.

Several years ago, one of my doctoral students returned to the university from a morning spent supervising a student teacher in a local middle school. She burst into my office, upset about what she had witnessed in a seventh-grade social studies classroom. After lecturing for a few minutes, the teacher had told the students to read the next section of the text and to ask him questions if there was anything in the section that they wanted to learn more about or discuss as a class. Most of the students sat quietly at their desks, some apparently reading the text, others just looking around the room. Some did homework for other classes, and a few students whispered quietly with each other. This went on for 35 minutes of the 50-minute class period. After the bell rang and the students left the room, the doctoral student asked the teacher why he had let the students just sit there, some students working on other classes, others doing nothing at all. The teacher just pointed to a sign taped on the wall at the back of the classroom that read, "When a student is ready, a teacher will teach." The doctoral student said she thought the sign should read, "When a teacher teaches, a student will learn." I felt sad for the students in that seventh-grade classroom, but I felt good about the teachers the doctoral student would train.

Scientific Research Devalued or Ignored

Unlike most professions in which practitioners' tools are thoroughly field-tested to ensure they are effective and reliable before they are implemented on a widespread basis, education has a long history of adopting new curricula and teaching methods with little or no empirical evidence of effectiveness (Grossen, 1998b; Spear-Swerling & Sternberg, 2001). Convention, convenience, dogma, folklore, fashion, and fad—more so than the results of scientific research—have all influenced theory and practice in education over the years (Carnine, 1992; Gersten, 2001; Vaughn & Damann, 2001). In recent years, the general lack of interest in applying the results of research to classroom practice has been replaced in some education circles by a distinct distrust of empirical research altogether (Sasso, 2001). In addition to this antiscience sentiment, some dismiss objective evidence as irrelevant to the issue at hand; others simply invent data to support their viewpoints.

Antiscience. Some educators contend that science is an antiquated and mechanistic approach to knowledge generation based on a misguided empiricism of arbitrary "variables" that no longer fits the more sophisticated, postmodern understanding of teaching and learning (Gallagher, 1998; Heshusius, 1982; 1986; Poplin, 1988b; Skrtic, Sailor, & Gee, 1996). Supporters of this view believe that quantitative methods that rely on logical positivism should be replaced by the qualitative methodologies of deconstruction and discourse (Danforth & Rhodes, 1997; Elkind, 1998). Their philosophy can be summed up as follows: There is no need to conduct those artificial and manipulative experimental comparisons any more; we can just talk about it.

But, as Sasso (2001) said so well, just talking about it isn't good enough:

> If you are really interested in the truth, then you *must* use the scientific processes of logical inquiry . . . to arrive at it. Special educators are held accountable for what they say and do in a way that journalists, novelists, and postmodern critics are not. And that is how it should be. Applications of logical inquiry to the needs of people with disabilities is tough, incredibly complex, and time consuming, but no one said it was going to be easy. (p. 187, emphasis in original)

Quantitative Science Has Its Place, But Those Data Are Not Relevant. Research data may not be relevant to persons with fundamentally different orientations or worldviews. For example, suppose an advocate of whole language instruction offers as evidence of its effectiveness some carefully collected data showing that children who have spent the school year in a whole language classroom report that they like to read and they enjoy the whole language activities. At the same time, a supporter of explicit instruction presents graphs showing sharply increasing rates of correctly read words per minute (WPM) by children who had participated in explicit instruction over the course of the school year. The whole language person thinks it is blasphemy and bad practice to measure an out-of-context variable like WPM and that the explicit instruction proponent misses the whole point of reading. The explicit instruction person in turn sees the fact that children say that they like to read and enjoy the whole language activities as positive information but cannot accept it as evidence that the children actually do read or that whole language had anything to do with their reading. In cases like this, neither party's data matter because they do not represent a canon of proof considered to be meaningful by the other party (Baer, 1993).

Heshusius (1986) offered her own example of two ships passing in the night:

> To ask for proof that nonmechanistic thought renders more effective outcomes than mechanistic thought is akin to asking whether Catholicism brings about more effective worshipping of God than Protestantism. Conceptions of effectiveness do not transcend paradigms. (p. 463)

Heshusius is right, of course. Because there can be no agreement on the existence or nature of God, let alone what the function and proper outcomes of worshipping should be, Catholicism and Protestantism are not to be transcended by secular concerns such as which is better. But Heshusius's analogy does not apply to the education of students with disabilities—students for whom the outcomes of special education are not ephemeral, existential phenomena but specified changes in functioning that exist in law and by mutual agreement (i.e., on students' IEPs). The fact is that we can and must ask which teaching methods and materials are the most effective (Crockett, 2001; Sasso, 2001).

Pseudoscience. The value and influence of carefully conducted science is also undermined by pseudoscience. With pseudoscience, one does not need real data to give the appearance and credibility of scientific support to favored treatments, therapies, or viewpoints; one simply makes up the data. Not only is invented knowledge much easier to acquire than discovered knowledge, it can be made to show exactly what the pseudoscientist wants it to show (cf. Green & Perry, 1999; Maurice, 1993; see Note).

Three Recommendations

Most special educators have been—and continue to be—exposed to the well-meaning but faulty notions about teaching and learning discussed in this article. The three recommendations that follow may help teachers to be less influenced by such misguided notions and more likely to use research-based curricula and instructional tools with their students.

View Special Education as a Profession

Professional competence begins with an objective understanding of the nature and scope of the job's responsibilities:

> Be wary of the conception of disabilities as merely socially constructed phenomena; that all children who are identified as disabled would achieve success and behave well if others simply viewed them more positively. This romantic ideology is seldom, if ever, promoted by individuals with disabilities themselves or by their parents and families. Children with disabilities have skill deficits and difficulties in acquiring and generalizing new knowledge and skills—real disabilities that won't be "deconstructed" away. Don't let the needs of exceptional children and their families get lost in such postmodern ideologies. Exceptional children need and deserve systematic, effective special education. (Heward, 2003, p. 608)

Next, it is important to recognize that special education can be no better—and no worse—than the quality of instruction provided by teachers. Lovitt (1996) noted,

> Teachers must get back to the business of teaching. To do so they must increase their knowledge and skills about effective instructional strategies. It may be more exciting to learn and debate about the policy issues of education, such as school reform, the merger of special and general education, the merits of full inclusion, graduation requirements, class size, co-teaching, and integrated curriculum, but knowledge about any of those topics is no substitute for having skills and knowledge of sound instruction. (pp. 85–86)

Ask for the Data and Evaluate Their Believability

Teaching not only *can* but *must* be guided by science if students with disabilities are to learn as much as they are able to learn. Scientific research can help us discriminate between effective and reliable practices and those that are false or merely fashionable (Kame'enui, 1994; Vaughn & Damann, 2001). The popularity of a particular curriculum or method does not necessarily correlate with its effectiveness. For example, a recent large-scale review by the American Institutes for Research of the 24 school-wide reform models found that only 3 of the models (DI, Success for All, and High Schools That Work) had "strong evidence" of positive effects on student achievement (Olson, 1999).

Teachers can increase their effectiveness by using only those instructional materials and methods that are backed by sound, empirical research evidence. When considering a new curriculum, program, or instructional method, teachers should ask questions such as the following:

- Has this program been tested in the classroom?
- What is the evidence showing that this program works?
- What measures of student performance were used to evaluate this program?
- Has any research on this program been published in peer-reviewed journals?
- Is there any evidence to suggest that the program will be successful if modified to meet the skill levels and ages of my students? (Heward, 2003, p. 608)

When first using a new instructional tool, teachers should conduct their own empirical evaluation of its effectiveness (Bushell & Baer, 1994; Greenwood & Maheady, 1997).

Focus on Alterable Variables

Bloom (1980) used the term *alterable variables* to refer to things that both make a difference in student learning and can be affected by teaching practices. Alterable variables include factors such as the amount of time allocated for instruction; whether instructional materials call for a recognition or recall response; the sequence of activities within the overall lesson; the pacing of instruction; the frequency with which students actively respond during instruction; whether, how, and when students receive praise or other forms of reinforcement for their efforts; and the manner in which errors are corrected.

The academic and social learning needs of many students with disabilities present a staggering challenge for teachers. This challenge is made all the more difficult because the teacher seldom, if ever, can control or even know all of the factors affecting a student's behavior. It does little good to point to the student's past (which no one can alter) or to use all of the things in the student's current life that cannot be changed as a reason for failing to help the student in the classroom. Special educators should focus their attention and efforts on those aspects of a student's life that they can effectively control. Kauffman (1997) believes that it is not productive to talk of influence beyond the classroom with such high-sounding phrases as *ecological management* and *wraparound services* until the teacher has demonstrated that he or she can create a classroom environment conducive to improved behavior and learning.

Conclusions

Some children with disabilities today receive and benefit from a special education that is individualized, specialized, intensive, structured, precise, goal-directed, and continually monitored for procedural fidelity and outcomes (Heward, 2000; Kauffman, 1996; Zigmond & Baker, 1995). These fortunate children participate in a special education that includes instructional strategies and tactics that were unknown just 25 years ago. Clearly, significant progress has been made. Far too few children with disabilities, however, are involved in a true *special* education program. An objective comparison between what research has discovered about effective instruction and the school day experienced by many students with disabilities reveals a large difference between what is known and what is practiced. Without doubt, there still is a long way to go.

Although its beginnings can be traced back several centuries (Safford & Safford, 1996), special education is still in its formative stages in many respects. The journey is difficult, and it is easy to get discouraged when progress is slow and there is still so far to travel. At times we may lose our way in the maze created by postmodern deconstructivism. Blinded by the promise of fads and miracle cures, it is easy to lose faith in the trustworthy but slow-moving and cautious guides who have been part of the field from the beginning: *empiricism* (objective observation and measurement of behavior change in place of speculation, opinion, and "common sense"); *parsimony* (trying simpler, logical explanations for phenomena before considering more complex or abstract explanations); *philosophic doubt* (continually questioning the truthfulness of what is regarded as fact); and *scientific manipulation* (conducting experiments to control for confounding variables and to isolate functional variables). These four "attitudes of science" have served special education well since the field's inception. We need them now more than ever.

The biggest reason we do not teach more children with disabilities better than we do is not because we do not know enough but because we do not teach them as well as we know how. Instead of losing interest and faith in empirical science, we should turn to it for help in closing the research-to-practice gap. The same attitudes of science that helped us discover effective teaching practices can help us learn how to improve the application of those practices in the schools.

Science cannot tell us what is important in terms of ultimate goals and outcomes, but it can help us get to where we want to go. The answer does not lie in more research alone. We need more research aimed at bridging the gap between current knowledge and classroom practice—research that is more responsive to the needs of practitioners and the students and families they serve and that has increased trustworthiness, usability, and accessibility (Carnine, 1997; Gersten, 2001). As such research is conceived, conducted, and disseminated—and it will be—there will come a time when the accumulated evidence for research-based practices is so overwhelming that all teachers will feel compelled to implement them. When that time comes, a list of widely held notions about teaching and learning will look much different than it does today.

AUTHOR'S NOTES

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NOTE

The mention of pseudoscience in this article does not imply that any of the individuals cited as advocates for the 10 notions have fabricated data.

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