What Works for Students at Risk: A Research Synthesis

By reviewing what we know about instructional practices that help at-risk students, we take a first step toward ensuring that every child learns.

Every child can learn. That so many students fail to attain necessary skills reflects not the incapacity of the students but the incapacity of schools to meet the needs of every child. Given a skilled one-to-one tutor, for example, every student without severe dyslexia or retardation could attain an adequate level of basic skills. Practically speaking, of course, it is unlikely that we will soon be providing a skilled tutor for every child who is falling behind in reading or math. Nevertheless, we can develop feasible programs to ensure that every child learns. The first step is to consider what we know about practices that can accelerate the achievement of students in danger of school failure.

Who Is "At Risk"?

In this article, a student described as "at risk" is one who is in danger of failing to complete his or her education with an adequate level of skills. Risk factors include low achievement, retention in grade, behavior problems, poor attendance, low socioeconomic status, and attendance at schools with large numbers of poor students (Slavin 1989). Each of these factors is closely associated with the dropout rate; and by the time students are in 3rd grade, we can use these factors to predict with remarkable accuracy which students will drop out of school and which will stay to complete their education (Howard and Anderson 1978, Lloyd 1978, Kelly et al. 1964). A practical criterion for identifying students at risk is eligibility for Chapter 1, special education, or other remedial services under today's standards.

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What We Do Now Doesn't Work

One of the most frequently used strategies to deal with at-risk students is also the least effective: flunking them. Many urban school districts now retain about 20 percent of students in each of the elementary grades, and in many such districts the *majority* of students have been retained at least once by the end of elementary school (Gottfredson 1988). Failing more students does have a misleading short-term effect on test percentiles or normal curve equivalents because the students are a year older when they take the tests. However, the long-term effects on students' achievement are most often negative, controlling for their prior achievement levels (Jackson 1975, Shepard and Smith 1985).

Another widely used program is the traditional diagnostic/prescriptive pullout program, still by far the most

widely used mode of service delivered under Chapter 1 (Birman et al. 1987). At best, these programs may keep at-risk students from falling further behind their agemates, but even this effect is limited to the early grades and is more apparent in mathematics than in reading (Carter 1984).

For many years, pullout programs have been criticized on the grounds that they provide instruction that is poorly integrated with students' regular classroom instruction, that they disrupt students' regular instruction, and that they label students (see, for example, Cohen et al. 1978, Glass and Smith 1977, Johnston et al. 1985). Similar criticisms have been leveled at special education pullouts (Sargent 1981).

Growing awareness of the disadvantages of pullouts has led to increasing use of in-class models, in which Chapter 1 or special education researchers or aides work right in the regular classroom. Yet such in-class models are no more effective than pullouts (Archambault 1989, Madden and Slavin 1983).

Both pullouts and in-class models are probably too limited a change in instructional strategy to make much of a difference. Chapter 1 and special education services are administered to groups much smaller than the regular class, typically in the range of 4-8, yet there is little research evidence that reducing class size produces substantial achievement benefits—until class size approaches one (Slavin 1988a).

Effective Programs

If neither pullout nor in-class models are effective, what does help students at risk of school failure?

To answer this question, we reviewed research on every imaginable approach designed to increase student reading and mathematics achievement in the elementary grades (see Slavin et al. 1989, Slavin 1987). We examined the published literature, technical reports, government reports, and other sources in search for programs that met the following criteria:

1. The program had to be one that could be replicated by schools other than those in which it was developed.

2. The program had to have been evaluated for at least a semester and (a) have been compared to a control

Program and Source	Grades/ Subjects	Description	Evaluation	Effect Sizes	
Alpha Phonics (JDRP #74–15)	K Reading Readiness	Readiness phonics program focusing on sequential learning, immediate correction and feedback, gamelike presentation, 1 hour/day.	Compared project school to matched comparison schools. South San Francisco.	Readiness Gr. 1 ach. Gr. 2 ach. Gr. 3 ach.	+ .89 +1.14 + .90 +1.07
Astra's Magic Math (JDRP #83–54)	K Math Readiness	Comprehensive, structured, and sequenced curriculum with 22 self-contained units. Uses multisensory approach, behavior modification, high interest materials.	Compared classes randomly assigned to treatment or control. South San Francisco.	CTBS (Math)	+ .30
MECCA (JDRP #77–11)	K Reading Readiness	Early identification and prescriptive educational programs for children entering K with special potential handicaps.	Compared classes randomly assigned to treatment or control. Trumbull, Conn.	Jansky MAT	+ .67 + .88
TALK (JDRP #78–189)	K–3 Language	Language specialist instructs class in listening skills ½ hour/week for 6 mos., then classroom teacher continues lessons.	Compared project school to matched control school. Original study (1975–76), replication (1976–77). Rockford, Ill.	Original Study PPVT WISC Replication PPVT WISC	 + .25 + .38 + .42 + .46
MARC (JDRP #79–7)	K–1 Reading	Continuous progress program using multisensory activities and systematic instruction.	Compared project school to matched control school. Crawfordville, Ill.	SESAT Letters Word Rdg. Sentence Rdg.	 +1.12 + .88 + .25
PLAY (JDRP #79–38)	K–1 Motor/ Cognitive Skills	Diagnostic/prescriptive direct instruction in perceptual/motor skills, monthly home reinforcement activities.	Compared matched students.	BOEHM 75–76 76–77 77–78	 +1.77 + .23 +1.33

Adapted from R.E. Slavin, N.L. Karweit, and N.A. Madden, eds. (In press). *Effective Programs for Students at Risk*. Needham Heights, Mass.: Allyn and Bacon.

Fig. 1. Kindergarten Programs

Research on preschool tends to find strong effects immediately after the preschool experience; but these effects diminish each subsequent year until, by the 2nd or 3rd grade, they are undetectable.

group or (b) have shown convincing evidence of year-to-year gains. This criterion excluded dozens of studies that used fall-to-spring gains or other means of evaluation found to greatly overstate program effects (see Slavin 1989).

3. The program had to provide effects in reading and/or mathematics of at least 25 percent of an individual standard deviation (i.e., the effect size had to be at least +.25, a difference that could be considered educationally as well as statistically significant).

The effective programs we identified fell into three broad categories: *prevention*, *classroom change*, and *remediation*.

Prevention

Learning deficits easiest to remediate are those that never occur in the first place. Given the limited capacity of Chapter 1 and special education programs to bring students up to an adequate level of performance, educators have shown increasing interest in strategies to give intensive (usually expensive) services in the early grades to reduce or eliminate the need for remedial services later on. Prevention programs typically focus on preschool, kindergarten, or 1st grade.

Preschool. One of the most widely discussed preventive strategies in recent years has been the provision of preschool education for 4-year-olds, particularly those from disadvantaged homes. The idea that high-quality preschool programs could give disadvantaged students a leg up in their education was an important piece of Lyndon Johnson's War on Poverty in the 1960s; it led to the creation of the federal

Program and Source	Grades/ Subjects	Description	Evaluation	Effect Sizes		
Programmed Tutorial Reading (JDRP #74–17)	Gr. 1 only Reading	Each student tutored 15 min./day by paraprofessionals or older students.	Evaluation contained matched pairs of tutored/nontutored students. Farmington, Utah.	Grade 1, reading, bottom quartile	Vocabulary Comprehension Basal comprehension measure	+ .65 + .41 + .50
Prevention of Learning Disabilities—New York (JDRP #79–33)	Gr. 1–2 Reading	Each student tutored 3–5 times/week for 30 min. by a resource teacher.	Students randomly assigned to tutoring or control treatments.	Gr. 1 and 2, students with low readiness scores	WRAT Word Attack Word Recognition	Gr. 1 + .86 +1.41 + .95 Gr.2 +1.06 +1.67 + .91
Wallach Tutorial Program (Dorval, Wallach, and Wallach 1978)	Gr. 1 only Reading	Students tutored 30 min./day, 28 hrs. total, by paraprofessionals.	Unclear how students were assigned to treatments but groups were equivalent at pretest. Compared tutoring to no tutoring to time with aide.	Gr. 1 students below 40% on MAT	Spache Word Recognition CTBS Total Reading	+1.3 GE + .75
Reading Recovery (DeFord, Pinnell, Lyons, and Young 1987)	Gr. 1 only Reading	Students tutored by specially trained teachers 30 min./day, at least 60 days.	Study 1 compared lowest readers in 14 Columbus, Ohio, classes to similar students in comparison classes. Study 2 randomly assigned low readers to exp., control.	Grade 1 Low readers	CTBS Rdg. Vocabulary CTBS Rdg. Comprehension	+ .70 + .92
Early Childhood Preventative Curriculum (JDRP #74–57)	Gr. 1 only Reading	Students identified as high risk given intensive continuous progress, diagnostic-prescriptive program with small group and individualized activities.	Compared project schools to matched control schools in Miami, Fla.	Grade 1	Paragraph Meaning WRAT	+ .95 + .28

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Fig. 2. 1st Grade Prevention Programs

Program and Source	Grades/ Subjects	Description	Evaluation	Effect Sizes			
DISTAR (Becker and Carnine 1980; JDRP #77–122, JDRP #80–50)	K–6 Reading Math	Teacher instructs small groups using highly structured, scripted lessons. Students frequently assessed, regrouped.	Abt evaluation found positive effects in reading and math in most sites; JDRP-approved sites include Flint, Mich.; Dayton, Ohio; Flippin, Alaska; E. Las Vegas, N. Mex.; Uvalde, Tex.; Kingstree, S.C.; Cherokee, N.C.; Washington, D.C.	Gr. K–3 (4 yrs.)		Reading Comprehension Language Math Comprehension Math P.S.	+.07 +.84 +.57 +.17
U-SAIL (JDRP #76–95)	1–9 Reading Math	Combines continuous progress, individualized activities. Adapts to existing curriculum, materials.	Both time series and control group comparisons showed clear effects in reading and math in suburban school near Salt Lake City. *Not disadvantaged.*	Gr. 3–5 2 (yrs.)		Reading Math	+.45 +.27
PEGASUS-PACE (JDRP #1, JDRP #79–1)	K–8 Reading	Students proceed through 17 reading levels, gr. K–8; frequently assessed and regrouped.	Matched control group design found convincing effects in reading in rural Princeton, Ill.; some students were Title I, but mostly *not disadvantaged.*	Gr. 2 Gr. 3 Gr. 4 Gr. 5 Gr. 6	+.72 +.80 +.50 +.39 +.43	Reading Vocabulary Reading Comprehension	+.53 +.61
ECRI (JDRP #74–48)	1–6 Reading	Teacher instructs small evaluations groups; frequent mastery checks.	Most evaluations fall-spring or spring-spring. One control group evaluation in suburban Chapter I school near Cincinnati found convincing effects.	Gr. 4		Reading Vocabulary Reading Comprehension	+.51 +.39
Project INSTRUCT (JDRP #75–37)	K–3 Reading	Cross-grade grouping according to reading skills; students proceed through skills at own rates.	Compared students in Lincoln, Nebr., schools that had successfully implemented program to matched schools. *Not disadvantaged.*	Gr. 2		Word Knowledge Reading	+.30 +.23
GEMS (JDRP #79–2)	K–12 Reading	Students work in small groups or individually on materials at their own levels. Frequent assessment, mastery tests, corrective instruction.	Compared project schools with matched controls in suburb of Salt Lake City. *Not disadvantaged.*	Gr. 1 Gr. 2 Gr. 3 Gr. 4 Gr. 5 Gr. 6	+.11 +.00 +.41 +.23 +.44 +.39	Reading Vocabulary Reading Comprehension	+.39 +.14

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Fig. 3. Continuous Progress Programs

Head Start program and other preschool initiatives.

Research on preschool tends to find strong effects on the language and IQ scores of disadvantaged children immediately after the preschool experience; but these effects diminish each subsequent year until, by the 2nd or 3rd grade, they are undetectable (see Karweit 1989b, McKey et al. 1985). However, the students involved in many of the early studies of preschool are now in their early 20s, and longitudinal data have begun to show positive effects of preschool participation on such outcomes as high school graduation and delinquency (Berrueta-Clement et al. 1984).

The long-term effects of preschool on the dropout rate are difficult to evaluate, given that no achievement effects are detected for many years before graduation or dropping out would occur. More important, perhaps, are the well-documented short-term effects on both achievement and referrals to special education in the early grades. Preschool may be seen as a means of getting students off to a good start in school, not as a program

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Program and Source	Grades/ Subjects	Description	Evaluation	Effect Sizes		
Team Accelerated Instruction (Slavin et al. 1984; Slavin and Karweit 1985; JDRP #84–5)	3–6 Math	Students work on programmed materials in mixed-ability teams while teachers teach same-ability teaching groups.	In three studies; two with random assignment, one matched, TAI classes exceeded control. One study in rural Md., one in suburban Md., one in urban Del.	Full Sample (Gr. 3–6)	Math Comp. Math C&A	+ .50 + .06
				Mainstreamed Students	Math Comp. Math C&A	+ .38 + .47
Cooperative Integrated Reading and Composition (Stevens et al. 1987; JDRP #87-X)	3–5 Reading Writing	Students work in mixed-ability teams on partner reading, story grammar, summarization, vocabulary, reading comprehension, spelling, and writing while teacher teaches reading groups.	Compared CIRC to matched control classes in suburb of Baltimore.	Full Sample (Gr. 3–4)	Reading Vocabulary Reading Comprehension Oral Reading Language	+ .12 + .35 + .54 + .30
Student Teams—Achievement Divisions (Slavin and Karweit 1984; Mevarech 1985a,b; JDRP #79–12)	3–5 Math	Students work in mixed-ability teams, are rewarded based on achievement of all team members.	Compared classes randomly assigned to STAD or control. Studies in inner-city Philadelphia, Israel.		Philadelphia (CTBS-Math) Israel (a) Israel (b)	+ .21 + .24 + 1.04
Companion Reading	Gr. 1 only Reading	Students engage in structured peer tutoring using phonetic materials, whole-class teaching.	Compared experimental classes to matched control classes in Winona, Minn. *Not disadvantaged.*		Stanford Reading Comp. Woodcock	+ .3 GE + 1.3 GE

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Fig. 4. Cooperative Learning Programs

that, used in isolation, is likely to reduce substantially students' risk of school failure.

Kindergarten. Kindergarten attendance is now so nearly universal that its effects are no longer of great interest. Concern in this area has shifted to two issues: (1) full-day vs. half-day programs and (2) particular kindergarten curriculums and programs.

A review of the literature by Karweit (1989a) found that the effects of full-day kindergarten (in comparison to half-day) are very similar to the effects of preschool. That is, full-day programs usually produce positive effects on 1st-grade readiness or performance, but by the 2nd or 3rd grade the effects have generally disappeared. Like preschool, extended-day kindergarten may be seen as a means of starting students off with good language skills and school readiness, but not as a sufficient intervention in itself.

Figure 1 (p. 5) summarizes information on several programs to develop reading or mathematics readiness among kindergartners. Each of these programs has been successful, compared to control groups using traditional methods. In this and all subsequent figures, "effect size" refers to the proportion of a standard deviation by which the experimental group exceeded the control group.[1]

A word of caution is in order regarding the interpretation of these results. Kindergartens are becoming increasingly academic; in many districts they virtually introduce the traditional 1st grade curriculum a year earlier. In other districts, kindergartens remain primarily nonacademic. When academic kindergarten programs are evaluated, it is rarely clear to what degree program effects are due to provision of *any* academic program (in comparison to a nonacademic kindergarten control group). For example, IBM's Writing to Read program has been found to have small but statistically significant effects on reading performance at the kindergarten level but not at the 1st grade level (Murphy and Appel 1984). Since all 1st grades, but only some kindergartens, have an academic focus, it is probable that the Writing to Read effects in kindergarten are due at least in part to the fact that reading is taught at all.

First grade prevention programs. Several effective instructional programs are built on the proposition that success in 1st grade, particularly in reading, is prerequisite for success later in school. These programs apply intensive resources, usually including tutors or other additional staff, to try to enable every child to succeed in beginning reading. Information about successful 1st grade programs is summarized in Figure 2 (p. 6).

The rationale underlying 1st grade prevention differs in important ways from that underlying preschool prevention. In the 1960s, advocates of preschools as compensatory education argued that the key to school success is IQ and that properly designed early school experiences could have a lasting effect on IQ, which would in turn have a lasting effect on school achievement. Whatever one believes about the long-term effects of preschool, this argument has proven wrong; no long-lasting effects of preschool on IQ have ever been found.

In contrast, 1st grade prevention programs are based on the argument that success in *reading* is the essential basis for success in school; therefore, the key moment for intensive intervention is 1st grade, not preschool or kindergarten.

As is clear from Figure 2, all of the 1st grade preventive models used tutoring and/or small-group instruction, and all were extremely successful in increasing students' reading achievement. Unfortunately, only one model, Reading Recovery, has data on the

long-term effects of intensive reading instruction in 1st grade. Students who received an average of six 30-minute lessons from a specially trained Reading Recovery tutor were compared to matched control children. By the end of 1st grade, Reading Recovery students substantially exceeded control students on an individually administered test of "text reading levels," with an effect size of +.87. A year later, with no additional intervention, the difference in effect size had dropped to +.45, and by the end of the third year, to +.29 (DeFord et al. 1987, Pinnell 1988). This is still a respectable difference, and shows that the effects of the program do persist for at least two years. Yet the fact that the differences diminished indicates that the effects will probably not be detectable indefinitely.

Classroom Change Programs

One of the most effective ways to reduce the number of children who will ultimately need remedial services is to provide the best possible classroom instruction in the first place. Teachers should use instructional methods with a demonstrated capacity to accelerate student achievement, especially that of students at risk.

Full-day kindergarten programs usually produce positive effects on 1st-grade readiness or performance, but by the 2nd or 3rd grade the effects have generally disappeared.

In our search for programs with convincing evidence of effectiveness (compared to control groups), we were surprised to find that nearly all such programs fell into one of two categories: *continuous progress models* and certain forms of *cooperative learning* (see Slavin and Madden 1989).

Continuous progress programs. In continuous progress models, students proceed at their own pace through a sequence of well-defined instructional objectives. However, they are taught in small groups composed of students at similar skill levels (but often from different homerooms or even different grades). For example, a teacher might teach a unit on decimals to 3rd, 4th, and 5th graders who have all arrived at the same point in the skills sequence. Students are frequently assessed and regrouped based on these assessments.

Figure 3 (p. 7) summarizes information on several of the best-evaluated continuous progress programs (for a more extensive list and discussion, see Slavin and Madden 1989). Note that continuous progress programs range from the highly structured and scripted DISTAR program to such programs as U-SAIL and PEGASUS, which use similar flexible groupings and hierarchies of skills but adapt them to existing curriculum materials and teaching methods. Also note, however, that while all of the programs listed in Figure 3 have been used with at-risk students, evaluative data were often available only for non-disadvantaged populations.

Cooperative learning. In cooperative learning, students work in small

Program and Source	Grades/ Subjects	Description	Evaluation	Effect Sizes		
Training for Turnabout Volunteers (JDRP #81–11)	Tutors 7–9 Tutees 1–6 Reading Math	Cross-age tutoring. Tutors trained with pre-service and inservice classes. Not programmed material. Tutored 40 min./day, 4 days/week. Inservice training on fifth day.	One-year study in Miami, Fla., compared trained vs. untrained tutors. Nonequivalent but unbiased groups. Five schools in study.	Tutees 1–6	Tutees: MAT (math) (MAT) reading	 + .93 + .51
				Tutors 7–9	Tutors: MAT (math) MAT (reading)	 + .49 + .08
School Volunteer Development Project (JDRP #75–79)	Grades 2–6 Reading Math	Community volunteer tutors. 2–4 hrs./week/volunteer. Each student tutored ½ hr. 4 days/week minimum.	Students in Miami, Fla., randomly assigned to tutored or nontutored conditions for one school year.	Grades 2–6	MAT (reading) MAT (math)	+ .50 + 1.1
Success Controlled Optimal Reading Experience (SCORE) (JDRP #80–42)	Grades 1–6 Reading Math	Each student tutored 15 min./day by older students or adult volunteers.	Students in San Francisco randomly assigned to tutored, control conditions—2 controls replicated over 3 yrs. No tests of reading comprehension—effects are on word recognition only.	Grades 1–6	WRAT Gilmore	+ .5 – .7 + .5

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Fig. 5. Remedial Tutoring Programs

learning teams to master material initially presented by the teacher. When the teams are rewarded based on the individual learning of all team members, cooperative learning methods can be consistently effective in increasing student achievement, compared to traditionally taught control groups (Slavin 1988b). While many cooperative learning methods have been successfully applied in many subjects, only four meet the inclusion criteria applied in this article (most cooperative learning studies involve durations other than a semester and/or subjects other than reading and math). These four methods are listed in Figure 4 (p. 8).

Two of the successful cooperative learning methods combine the use of cooperative teams with forms of continuous progress. In Team Accelerated Instruction (TAI) and Cooperative Integrated Reading and Composition (CIRC), students work in mixed-ability groups but are taught in small groups of students performing at the same level.

Supplementary/Remedial Programs

In contrast to classroom change programs, supplementary/remedial models are applied outside of, and usually in addition to, regular classroom instruction. These models are usually remedial rather than preventive. That is, they are most often used with students who are already behind their agemates in basic skills.

As noted earlier, the most widely used supplementary/remedial programs, diagnostic-prescriptive pullout programs provided under Chapter 1 or special education funding, show little evidence of effectiveness (see Madden and Slavin 1989). Programs that do show convincing evidence of effectiveness fall into two major categories: *remedial tutoring programs* and *computer-assisted instruction*.

Remedial tutoring programs. As with 1st grade prevention programs, the most effective supplementary/remedial models involve one-to-one tutoring. However, unlike the *preventive* tutorial models, which use certified teachers or paraprofessionals, *remedial* tutoring programs tend to use older students and/or volunteers. Programs of this kind are listed in Figure 5 (p. 9).

Computer-assisted instruction. In general, research on the achievement effects of computer-assisted instruction is highly variable in quality and only inconsistently finds positive effects (see Becker 1987). However, a few specific CAI models have been successfully evaluated. These are listed in Figure 6 (below).

Program and Source	Grades/ Subjects	Description	Evaluation	Effect Sizes				
Computer Curriculum Corp.		Students engage in drill and practice activities on computers 10 min./day in addition to regular instruction.						
Study 1 **Los Angeles Unified School District** (Ragosta 1983)	Gr. 1–6 Math Gr. 3–6 Reading, Language		Comparison with randomly selected controls. Groups studied longitudinally over four years in Los Angeles Unified School District—4 schools.	Gr. 1–6 Math 3–6 Rdg. 3–6 Lang.	CTBS	Yr1	Yr2	Yr3
					Math			
					Comp.	+.36	+.56	+.72
					Conc.	−.02	+.12	+.09
					Appl.	+.03	+.12	+.26
					Reading			
					Voc.	+.25	+.17	+.58
					Comp.	+.23	−.01	−.24
					Spel.	+.14	+.05	+.14
					Language			
					Mech.	+.22	+.27	+.25
					Expr.	+.11	+.05	+.23
Study 2 **Lafayette Parish Title I Math** (JDRP #82–46)	Gr. 3–6 Math (Chapter 1)		Compared to students receiving Chapter I pullout. Students randomly assigned in Lafayette Parish, La.	Gr. 3–6 Math	CTBS Total Math			+.19
Study 3 **Merrimack Education Center** (JDRP #82–34)	Gr. 2–9 Reading (Chapter 1)		Students randomly assigned in Merrimack, Mass. Compared to students receiving Chapter 1 pullout.	Gr. 2–9 Reading	MAT Reading			+.40
Basic Literacy Through Microcomputers (JDRP #84–14)	Gr. 1–3 Reading (Chapter 1)	Microcomputers or typewriters used to practice phonics and writing skills in addition to regular instruction.	Students randomly assigned. Compared to students receiving no additional time.	Grade 1	CAT Reading			+.58

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Fig. 6. Computer-Assisted Instruction Programs

The best-evaluated and most consistently effective CAI models have been forms of the Computer Curriculum Corporation's drill-and-practice programs. Students spend about 10 minutes per day in addition to regular class time using CCC programs. Successful CAI programs tend to be very expensive and their positive effects are moderate in size, so there is some question about the cost-effectiveness of this approach. However, as software continues to improve and hardware becomes less expensive, computers can become an important part of a remedial strategy.

General Principles of Effective Programs

Some general features characterize effective programs for students at risk of school failure.

1. *Effective programs are comprehensive.* One of the most important elements common to effective programs is that they are *programs*. That is, they are well-planned, comprehensive approaches to instruction. They almost invariably include detailed teacher's manuals and usually include curriculum materials, lesson guides, and other supportive materials. Effective programs in the basic skills are not simply a series of workshops to give teachers strategies to add to their repetoire; rather, they are complete, systematic, carefully constructed alternatives to traditional methods.

2. *Effective preventive and remedial programs are intensive.* In general, programs designed to identify students with learning problems and provide them with additional instruction are successful only when they are *intensive*. That is, effective programs use either one-to-one tutoring (from teachers, paraprofessionals, volunteers, or other students) or individually adapted computer-assisted instruction. Instruction in small groups may be effective as a classroom strategy, but it is not sufficient as a preventive or remedial strategy to give students a chance to catch up with their agemates.

3. *Effective programs frequently assess student progress and adapt instruction to individual needs.* Virtually all of the programs found to be instructionally effective for students at risk assess student progress frequently and use the results to modify groupings or instructional content to meet students' individual needs (one exception is the cooperative learning program, Student Teams-Achievement Divisions).

First grade prevention programs are based on the argument that success in *reading* is the essential basis for success in school; therefore, the key moment for intensive intervention is 1st grade, not preschool or kindergarten.

A Comprehensive Approach

If we are to ensure that all students attain an adequate level of basic skills, then we must organize schools differently. It is not enough to take a little of program A and a little of program B and hope for the best. Rather, we need to have a plan articulated through the grades to ensure that students achieve success at each step in their schooling. Some principles of a school plan for success are outlined below.

1. *State that it is the school's responsibility to see that everyone succeeds.* In education, there is too much shifting of responsibility for student failure. When large numbers of students fail, schools often blame parents, society, television, or the students themselves. Factors outside the school can make the task of educating every child more difficult, but it is still the school's responsibility to ensure that children enrolled there will succeed.

2. *Recognize that success for everyone will not be cheap.* We can do a much better job with the money that already exists in schools, but if we decide that schools can and must take responsibility for the success of every child, we must also be prepared to add additional resources.

3. *Emphasize prevention.* The cornerstone of a school plan to ensure success for all students is to make certain that all students learn to read the first time they are taught, so that they never become remedial readers. Well-structured preschool and kindergarten programs can prepare students to learn to read in 1st grade, but perhaps the most important single element of prevention is to use programs in 1st grade to ensure that students who do not make adequate progress in reading will receive immediate and intensive assistance.

4. *Emphasize classroom change.* Studies of preventive strategies in the early grades find that while such programs as preschool, extended-day kindergarten, and 1st grade tutoring can have strong effects for a few years, they do not in themselves guarantee lasting success for all children. Therefore, effective prevention programs must be followed up with effective classroom change programs to maintain the gains students have made.

5. *Use remedial programs as a last resort.* The problem with traditional practices for students at risk of school failure is that we wait until students get far behind and then bring in remedial programs. Yet we know now that when students are one or more years behind, even the best remedial or special education programs are unlikely to be very effective. We will always need remedial programs, but they should be used as a last resort, never as the first line of defense. When remediation is used, it should be provided in addition to regular classroom instruction, never as a replacement for it, and it should be intensive and temporary.

We Can Take Action

Significant change in education is both necessary and possible for students at

risk of school failure (see p. 14, this issue). We know we can do much better with students at risk, that we can begin to consider success in school as the birthright of virtually every child. While there is still more we must learn, we know enough today to take action. We can do no less for our most vulnerable children.□

Authors' note: This article was written under funding from the Office of Educational Research and Improvement, U.S. Department of Education (No. OERI-G-86-0006). However, any opinions expressed are the authors' and do not represent OERI positions or policy.

1. To get an idea of what *effect size* means, consider that an effect size of +1.0 would indicate that a program increased students' scores by the equivalent of approximately 100 points on the SAT Verbal or Quantitative scales, by two stanines, or by 15 IQ points. However, the effect sizes given in the tables are only rough approximations (see Slavin et al. 1989).

"JDRP" numbers refer to programs recognized as effective by the U.S. Department of Education's Joint Dissemination Review Panel and listed in its publication, *Educational Programs That Work* (available from Sopris West, 1120 Delaware Ave., Longmont, CO 80501).

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Highlights of Research on What Works for Students at Risk

According to research, what are the most effective ways to help at-risk students?

Two commonly used strategies—flunking and pullout programs—are *ineffective* at producing lasting achievement gains. The long-term effects of flunking on achievement are negative. Pullout programs, at best, do no more than keep at-risk students in the early grades from falling further behind their peers.

As a means of *preventing* learning deficits, preschool and extended-day kindergarten have not shown lasting effects on achievement. Disadvantaged children tend to show improved language and IQ scores immediately after the experience, but these effects wash out by the 2nd or 3rd grade. Preschool and extended-day kindergarten may get students off to a good start in school, but these programs in isolation are unlikely to reduce students' risk of school failure.

So what *does* work for at-risk students?

- First grade prevention programs that apply intensive resources, usually including tutors and/or small-group instruction, are extremely successful in increasing students' reading achievement (fig. 2). Reading Recovery, the one model with data on long-term effects, produced effects that persisted for at least two years.
- Instructional methods that accelerate student achievement, especially that of students at risk, include continuous progress models (fig. 3) and cooperative learning programs (fig. 4)
- Supplementary/remedial programs that have proven effective include remedial tutoring programs (fig. 5) and some models of computer-assisted instruction (fig. 6).

Some general principles characterize effective programs for students at-risk:

- Effective programs are comprehensive and include teacher's manuals, curriculum materials, lesson guides, and other supportive materials.
- Effective preventive and remedial programs are intensive, using one-to-one tutoring or individually adapted computer-assisted instruction.
- Effective programs frequently assess student progress and modify groupings or instructional content to meet students' individual needs.

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