

# *Outcomes for Students With Learning Disabilities in Inclusive and Pullout Programs*

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**ABSTRACT:** *This study investigated the relationship between placement in inclusive and pullout special education programs and academic and behavior outcomes for students with learning disabilities (LD). Demographic data such as age, gender, ethnicity, socioeconomic status, and IQ established comparability of two groups. Qualitative and quantitative methods described two schools and their special education models, one inclusive and the other pullout. Individualized Education Plan (IEP) goals and objectives, classroom accommodations, and teacher collaboration were examined to provide functional definitions. Results indicated that the two programs differed significantly. Further, students served in inclusive classrooms earned higher grades, achieved higher or comparable scores on standardized tests, committed no more behavioral infractions, and attended more days of school than students served in the pullout program.*

**T**he practice of including students with disabilities in general education classrooms has been gaining momentum for more than 15 years (Andrews, et al., 2000; U.S. Department of Education [USDE], 2000; Will, 1986). During this time, many complex philosophical, legal, and educational issues have been raised for schools, courts, and society as a whole. Lack of satisfactory academic performance by students with disabilities, combined with growing demands for social equity and civil rights, increas-

ing identification of students requiring services, and ballooning costs of special education, prompted a radical reconsideration of the special education delivery system of the mid-1980s (Kavale & Forness, 2000; Will, 1986). Since that time, increasing numbers of students with disabilities have been educated within the context of general education (McLeskey, Henry, & Axelrod, 1999; USDE, 2000).

Two major issues have surfaced: the efficacy of the continuum model and the use of inclusive education to address shortcomings of the contin-

uum model (Skrtic, 1995). While the field of special education evolved to serve more students with increasingly complex needs, data on pullout special education programs for students with LD revealed results that were not satisfactory in terms of school achievement or long-term benefits (Carlson, 1997; Fuchs & Fuchs, 1995; Lloyd & Gambatese, 1991; Wagner & Shaver, 1993). Factors identified as barriers to student success are lower expectations, uninspiring and restricted curricula focused on rote or irrelevant tasks, disjointedness from general education curricula, and negative student attitudes resulting from school failure and stigmatizing segregation (Andrews et al., 2000; Meyen & Skrtic, 1995; Wang, Reynolds, & Walberg, 1988). Two decades of disappointing results have led to the question: What is the relationship between placement and outcomes?

Reactions to the inclusive movement have varied, often polarizing teachers, administrators, families, and advocacy groups. On one hand, inclusion opponents suggest that special education will become diluted and no longer “special.” They contend that general education is unprepared to meet the unique needs of students with disabilities and that inclusion is primarily a cost-cutting effort. Many think that the continuum of services requirements of the Individuals With Disabilities Act (IDEA '97) prohibit the identification of one location as appropriate for all students (Hallahan, 1998). On the other hand, inclusion supporters insist that students with disabilities have the legal right to be educated with typical peers in age-appropriate settings (Walther-Thomas, Korinek, McLaughlin, & Williams, 2000; Yell, 1998) and suggest that two separate educational systems have resulted in fragmented, artificial programs (Giangreco, Cloninger, Dennis, & Edelman, 1994; *National Study of Inclusive Education* [NSIE], 1994). Proponents further contend that poor social, academic, and employment outcomes for students with disabilities are reflective of restricted experiences available outside general education (Carlson, 1997; Tapasack & Walther-Thomas, 1999; Wagner & Shaver, 1993). Finally, proponents say that once included in classrooms with higher expectations, appropriate role models, and true opportunities for gener-

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alization of skills, students with disabilities will experience improved outcomes (Walther-Thomas et al., 2000).

Many disagreements about the merits of inclusion hinge on the lack of empirical evidence (Fuchs & Fuchs, 1995; Kauffman & Hallahan, 1993, Walther-Thomas et al., 2000). Early studies are few and now dated, comparing inclusive services with pullout practices that were prevalent in the 1970s through the mid-1980s evidencing less relevance to today's classrooms (Hocutt, 1996). Limited research has been conducted on academic achievement and social outcomes of students with LD. Findings are not conclusive; however, they suggest a positive trend when students are integrated into general education classrooms (Affleck, Madge, Adams, & Lowenbraun, 1988; Baker, Wang, & Walberg, 1995; Carlberg & Kavale, 1980; Deno, Maruyama, Espin, & Cohen, 1990; Schulte, Osborne, & McKinney, 1990; Walther-Thomas 1997; Wang & Baker, 1985-86; Zigmond & Baker, 1990).

While varying philosophical perspectives and limited data continue to fuel the placement debate, the overriding question remains, “How do we best educate these students?” As more students with disabilities are included in general education classrooms, it is critical to examine the relationship between models of special education service delivery, specifically pullout or inclusion in general education, and academic outcomes for students with disabilities (Giacobbe, Livers, Thayer-Smith, & Walther-Thomas, 2001; Kavale & Forness, 2000; Walther-Thomas, Korinek, & McLaughlin, 1999).

This article describes an investigation comparing the performance of middle school students with LD who were served in inclusive classrooms with similar students served in pullout special education programs. The study explores extant practice in authentic settings. Students were com-

pared across dimensions of academic achievement, daily school attendance, and disciplinary infractions. Findings will be presented and implications for policy and practice discussed.

## METHOD

### POPULATION AND SAMPLE

The population consisted of all students with LD in the 8th grade in two middle schools in a suburban school district in the southeast. Selection of two schools within the same district established equivalence of as many factors as possible to increase the ability to attribute any differences in observed outcomes to the special education process itself. Participants had been classified with LD after referral, assessment, and placement consistent with federal and state regulations. In the case of transfer students from other districts, each student's eligibility records had been reviewed and verified consistent with federal and state regulations. Students with LD who had not been enrolled in their assigned school program for at least 2 years were removed from the sample. Students were selected by a computer search of the December 1 Federal Child Count conducted by every school district. Prior-year child count records were used to verify previous enrollment in special education.

### DESIGN

This descriptive investigation explored, through use of archival qualitative and quantitative data, the relationship between placement of students with LD and specific facets of school performance, namely, achievement, behavior, and attendance. Variables clustered into student and program categories. Student variables were further grouped into demographics (student and family data) and outcomes (grades, test scores, behavioral data). Program information was collected about the school district and each of the two middle schools under study (program, IEP, and teacher variables). All of these data were archival, neither created nor manipulated for this study. While other factors might have contributed to results obtained in this study, the authors focused on the student and program factors

that would provide a comprehensive depiction of existing practice and be most likely to influence student performance outcomes. For statistical comparisons, alpha error rates were controlled at .05.

*Student Data.* Data on two groups of middle school students (i.e., 36 from Enterprise Middle School who received special education services through an inclusive support model and 22 from Voyager Middle School who received special education services through a resource or "pullout" model) were drawn from December 1 Child Count records, IEPs, special education eligibility records, individual student evaluation reports, class schedules, attendance records, discipline records, report cards, and student scholastic records. The following information was compiled for each student at the end of the 8th-grade year: chronological age, gender, race, socioeconomic status, education level of the mother, disability category, estimated IQ at the most recent triennial evaluation, years receiving special education services, years enrolled in the present school district, report card grades, standardized test scores, state proficiency test scores, disciplinary actions, and daily school attendance.

*T tests or chi-square analyses* conducted on student demographic data established comparability of the groups in terms of their chronological age, gender, ethnicity, socioeconomic status, mother's education level, estimated cognitive abilities, years receiving special education services, and years in the current school district (see Table 1 and Table 2). Students at Enterprise averaged 14.5 years of age ( $SD = .597$ ), and at Voyager, 14.7 years of age ( $SD = .618$ ). A *t* test revealed an insignificant difference between the two (mean difference =  $-.2546$ ,  $t = -1.55$ ,  $p = .126$ ). The majority of students in both settings were Caucasian, 83.3% at Enterprise and 63.6% at Voyager, representing comparability (Pearson significance =  $.08896$ ). Statistical analysis revealed no significant difference in ethnicity (Pearson significance =  $.96430$ ). Of the total sample, 12.1% received free or reduced-fee lunch (8.3% of the studied population at Enterprise, and 18.2% at Voyager). A chi-square analysis substantiated that the groups did not differ on this variable (Pearson significance =  $.26393$ ). The two groups were also similar in terms of mothers' education levels. All

**TABLE 1**  
**Summary of Demographic Data on Students Participants: Age, IQ, Years in Special Education, and Years in School**

	Enterprise			Voyager			t-Value	df	2-Tail Significance
	M	SD	SE of Means	M	SD	SE of Means			
Age	14.5	.597	.100	14.7	.681	.132	-.2546	56	.126
I.Q.									
Full-Scale	91.53	14.046	2.341	90.14	9.843	2.099	1.3914	56	.686
Verbal	90.67	14.794	2.456	90.14	9.342	1.992	.5303	56	.881
Performance	93.36	15.142	2.524	90.68	12.469	2.658	2.6793	56	4.88
Years Receiving Special Education	6.7	1.579	.263	6.2	3.142	.306	.5404	56	.196
Years in School District	5.1	2.557	.426	4.8	.670	.670	.2652	56	.727

TABLE 2 Summary of Demographic Data on Student Participants: Ethnicity, Gender, SES, & Mothers' Education

Ethnicity	Enterprise		Voyager		t Value	df	2-Tail Significance
	White	Non-White	White	Non-White			
	30 (83.3%)	6 (26.7%)	14 (63.6%)	8 (36.4%)	2.89315	1	.08896
Gender	Male	Female	Male	Female			
	28 (77.8%)	8 (22.2%)	17 (77.3%)	5 (22.7%)	0.0200	1	.96450
SES (free or reduced lunch)	Noneligible	Eligible	Noneligible	Eligible			
	33 (91.7%)	3 (8.3%)	18 (81.8%)	4 (18.2%)	1.24803	1	.26393
Mothers' Educational Level	Some HS	Some College	Some HS	Some College			
	HS Diploma	College Degree	HS Diploma	College Degree	6.77826	3	.07913
	0 (0%)	6 (16.6%)	2 (9.1%)	7 (18.5%)			
	18 (50%)	12 (33.3%)	10 (45.5%)	3 (7.7%)			

students' mothers at Enterprise had obtained at least a high school diploma; 50% of them had attended college and 33.3% of them earned at least a bachelor's degree. At Voyager, the picture was similar. Mothers having at least a high school diploma composed 90.9% of the group. Forty-five percent attended college, and 13.6% earned at least a bachelor's degree (Pearson significance = .07931).

A comparison of measured cognitive abilities of the two groups revealed no significant differences in full-scale, verbal, or performance IQ. Respective mean full-scale, verbal, and performance IQ for Enterprise students were 91.52 ( $SD = 14.046$ ), 90.67 ( $SD = 14.734$ ), and 93.4 ( $SD = 15.142$ ). Mean full-scale, verbal, and performance IQ for Voyager students were 90.14 ( $SD = 9.843$ ), 90.14 ( $SD = 9.342$ ) and 90.68 ( $SD = 12.469$ ), respectively. *T* tests revealed comparability of the groups on each of these cognitive measures (full, mean difference = 1.3914,  $t = .41$ ,  $p = .686$ ; verbal, mean difference = .5303,  $t = .15$ ,  $p = .881$ ; performance, mean difference = 2.6793,  $t = .70$ ,  $p = .488$ ).

Students were also comparable on two additional variables, the mean number of years that they received special education services and that they had been enrolled in the school district. At Enterprise, students had been receiving special education services for a mean number of 6.7 years ( $SD = 1.579$ ) and at Voyager for 6.2 years ( $SD = 1.435$ ). The mean difference was .5404 ( $t = 1.31$ ,  $p = .196$ ). The mean number of years attending school in the current school district was 5.1 years ( $SD = 2.557$ ) at Enterprise and 4.8 years ( $SD = 3.142$ ) at Voyager. The mean difference was .2652 ( $t = .35$ ,  $p = .727$ ).

*Settings.* Rich descriptions of the two settings were generated to document similarities and differences between the two programs. Existing service delivery models were verified through teacher planning documents, supervisor observation notes, students' IEPs, teacher and student schedules, and team meeting minutes. This review of data revealed and validated various program variables, such as type and intensity of special education service delivery, skills areas addressed, amount of teacher consultation, number of students with disabilities in general education classrooms, numbers of students in pullout

instructional groups, and teacher and paraprofessional staffing patterns. Administrators responsible for special education services, special education teachers who had taught the students, and the middle schools director reviewed setting descriptions and summaries to substantiate their accuracy.

Enterprise Middle School served students in Grades 6 through 8 with a teaming model; that is, a group of students was divided into classes that rotated during the day with a group of teachers who worked and planned together. During the period investigated by the study, a principal, two assistant principals, and 63 classroom teachers staffed the school. Support staff included three full-time guidance counselors and one psychologist and one social worker who were in the school 1 day a week. A sample of 36 students who met the design criteria (i.e., had received inclusive services at the school for least 2 years) was selected. Data on participants from 2 years were collected and analyzed.

A team of nine special education teachers served the students with disabilities assigned to Enterprise, all with master's degrees in special education and endorsement in LD, five with dual endorsements in LD and emotional disturbance (ED), and one in LD and mental retardation (MR). Four of the nine also held endorsements in general education. Four of the nine special education teachers taught the students in the sample during the 1994-95 and 1995-96 school years, two each year, representing an average pupil-teacher ratio of 9:1. Of those serving the participating students in 1994-95, one was dually endorsed in LD and ED, the other LD and MR. During the period of investigation, three 4-person teams of general educators served the students. They held endorsements either in the content area they were teaching or in middle grades (4-8) education. Enterprise teachers had a mean of 17.3 years of professional experience; 33% held master's degrees.

Teachers and administrators at Enterprise Middle School created a model for implementing inclusive special education services based on team teaching and collaborative planning. General and special education teachers co-taught four periods per day and had one period of individual planning and one period of team planning. During

team planning, teachers discussed curriculum concerns, classroom management, instructional strategies, and student progress. During individual planning time, co-teachers met frequently to plan academic content, presentation format, practice activities, and evaluation procedures. Once a week, during the individual planning time, all special education teachers met to coordinate their work, collaborate on challenging cases and issues, exchange information, and share successes.

Co-teaching in the general education classrooms took a variety of forms. Sometimes teachers took turns presenting the content (i.e., interactive teaching). One of the teachers instructed while the other circulated to observe and monitor student progress. Sometimes teachers divided the class into two groups and taught the lesson parallel, or taught part of the lesson and then switched groups. One teacher may have taken responsibility for teaching students who did not master the material initially and required additional instruction. Interactive teaching accommodated the needs of students with different but complementary objectives (i.e., when one teacher presented the content while the teaching partner instructed study skills, learning strategies, or social skills needed for success in the general education curriculum and environment). This content/process division was also evident when co-teachers used other variations, such as parallel teaching, station teaching, and alternative teaching. These approaches allowed for individualization within the general education classroom necessary for the success of heterogeneous groups of learners.

During the same 2-year period, Voyager Middle School served students in grades 6 through 8 in a teaming model, each grade-level team consisting of four general education teachers who rotated groups of students throughout the day. A principal, two assistant principals, and 52 classroom teachers staffed the school. Support staff included two full-time guidance counselors and a part-time school psychologist and social worker. Four special education teachers served the students with disabilities assigned to Voyager, three per year during the years of the study. One teacher left between the 1994-95 and 1995-96 school years. Of those four teachers, two were endorsed in LD and ED; one was endorsed in LD

and working on endorsement in MR and the fourth was endorsed in ED and MR. Voyager students received special education services from two teachers each year in settings with a pupil-teacher ratio of 11:1. All general education teachers held endorsement in the content area they were teaching or in middle school education. Voyager teachers had a mean of 18.7 years of professional experience; 25% held master's degrees.

Interaction between general and special education teachers at Voyager consisted largely of reviews of student progress focused on problem areas in which special educators offered possible solutions and general educators provided a list of skills, incomplete assignments, or tests students needed assistance with in the resource room. Meetings usually took place before or after school. Other less formal contact would take place while passing in the halls or during lunch breaks. Most of the students with disabilities were encouraged to keep assignment notebooks to take home. Special educators relied heavily on those notebooks to remain apprised of the status of their students. Special education teachers were not members of grade-level general education teams, and they did not attend ongoing team meetings on a routine basis. Instead, their presence was typically requested if a student was experiencing an academic or behavioral crisis. The expertise of special educators was also tapped when a student without a label presented a challenge with which the team wanted assistance.

Students at Voyager received no in-class special education service delivery. Their four core courses (language arts, mathematics, science, and social studies) were taught in general education classrooms by general education teachers working alone. These teachers were assigned the services of a general education paraprofessional for small amounts of time, but their duties were clerical rather than instructional. Pullout services at Voyager were scheduled during elective periods. Students forfeited either one or both of their elective classes to receive special education services. During pullout sessions one special education teacher worked with a small group of identified students to remediate academic weaknesses or to assist with completion of assignments for general education core classes. Instructional models included lecture, monitoring of work completion, and co-

operative learning groups.

*Program Variables.* Subsequently, program variables, including number and nature of IEP goals and objectives, degree of classroom accommodation, and amount of special education service delivery that students in the two groups received were targeted. Objective data relating to number of accommodations and amount of special education service students received were collected from a review of students' IEPs. This information was cross-referenced with class schedules. In order to determine types of IEP goals and objectives developed for students in each group, a panel of doctoral students was trained in review procedures and provided copies of the school district's curriculum and coding forms. Each graduate student reviewed approximately one third of each school's IEPs. Interrater reliability was established at .92 by distributing 10% duplicates. Coders classified goals and objectives according to standard curriculum used by the district, remedial basic skills, thematic units, learning strategies, study skills, affective/behavioral skills, or vocational/career skills. Systematic examination of IEPs revealed that the inclusive and pullout programs differed significantly in several features, including number and types of goals, number and types of objectives, number and types of accommodations, and amount of time per week students received special education services.

*IEP Goals.* Data indicated that IEPs developed at Enterprise contained significantly more instructional goals than those at Voyager. Mean number of goals for Enterprise students receiving inclusive services was 3.22 ( $SD = 1.198$ ) as compared to 2.50 goals for Voyager students in the pullout program ( $SD = 1.144$ ) revealing a mean difference of .722 goals ( $t = 2.27, p = .027$ ). Significant differences were also found in two categories of goals, specifically in those focused on general education curriculum and those focused on remedial skills. IEP committees at Enterprise established goals for students included in general education that reflected school district learning expectations for all 8th-graders. Voyager IEP committees focused on academic deficits and established goals to remediate these areas. At Enterprise, students averaged 1.67 ( $SD = 1.242$ ) goals related directly to the general education curriculum. At Voyager, the mean number of goals re-

flective of the general education curriculum was .1364 ( $SD = .465$ ). The mean difference was 1.5303 ( $t = 6.66, p = .000$ ). Conversely, Voyager staff concentrated on teaching remedial basic skills in the pullout program, as evidenced by the mean number of goals that were remedial in nature (1.91,  $SD = 1.065$ ). At Enterprise, the number of goals focused on remediation of academic deficits was .92 ( $SD = 1.079$ ). The mean difference in the two groups was -.9924 ( $t = -3.42, p = .001$ ). IEP goals revealing nonsignificant findings were those addressing learning strategies and student behavior. It should also be noted that no IEP in either group had goals for thematic units or vocational/career skills.

*IEP Objectives.* Analyses of IEP objectives, that is, specific performance expectations, revealed that IEPs written for inclusive services contained significantly more objectives than did those written for pullout service delivery. Enterprise developed a mean of 10.89 ( $SD = 5.002$ ) objectives for each student served in a general education setting. Voyager developed a mean of 7.59 ( $SD = 4.33$ ) objectives for each student served in a pullout special education setting. The mean difference was 3.2980 ( $t = 2.56, p = .013$ ).

In terms of type of IEP objectives generated, two areas showed statistically significant differences: those focused on general education curricula and those that targeted student behavior. Enterprise developed more objectives reflective of general education curricula than did Voyager. IEPs for students receiving inclusive support services had a mean of 4.72 ( $SD = 3.186$ ) objectives related to standard curricula while those of students who received pullout services had a mean of .45 ( $SD = .739$ ). The mean difference between groups was 4.2677 ( $t = 7.71, p = .000$ ). Typical contrasting examples from the documents themselves were objectives for included students to "master the vocabulary in each eighth grade reading text" as opposed to those for students in pullout to "master the sounds of short vowels." Examples of behavioral objectives for included students were "to participate in cooperative learning groups by taking turns speaking;" in pullout programs, behavioral objectives often required students "to complete and turn in homework." IEPs for included students at Enterprise contained a mean of .69 ( $SD = 1.864$ ) objectives



related to behavior, whereas Voyager students had a mean of 1.86 ( $SD = 2.054$ ). The mean difference was  $-1.1692$  ( $t = -2.23, p = .03$ ). Data analyses revealed no significant differences between the two groups in mean number of IEP objectives for remedial basic skills or for learning strategies. No objectives were developed for units or vocational/career skills.

Analyses of IEP goals and objectives thus confirmed the expected differences in program models. In included classes, instruction focused on general education curricula to a greater extent than in pullout programs where the focus was remediation. This finding, though unsurprising, is important for interpretation of student academic outcomes.

*Accommodations.* Analyses revealed statistically different patterns of implementation for classroom accommodations. It is important to note that accommodations, even for students in pullout special education programs, were intended for use in general education classrooms. Enterprise students required an average of 14.8 ( $SD = 6.189$ ) accommodations. Voyager students required an average of 5.6 ( $SD = 2.258$ ) accommodations. The mean difference was 9.1136 ( $t = 9.01, p = .000$ ). Accommodations fell into three categories: instruction, assessment, and behavior. Instructional accommodations numbered 7.9 ( $SD = 3.353$ ) for the included group, and 3.5 ( $SD = 1.566$ ) for students served in pullout programs. The mean difference between groups was 4.3889 ( $t = 6.74, p = .000$ ). The mean for classroom assessment accommodations for students at Enterprise was 1.8 ( $SD = .869$ ) and 5.9 ( $SD = 2.856$ ) for students at Voyager. The mean difference between the two schools was 4.1162 ( $t = 8.06, p = .000$ ). There was also a significant difference in implementation of accommodations to address student behavior. IEP committees at Enterprise incorporated an average of .97 ( $SD = 1.183$ ) behavioral accommodations into IEPs for students in inclusive classrooms. Voyager IEPs, however, included an average of .36 ( $SD = .727$ ) behavioral accommodations for students served in pullout programs. The mean difference was .6086 ( $t = 2.17, p = .034$ ). These objective data point to significant differences in the programmatic variables investigated.

*Time Receiving Special Education Services.*

The final element of the two programs analyzed statistically was time that students received special education services. At Enterprise, special education teachers were assigned to instructional teams on which students with disabilities were placed. Service delivery time was designated in minutes per week. For included students, the number of minutes that they received special education intervention averaged 740 ( $SD = 265.341$ ). At Voyager, students received an average of 252.27 ( $SD = 152.876$ ) minutes per week in special education services outside general education classrooms. The mean difference between groups was 487.7273 ( $t = 9.08, p = .000$ ).

In summary, students were comparable on measures of age, gender, ethnicity, socioeconomic status, IQ, education level of the mother, years of special education service, and years in the school district. Programs differed primarily in type and intensity of special education service delivery, skills addressed, implementation of classroom accommodations, and teacher consultation and instructional models.

#### OUTCOME MEASURES OF STUDENT PERFORMANCE

Three indicators of student outcomes were measured: academic achievement, behavior, and school attendance. Measures of academic achievement included final course grades in the 8th-grade language arts, mathematics, science, and social studies curricula; and standard scores on reading, mathematics, science, and social studies subtests of the *Iowa Test of Basic Skills* (ITBS). In addition, the highest scores, pass/fail rates, number of administrations, and nonstandard administrations on the reading, mathematics, and written language subtests of the state's academic proficiency tests, the Literacy Passport Tests (LPT), were also used.

*Course Grades.* Course grades were teacher-determined measures of student achievement in each course reported in letters based on a district-approved point system (A = 94-100, B = 85-93, C = 75-84, D = 69-74, F = 0-68), evaluating student work, such as tests, quizzes, class work, homework, and projects. Final course grades in language arts, mathematics, science, and social studies were collected from student report cards and converted to a standard 4-point scale.

*State Proficiency Tests.* The state proficiency tests (i.e., LPT) consisted of three subtests designed to measure mastery of state learning objectives in reading, language arts, and mathematics. It was necessary to pass all three subtests to obtain the Literacy Passport, a requirement for graduation from high school with standard or advanced diplomas. Students with disabilities were eligible for accommodations in administration of the tests. Students not passing all portions of the tests were provided with repeat opportunities to take the failed portions.

The LPT was comprised of three domains. The Reading Domain scores reported proficiency at understanding a reading selection using ability to predict a missing word using surrounding text. It employed the commercial test, *Degrees of Reading Power* (DRP). The DRP had correlations of .80 to .88 with three other tests designed to measure reading comprehension; it was more highly correlated with reading tasks requiring comprehension than vocabulary-related tasks. Internal consistency was rated at .93 to .97 and alternate form reliability at .91. The Mathematics Domain was designed by the state department of education to determine proficiency at various computational and problem-solving functions. Test items were based on learning objectives in the state-prescribed curriculum. The reliability coefficient was .93. The Writing Domain was developed by the state department of education to measure skill at writing a paper on an assigned topic. The domain score was obtained by assigning a numerical value to the performance on each of five areas: composing, style, sentence formation, usage, and mechanics. A scoring rubric was based on theory and research in the development of children's writing ability, which supported the test's validity. Based on this research and the curricular emphasis of the writing objectives, various components received weighted scores (e.g., mechanics, style, composition) in determining the final score. Additional evidence of the validity of the writing test came from a factor analysis of scores on 10 writing prompts. Interrater reliability was typical of reliability coefficients for other tests requiring judgment in scoring and was established by training using anchor papers with predetermined scores. Validity, reliability, and lack of bias on all three-domain subtests were determined through

statistical computations as well as the judgment and advice of experts. A modified Angoff procedure was used to set scores for passing on all three subtests (Spagnola & Redfield, 1991, 1992a, 1992b).

*The Iowa Tests of Basic Skills (ITBS).* The ITBS, published by the Riverside Publishing Company, is a battery of nationally standardized tests that measure student achievement in specific skills in vocabulary, reading, mechanics of writing, methods of study, and mathematics. In each curricular area, scores represented the range of skills from low-level Grade 3 through superior-level Grade 9. Reliability coefficients ranged from .84 to .96, with composite reliability at .98 for all grades. Adaptations could be made in order to assess most students without altering requirements for standardization. Departures from standard test administration, such as oral administrations, extending time limits, giving some tests but not others, or varying levels across tests for individuals, were considered nonstandard administrations.

*Student Behavioral Infractions.* School behavior was defined for purposes of this study as actions (e.g., disruption, disobedience, fighting) that resulted in in-school or out-of-school suspension. Data were collected from student scholastic records and cross-referenced for accuracy with district records.

*School Attendance.* School attendance was determined by the number of days per school year each student was absent from school. Information was gathered from student attendance records and cross-referenced for accuracy with district computerized attendance records.

## RESULTS

After having established comparability of the groups, course grades, standardized and criterion tests scores, suspension, and attendance data were analyzed.

### COURSE GRADES

All participants received instruction in language arts, mathematics, science, and social studies and were awarded grades in those subjects. Students with LD served in inclusive classrooms earned significantly higher grades in all four areas of aca-

demographic instruction. Table 3 shows mean grades on a 4.0 scale, standard deviations, and *t* test results, as well as the number and percent of students earning course grades of C or above. The mean language arts grade for students at Enterprise was 2.4 (*SD* = .806), for Voyager, 1.8 (*SD* = 1.020), resulting in a significant difference between means (mean difference = .6439, *t* = 2.67, *p* = .01). Thirty-three (91.7%) students at Enterprise passed language arts with a grade of C or better, indicating average or above-average achievement. By comparison, at Voyager, 14 (63.6%) students passed with average or above-average achievement.

The mean mathematics grade for students at Enterprise was 2.4 (*SD* = 9.69), while the mean score for students served in pullout special education was 1.8 (*SD* = .853). Once again, this represented a statistically significant difference between means (mean difference = .6263, *t* = 2.50, *p* = .016). Thirty-one (86.1%) students receiving inclusive services made a C or better for their final report card grade in mathematics. Sixteen (72.7%) students at Voyager passed mathematics with a grade of C or better.

Students served in inclusive settings also earned better grades in science. The mean course grade in science for students at Enterprise was 2.6 (*SD* = 1.079), at Voyager, 1.6 (*SD* = .908). This represented a significant difference in the means (mean difference = .9924, *t* = 3.60, *p* = .001). Thirty-two (88.9%) students at Enterprise received a grade of C or better in science on their report cards, compared to 13 (59.1%) students at Voyager.

Likewise, students in inclusive settings received higher grades in social studies. The mean course grade in social studies for students at Enterprise was 2.28 (*SD* = .944), at Voyager 1.59 (*SD* = 1.008). This reflected a significant difference in means for the two groups (mean difference = .6869, *t* = 2.62, *p* = .011). Thirty-one (86.1%) students served in inclusive settings received a science course grade of C or better. By comparison, 11 (50%) students served in pullout programs received a grade of C or better. In summary, middle school students with learning disabilities served in inclusive classrooms achieved significantly better course grades in language arts, mathematics, science, and social studies.

#### STATE PROFICIENCY TEST (LITERACY PASSPORT TEST)

A review of data on the performance of the sample groups on the LPT revealed that 57 students (98.3%) took the tests: 35 (100%) at Enterprise and 21 (95.4%) at Voyager (see Table 4). Analyses of highest scores for the LPT reading subtest yielded insignificant differences in the mean scores of the two groups. Students served in inclusive settings earned a mean score of 257 (*SD* = 10.262). Students served in pullout special education programs earned a mean score of 253 (*SD* = 12.015). This did not indicate a significant difference when a 2-tail *t* test was conducted (mean difference = 3.4960, *t* = 1.16, *p* = .249). Nor did a chi-square analysis of pass-fail rates reveal a significant difference between the two groups (Pearson significance = .19644). Thirty-two (88.9%) students at Enterprise passed the LPT reading subtest before exiting 8th grade to enter high school. Voyager demonstrated a similar outcome: 16 (72.7%) passed before exiting middle school.

Analysis of student performance data on the mathematics subtest of the LPT was conducted using the same statistical tests; no significance differences were found. The mean highest score for students in inclusive classrooms was 255 (*SD* = 6.446). For students served in pullout programs, the mean highest score was 254 (*SD* = 5.006) with a mean difference of .8294 (*t* = .51, *p* = .614). Pass-fail rates showed that 32 (88.9%) Enterprise students passed the mathematics subtest before exiting 8th grade. At Voyager, 19 (86.4%) achieved a passing score on the mathematics subtest before entering high school. A chi-square analysis of the pass-fail rate showed no significant difference (Pearson significance = .42739).

Student performance data on the writing

*This study clearly demonstrated that students with disabilities included in general education classrooms achieved better outcomes on some measures than did their peers in pullout programs and comparable outcomes on others.*

**TABLE 3**

**Students With Course Grade of C or Above**

	Enterprise				Voyager				t-Value	df	2-Tail Sig.	
	M Grade	D	SE of Mean	Students with Course Grade Above C	M Grade	SD	SE of Mean	Students with Course Grade Above C				
Language Arts	2.41	.086	.134	33 (86.1%)	1.772	1.020	.218	14 (63.6%)	.6439	2.67	56	.010
Mathematics	2.4	.969	.162	31 (86.1%)	1.818	.853	.182	16 (72.2%)	.6263	2.50	56	.016
Science	2.6	1.079	.180	32 (88.9%)	1.6	.908	.194	13 (59.1%)	.9924	3.60	56	.001
Social Sciences	2.3	.944	.157	31 (86.1%)	1.6	1.008	.215	11 (50.0%)	.6869	2.62	56	.011

**TABLE 4**  
*Summary of Literacy Passport Domain Scores and Number of Administrations*

	Enterprise			Voyager			t-value	DF	2-Tail Significance
	Mean	SD	SE of Mean	Mean	SD	SE of Mean			
<b>Reading</b>									
Highest Score	257	10.262	1.710	254	12.015	2.622	3.4960	55	.249
Number of Administrations	2.1	1.437	.240	2.0	1.362	.290	.0934	56	.807
<b>Writing</b>									
Highest Score	255	10.992	1.832	258	10.868	2.372	-3.4643	55	.254
Number of Administrations	2.3	1.390	.232	2.6	1.501	.320	-.2854	56	.656
<b>Mathematics</b>									
Highest Score	255	6.446	1.074	254	5.006	1.092	.8294	55	.614
Number of Administrations	2.0	1.183	.194	1.9	1.356	.289	.1086	56	.749

portion of the LPT were indicative of a similar pattern. Mean highest score for the included students (255,  $SD = 10.992$ ) did not differ significantly from the mean highest score for students served in pullout programs (258,  $SD = 10.868$ ). A 2-tail  $t$  test documented that the difference between means was not significant (mean difference =  $-3.4643$ ,  $t = -1.15$ ,  $p = .254$ ). Thirty-two (88.9%) of the students at Enterprise and 19 (86.4%) at Voyager passed the writing portion of the LPT before leaving 8th-grade. A chi-square analysis of the pass-fail data did not reveal a significant difference (Pearson significance =  $.42739$ ).

Statistical analysis of data on performance on the reading, mathematics, and writing subtest of the state proficiency test, including mean highest scores and pass-fail rates revealed no significant differences between students with LD receiving inclusive and pullout services. In terms of number of administrations and patterns of testing accommodations, data on all three subtests also yielded no significant differences (see Table 5).

#### *IOWA TEST OF BASIC SKILLS (ITBS)*

Of the total sample, 54 students (93.1%) participated in ITBS testing in their 8th-grade year. Four were exempted. Statistical analyses of the standard scores on the ITBS subtests produced mixed results (see Table 6). A significant difference was found between the means of the two groups on the language and mathematics subtests. On the language subtest, students at Enterprise achieved a higher mean standard score (mean =  $143.2$ ,  $SD = 18.698$ ) than did students in pullout programs at Voyager (mean =  $130.9$ ,  $SD = 19.448$ ), resulting in a mean difference of  $12.3265$  ( $t = 2.31$ ,  $p = .025$ ). Analysis of the ITBS mathematics subtest also revealed significant variability in the mean scores of the two groups. Students being served in Enterprise's inclusive program averaged a standard score of  $150.2$  ( $SD = 18.301$ ), whereas, students served in Voyager's pullout program earned an average standard score of  $139.9$  ( $SD = 12.100$ ), resulting in a mean difference of  $10.3353$  ( $t = 2.25$ ,  $p < .05$  =  $.029$ ). Both groups demonstrated similar mean standard scores on the reading comprehension, science, and social studies subtests.

In summary, statistical analyses of data gathered on student performance on the ITBS subtests, including mean scores and number of students requiring nonstandard accommodations, revealed that students with LD receiving inclusive special education services achieved higher standard scores on the language and mathematics subtest than students with LD receiving pullout special education services. Further, the two groups earned similar mean scores on the reading comprehension, science, and social studies subtests.

#### *IN-SCHOOL AND OUT-OF-SCHOOL SUSPENSIONS*

Statistical analyses of data indicated no significant differences between the two groups relative to behaviors that warranted in-school or out-of-school suspensions. At Enterprise, the students with LD who received inclusive support experienced no in-school suspension (mean =  $.0000$ ,  $SD = .000$ ). Six students at Voyager were placed in in-school suspension a total of 25 days resulting from 12 incidents (mean =  $1.14$ ,  $SD = 3.075$ ). This did not constitute a significant difference (mean =  $-1.364$ ,  $t = -1.73$ ,  $p = .098$ ). Similarly, out-of-school suspension figures revealed that at Enterprise, only one student was suspended for 7 days as the result of one infraction (mean =  $.1944$ ,  $SD = 1.167$ ). At Voyager, six students were suspended for a total of 17 days stemming from eight incidents (mean =  $.7727$ ,  $SD = 1.378$ ). This did not reflect a significant difference in means (mean difference of  $-.5783$ ,  $t = -1.64$ ,  $p = .109$ ).

#### *SCHOOL ATTENDANCE*

Attendance data from both schools revealed that students in inclusive classrooms attended significantly more days of school than did students in pullout special education programs. The mean rate of absence for students at Enterprise was 5.6 days ( $SD = 4.095$ ), whereas the mean rate at Voyager was 8.7 days ( $SD = 5.410$ ), representing a mean difference of  $-3.3081$  ( $t = -2.64$ ,  $p = .011$ ). Thirty (83.3%) of the 36 students at Enterprise missed from 2 to 15 days of school during 8th grade. Six (16.7%) missed no days. Twenty-one (95.5%) of the students at Voyager missed from 2 to 20 days of school during 8th grade.

TABLE 2

## Summary of Literacy Passport Domain Scores and Number of Administrations

	Elementary				High				Mean Difference	DF	2-Tail Significance
	Mean	SD	SE of Mean	N	Mean	SD	SE of Mean	N			
<b>Reading</b>											
High Score	257	10.262	1.710	234	12.015	2.622	9.4560	1.16	55	.249	
Number of Administrations	2.1	1.487	.340	2.0	1.562	.280	.0934	.24	56	.807	
<b>Writing</b>											
High Score	255	10.992	1.832	258	10.868	2.372	-8.4645	-1.15	55	.234	
Number of Administrations	2.3	1.590	.282	2.6	1.501	.320	-.2854	-.74	56	.456	
<b>Mathematics</b>											
High Score	255	6.446	1.074	254	5.006	1.092	.8234	.51	55	.614	
Number of Administrations	2.0	1.183	.194	1.9	1.396	.289	.1086	.32	56	.749	

TABLE 6

## Summary of TTSB Scores

	Essays		History		Mean Difference	t-value	df	2-Tail Sig.
	Mean	SD	Mean	SD				
Language	143.2	18.698	140.9	19.448	12.3365	2.51	52	.025
Reading	149.9	21.777	146.7	22.806	5.2612	.89	52	.999
Comprehension								
Mathematics	150.2	18.361	139.9	13.100	10.9959	2.25	52	.029
Science	150.5	20.271	151.9	20.201	-8.094	-.10	52	.920
Social Studies	146.2	20.992	147.9	21.601	-1.0941	-.14	52	.892



## DISCUSSION

At the heart of the inclusion debate lies the question of efficacy. Although much attention and energy remain focused on the justification for inclusion, the process itself, or affective responses of participants, it is essential to determine the extent to which inclusion serves the best interest of students with disabilities by producing better academic and social outcomes. This study was undertaken with the specific objective of contributing to the query about efficacy by investigating the relationship between inclusive and pullout special education service delivery models, and academic, behavioral, and attendance outcomes for students with LD. Data gathered from numerous archival sources were analyzed to construct a rich description of the contexts in which students were provided special education and a meaningful interpretation of achievement, behavior, and attendance outcomes.

This study clearly demonstrated that students with disabilities included in general education classrooms achieved better outcomes on some measures than did their peers in pullout programs and comparable outcomes on others. Five key findings can be drawn from this study. First, students with LD served in inclusive classrooms achieved higher course grades in language arts, mathematics, science, and social studies than students with LD in pullout programs. This result suggests that a program that provides a strong focus on the standard school curriculum with appropriate special education support does not exceed the ability of middle school students with LD. In fact, with adequate support and accommodation, students with LD can maintain acceptable achievement standards established by schools' grading practices while in inclusive classrooms.

Second, students with LD achieved higher scores on language and mathematics ITBS subtests than did students with LD in pullout programs. The group served in inclusive programs achieved comparable scores on the reading comprehension, science, and social studies subtests. These findings question the assumption of many that small group instruction will necessarily result in improved scores or pass rates on standardized tests.

Third, students with LD served in inclusive

classrooms demonstrated comparable scores to those in pullout programs on reading, writing, and mathematics subtests of a state proficiency test. Again, the standard curriculum focus and accommodations for LD appear to be factors in positive student outcomes. Because it is widely recognized that academic failure increases the likelihood that a student will drop out of school, these three indicators have powerful implications for long-term outcomes of high school graduation and subsequent employment.

Fourth, students with LD in inclusive classrooms did not experience more in-school or out-of-school suspensions than did students in pullout programs. This suggests that increased demands of full-time general education placement do not result in greater acting-out behavior. Finally, students with LD served in inclusive classrooms attended more days of school than those in pullout programs. Better attendance may be an indication of greater student satisfaction with inclusive services. Additionally, increased opportunities for quality instructional and social experiences may have produced positive influences on student attendance.

## LIMITATIONS

A concern with this study is that it was conducted in one small, suburban, school district where two distinctively different service delivery models were in place. Although 58 students with LD is large in comparison to sample sizes used in other service delivery studies, replication of this research design with larger sample sizes is recommended to further evaluate these findings. Archival data from 1994 through 1996 were used in this investigation because of the consistency with which the information was collected by the school system over time. Incorporation of data for more recent cohort groups was not possible for this study due to changes in the state assessment program. Replication of this intensive research model in a variety of current settings, at different grade levels, and with students in other disability categories would be useful. Results of such studies could help determine the broader impact of inclusion across a wide spectrum of student and program characteristics.

## IMPLICATIONS FOR PRACTICE

This study's findings provide important information that can have a significant impact on classroom practice, teacher preparation, and program evaluation. Results suggest that with adequate adaptations, individualized programs, and sufficient support, students with disabilities can achieve academic and social success in general education classrooms.

### *CLASSROOM PRACTICE*

New state and federal mandates are holding all students and all educators to higher academic standards (Andrews et al., 2000; Giacobbe, et al., 2001). Consequently, instructional practices in schools are changing. Schools are slowly becoming more inclusive and more collaborative despite existing organizational barriers that often interfere with effective practice (Kavale & Forness, 2000; Walther-Thomas et al., 2000). One practical implication of this research is the obvious need for better communication among professionals regardless of the service delivery model. Enterprise, the more inclusive school, provided teachers with organizational structures (e.g., common planning time, regularly scheduled team meetings, manageable specialist caseloads) that facilitated communication, collaborative problem-solving, and the development of appropriate support services. Principals and teacher leaders need to work together to develop professional teaching and planning schedules that enable classroom teachers and specialists (e.g., special education and gifted education teachers, speech pathologists, counselors, Title I teachers, reading specialists) to work together on an ongoing basis.

Results from this study also suggest collaborative structures, such as co-teaching and weekly team meetings, facilitated shared responsibility for student performance at Enterprise. Interdisciplinary teams at that school developed IEPs more directly focused on student mastery of the standard curriculum. They also addressed classroom accommodations in more detail. Such practices promote success by helping students with disabilities to meet both academic and behavioral expectations in their schools.

### *TEACHER PREPARATION*

Changing roles for classroom teachers and specialists necessitate new emphases in initial preparation and continuing professional development programs. Preservice teachers, both in general education and special education, need to develop effective instructional and interpersonal skills to work with colleagues in the development and delivery of classroom-based services for students with disabilities. In addition, teacher education programs need to ensure that beginning educators develop well-honed classroom management skills that will ensure greater teacher confidence and student success.

Likewise, practicing professionals, (i.e., teachers, specialists, and administrators) need ongoing professional development opportunities to enhance their skills related to effective classroom instruction, management, communication, and collaboration. These efforts will help ensure that school personnel are prepared to work effectively with colleagues, provide research-based instructional practices in the classroom, monitor student progress on an ongoing basis, and make appropriate data-based decisions.

### *PROGRAM EVALUATION*

The methodology used in this study provides a comprehensive and manageable example for school systems interested in evaluating their own services delivery models. One of the strengths of this design is its use of a variety of student and program data that can be retrieved from school archives and scrutinized. The key to the meaningfulness of local as well as large-scale efforts is a functional and commonly accepted description of the specific service delivery models. Complete program descriptions provide critical information to researchers and school leaders. Without the comprehensive descriptions developed in this study, for example, it would not have been readily apparent that both schools provided exemplary and distinctively different special education programs. Much of the power of these results hinges on the fact that the two different service delivery models produced different results with comparable students. Only by providing such clear context can results of research and evaluation studies take on the practical meaning necessary to guide

policy and program decision making.

In conclusion, school effectiveness depends in large part on its ability to respond to individual student needs. In the case of students with disabilities, that responsibility is heightened. The assumption that segregation from typical peers is the price that students with disabilities have to pay in order to learn must be seriously questioned. If students with LD who receive special education services in inclusive classrooms can achieve comparable or better academic and behavioral outcomes than those served in pullout programs, educators must confront the question that has haunted the profession for over 3 decades: How do we justify separate special education classes? (Dunn, 1968).

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Manuscript received February 6, 2001; revision accepted August 11, 2001.

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