

**INCLUDING STUDENTS WITH DEVELOPMENTAL DISABILITIES IN GENERAL
EDUCATION CLASSROOMS: EDUCATIONAL BENEFITS**

**Jennifer Katz
and
Pat Miranda**

University of British Columbia

The goal of this review is to examine the educational outcomes of inclusion for students with and without developmental disabilities in the early grades, including studies that have measured both traditional academic outcomes (e.g. literacy, mathematics, etc.) and non-academic skill development in areas such as basic life skills (e.g. communication, motor skills, functional life skills). We also review the research literature related to teaching techniques and educational contexts that have been found to promote effective inclusion (i.e., to provide optimal learning for all students, both with and without developmental disabilities).

To educate means *to develop and cultivate* (Merriam-Webster, 1978). To teach, on the other hand, is defined as *to cause to know; to show how; to guide; to make to know the consequences of* (Merriam-Webster, 1978). Thus, education, includes more than instruction in academic subjects; and teaching includes more than just delivery of academic content. Education should develop the whole child and cultivate all of the skills, attitudes, and knowledge necessary for successful integration into society. Schools should provide students with opportunities to discover, model, experience, and learn consequences. This is true for all populations of learners, both with and without disabilities; but it is especially true for students with developmental disabilities, because they often have difficulties with social, emotional, communication, motor, and behavioral development, in addition to academic learning (Alper & Ryndak, 1992). Thus, practices such as inclusion that aim to educate such students in the full sense of the word must promote development across all educational domains.

In a companion article, we reviewed research that has evaluated the social, emotional, and behavioral benefits of inclusion for students with and without developmental disabilities in elementary school classrooms. In this review, our goal is to examine the educational outcomes of inclusion for students with and without disabilities in the early grades, including studies that have measured both traditional academic outcomes (e.g. literacy, mathematics, etc.) and non-academic skill development in areas such as basic life skills (e.g. communication, motor skills, functional life skills). We will also review the research literature related to teaching techniques and educational contexts that have been found to promote effective inclusion (i.e., to provide optimal learning for all students, both with and without disabilities).

Social Interactions and Educational Outcomes

In the course of exploring the social benefits of inclusion, researchers discovered that the opportunity to interact with peers without disabilities also had academic benefits. Brinker and Thorpe (1984) wrote a seminal article exploring the rate of peer interactions as a predictor of inclusion outcomes. They observed the rates of interaction with typical peers by 245 students with severe disabilities. When level of functioning was held constant, the rate of interaction with typical students accounted for a statistically

significant 2.1% of the variance. However, the rate of interaction with other students with severe disabilities was not a significant predictor of students' educational achievement. This is an important finding since it establishes a clear relationship between social interactions with typical peers and the achievement of individual education plan (IEP) goals by students with severe disabilities.

Hunt, Staub, Alwell, and Goetz (1994) investigated the academic achievement of students with multiple, severe disabilities in the context of cooperative learning groups in inclusive classrooms. They demonstrated empirically that students with disabilities could acquire basic communication and motor skills through interactions with peers without disabilities who provided them with cues, prompts, and consequences. In the final days of the study, each of the students with severe disabilities was able to produce independent, targeted communication and motor responses. Furthermore, they generalized those skills during follow-up sessions to activities with classmates in a newly formed cooperative learning group. The authors concluded that opportunities to interact with peers without disabilities provided the support and motivation that was required to allow these students with multiple disabilities to acquire basic communication and motor objectives. Thus, it appears that opportunities to interact with peers without disabilities in inclusive classrooms may affect the educational outcomes for students with developmental disabilities.

Class Placement and Educational Outcomes

Meta-analyses and comparative studies that have compared the educational outcomes of students with developmental disabilities in inclusive versus segregated classrooms have found either no difference in educational outcomes or positive effects for inclusion (Alper & Ryndak, 1992; Hunt & Goetz, 1997). For example, Cole and Meyer (1991), in their longitudinal study that explored the benefits of inclusion for students with severe disabilities, found no significant differences over a 2 year period in the traditional domains of self-help skills, gross and fine motor co-ordination, communication, and adaptive behavior for students in integrated versus segregated settings. However, students in the integrated settings spent less time in their school buildings and more time in the community than did their segregated counterparts. This is a surprising finding given the common belief that specialized settings are better able to promote instruction in life skills/vocational/work settings in the community (Cole & Meyer, 1991). Also of significance was the finding that the students in integrated settings spent as much time in contact with special education teachers as did those in segregated settings. Thus, the claim that segregated settings provide more intensive and direct instruction is called into question by these results. In a similar comparison, Saint-Laurent, Fournier, and Lessard (1993) found no significant differences in academic outcomes for students with moderate developmental disabilities in inclusive, community based, or traditional segregated classrooms. The authors concluded that integration proved to be advantageous for social and behavioral outcomes, and that it provided academic, functional, and basic skills instruction that was equal to that provided in more segregated settings.

Most of the research studies that have studied the relationship between class placement and educational outcomes have found positive effects for inclusion. In 1985-86, Wang and Baker conducted a meta-analysis to review and analyze the design features and efficacy of mainstreaming as an educational approach to serving students with disabilities. Over 50% of the students were classified as mentally retarded, 25% included mixed categories of exceptionalities, 19% were hearing impaired, and 3% were learning disabled. The findings suggested that students with disabilities in mainstreamed classrooms made greater overall academic gains than did their peers with similar disabilities in segregated classrooms. The overall mean weighted effect size across all studies and all three categories of outcome measures (i.e., performance effects, attitudinal effects, and process effects) was .33. A series of ANOVAs were performed to investigate the extent to which any single independent variable or cluster of independent variables contributed significantly to the mean weighted effect sizes. The results indicated that none of the independent variables (e.g., type of handicap, grade level, etc.) either singly or in clusters showed a statistically significant impact on the overall weighted effect sizes. This suggests that the positive effect of mainstreaming on student outcomes was unlikely to be the result of any variable other than mainstreaming. Wang and Baker concluded that the results provided support for the effectiveness of mainstreaming in improving performance, attitudinal, and process outcomes students with disabilities.

In 1994-95, Baker, Wang, and Walberg reviewed three meta-analyses that addressed the issue of the most effective setting for the education of special needs students. The effect sizes in all three had demonstrated a small-to-moderate positive effect for inclusive placement, ranging from .08 to .44. This is a significant finding, in that none of the meta-analyses found any negative social or learning effects for inclusion. The authors attempted to discern whether other factors in addition to class placement influenced the effect sizes (e.g. age, gender, or level of disability), but found no consistent pattern. The authors concluded that *the average of the inclusion effects, 0.195, is near the average effect for effective instructional practice* (Baker et al., 1994-95, p. 34). Thus, inclusion in and of itself could be considered an effective instructional practice.

Helmstetter, Curry, Brennan, and Sampson-Saul (1998) compared the use of instructional time for students with developmental disabilities in general and special education classrooms. All of the participants spent some time in inclusive classrooms and some time in segregated classrooms. The percentage of non-instructional time was significantly different in the two settings, with 58% in the segregated classrooms and only 35% in inclusive classrooms. In fact, even when whole class instruction was deleted from the computation of instructional time, a significantly greater amount of time was devoted to instruction in the inclusive classrooms. This may explain why, despite smaller staff-to-student ratios in segregated classrooms, several studies have documented that students are more often alone, and less often engaged, in self-contained classrooms (Hunt, Farron-Davis, Beckstead, Curtis, & Goetz, 1994). In addition, the inclusive classrooms focused instruction to a significant extent on academics (72% of the time) as compared to the segregated settings (24% of the time). More instruction was provided by paraprofessionals and other adults in the segregated setting than in the inclusive classrooms (43% to 21% respectively); conversely, peer-peer instruction was more common in inclusive (18%) than in segregated settings (< 1%). Considering the extensive findings related to the relationship of peer interactions and academic activity to increased engaged behavior (Hunt, Farron-Davis et al., 1994; Logan, Bakeman, & Keefe, 1997) these are significant findings and provide important information regarding the specific opportunities inclusive classrooms offer students with developmental disabilities.

McDonnell, Thorson, and McQuivey (2000) also examined the instructional contexts provided to six students with severe disabilities and six of their typical peers enrolled in the same general education classrooms. The students with severe disabilities were 13 times more likely than their peers without disabilities to receive instruction directed exclusively toward them during whole class activities, and were 23 times more likely to receive 1:1 instruction. At the same time, there were no significant differences in the quality of teachers' instructional behaviors directed toward the two groups. The authors concluded that these results challenge the claim that students with disabilities cannot receive instruction in general education classrooms that is tailored to their individual needs.

Downing, Morrison, and Berecin-Rascon (1996) found that academic progress was made by all three students with autism in their transition study. All three students learned academic skills such as letter identification, beginning reading skills, emergent writing skills, matching, tracing, counting, etc. At the end of the year, one student who had been unable to communicate either verbally or in writing, wrote *I learned to write. I walk to school. I don't hit, bite, or scratch. I'm proud of the classroom teacher. I'm proud of Wood School. I'm proud of my mom. I'm proud of me* (p. 27). In the case of Melinda, a student with developmental disabilities who was transitioned from a special class to an inclusive class (Ryndak, Morrison, & Sommerstein, 1999), her literacy skills developed well beyond expectations in the inclusive classroom. At age 15, Melinda was described as the lowest functioning student in her special education classroom, where her instructional program was focused on basic reading, writing, and math. Melinda had developed *an aversion to reading* (p. 11) and read at a beginning grade two level. After being included, Melinda demonstrated tremendous growth in oral language, reading, and written literacy. This growth was so striking that she was invited to speak to the Assembly in her home State, and she was able to attend college on a modified program after graduation. She read college textbooks written at a grade seven level or above with complete comprehension. As Melinda reached adulthood, her mother stated:

I attribute the growth to higher expectation on the part of everybody...people expected her to be retarded and then they gave her activities that they would expect retarded people to do. Those

tests and statistics really are not a good forecaster of what any child can do, if given the proper opportunities, role models, and settings (p. 19).

Hunt and Farron-Davis (1992) conducted a preliminary investigation of IEP quality and content associated with placement in general education versus special education classes. They used a nationwide search to locate special education teachers who provided support to students with severe disabilities as members of general education classrooms, and who had previously taught the same students in special class programs. An IEP evaluation instrument was used to compare the IEPs of the students from both types of settings. Measures included quality indicators of age appropriateness, functionality of the skills taught, and the extent to which the design of instructional activities promoted the generalization of the skills to multiple, natural settings. No differences were found regarding curriculum content, and basic skills instruction was targeted equally in inclusion and in self-contained classrooms. The results did reveal a significant increase in the overall quality of the IEP objectives that were written for the focus students when their placements were changed from special classes to full-time membership in general education classrooms. It appears that the teachers who wrote the IEPs raised their expectations and used more effective teaching strategies with students in inclusive classrooms. In a related study, Hunt, Farron-Davis et al. (1994) compared the IEP objectives for students with disabilities in general and special education settings. The IEPs for students with less disability in general education classrooms included significantly more instruction in basic skills (i.e., communication, social, sensory motor, and academic skills) than did those for students in special class programs. This is a striking finding given the common belief that basic skills are more often and more appropriately taught in special education settings. On the other hand, the students with severe disabilities were engaged in more academic activities and fewer basic skills activities in general education settings. This may have been due to a greater emphasis on academic instruction and a decreased emphasis on life skills within the general education classrooms, a finding contrary to Hunt and Farron-Davis' earlier study (1992). The change in outcomes perhaps reflects the development of inclusive practices and goals in the early 1990's, and a balancing of the curriculum relative to students' level of disability. These findings provide support for the contention that basic skills instruction can be addressed within general education classrooms for students who require it.

Engaged Behavior and Educational Outcomes

Engaged behavior (i.e., active involvement in learning and time on task) is a measure that has been shown to predict academic achievement (Bulgren & Carta, 1993; Greenwood, Carta, Kamps, & Arreaga-Mayer, 1990). In fact, previous research has suggested that the engaged behavior of students with disabilities is the single best predictor of academic gains (Bulgren & Carta, 1993; Kamps, Leonard, & Greenwood, 1991; Sindelar, Smith, Harriman, Hale, & Wilson, 1989). Thus, if general education classrooms promote the active engagement of students with disabilities, it would be expected that academic achievement would also be improved.

In the Hunt, Farron-Davis et al. (1994) study, measures of the rate and type (i.e. active versus passive) of engagement were recorded. Results indicated that the students with developmental disabilities in inclusive classrooms demonstrated higher levels of engaged behavior than did those in self-contained classrooms. These findings correspond with the finding that these students were less often alone and were most often with at least one other student, since one would expect the level of engagement to parallel that of proximity. In addition, students with more disability in this study were more actively engaged in inclusive classrooms than were their peers in segregated classrooms.

Logan and Malone (1998) examined the instructional contexts provided for students with moderate, severe, and profound developmental disabilities in general education classrooms and their effect on engaged behavior. Students of all disability levels spent a significantly greater amount of time engaged in academic activities than in any other activities. They were involved in more whole-class activities than in small group or individual structures, and were taught most often by general education teachers. The students' level of disability had some effect on their engaged behavior, although all students demonstrated a high rate of engagement in academic activities. The students' level of participation in functional skills training was limited; however, most of the data were not collected during the non-instructional times when functional skills instruction was most likely to have occurred.

The three autistic students in the Downing et al. study (1996) all increased their level of participation and time on-task from the beginning of the year to the end. They were also found to spend more time with the class doing the same activities rather than parallel or separate activities. This is a significant outcome, as students' sense of belonging, self-esteem, and engagement are all affected by participating in the *regular* activities of the classroom alongside their peers (Schnorr, 1990; Williams & Downing, 1998).

Hollowood, Salisbury, Rainforth, and Palombaro (1994) investigated the amount of time allocated for instruction, the actual used time for instruction, and students' engaged time in inclusive classrooms. Students with severe disabilities had more of their daily schedules allocated to instructional tasks than did students without disabilities. Both groups spent comparable proportions of time passively engaged in instruction; however, students with disabilities spent less of their school day actively engaged than did students without disabilities. The authors suggested that this might have been due to the presence of instructional aides for the students with disabilities, who provided extended instruction that often relegated the students to passive roles.

Helmstetter et al. (1998) also assessed the engaged behavior of their students with severe disabilities in integrated versus segregated classrooms. All of the students spent some time in each of the two settings and spent less time engaged in non-instructional activities when they were in the inclusive classrooms. Active engagement was most prevalent when the students worked in 1:1 formats, regardless of the setting. However, because more individual work was done in special education classrooms, and more whole-group instruction was provided in general education classrooms, active engagement was higher in the special classrooms. The authors noted these results are not surprising, given that passive engagement (i.e., where students listen while the teacher talks) is often the norm in the whole-class instructional activities frequently encountered in general education classrooms.

Altman and Kanagawa (1994) also raised the issue of the need to explore specific instructional contexts and variables that promote the engaged behavior of students with developmental disabilities. They observed three students with mild developmental disabilities who spent half of their days in integrated kindergartens and half of their days in specialized programs. They found considerable individual social and academic variation in engaged behavior across the three students. However, they concluded that the opportunity to engage in academic and social activities varied according to the degree to which potential social agents, and presumably academic ones as well, were available and responsive in the environments. Inclusive classrooms provide a greater number of social agents and more responsive peers, and should therefore promote the engagement of students with disabilities to a greater degree than self-contained classrooms in which all of the students have social, communication, and learning difficulties. In fact, the bulk of the research has shown that students with disabilities are more engaged in academic activities in inclusive classrooms than in segregated classrooms (Hunt, Farron-Davis et al., 1994; Logan et al., 1997).

Academic Benefits of Inclusion for Students Without Disabilities

Concerns have often been raised in the inclusion literature about the impact of the presence of students with developmental disabilities, particularly those with challenging behaviors, on the learning of typical students (Kauffman, 1993; Peltier, 1997; Staub & Peck, 1995). Hollowood et al. (1994) investigated the degree to which the presence of students with severe disabilities in inclusive classrooms affected the time allocated for instruction, the actual time used for instruction, and students' engaged time. Classrooms with and without students with severe disabilities were compared on all three variables. The average time allocated and used for instruction was comparable for both types of classrooms. There were no differences in the percentage of time typical students were engaged in instruction across the two classroom types. This was a significant finding, as it demonstrated that the presence of students with severe disabilities, even those with challenging behaviors, did not negatively impact the amount of engaged time for typical learners. This finding has since been replicated in other studies (Peltier, 1997; Staub & Peck, 1995).

Hunt, Staub et al. (1994), assessed the achievement of students with and without disabilities in the context of co-operative mathematics learning groups in inclusive classrooms. Typical students were taught to prompt, cue, and facilitate specific communication and motor skills for students with severe disabilities in

co-operative group activities. The results indicated that the peer-facilitated interactions did not negatively affect the peers' achievement of academic objectives. Students without disabilities in the experimental co-operative learning groups performed equally as well as their peers in co-operative groups that did not include a student with a disability.

In a qualitative research study of an inclusive elementary school, the authors made a number of anecdotal observations regarding academic outcomes for students without disabilities (Staub, Schwartz, Gallucci, & Peck, 1994). For example, a grade one student who acted as a peer tutor for a student with a disability, after hearing about a science fair called the *Invent America Contest*, came home and announced that she wanted to enter with a wheelchair swing. She proceeded to build the swing and enter it in the contest, undoubtedly learning a great deal about mechanics, engineering, and other scientific concepts along the way. Thus, her friendship with a peer with disabilities appeared to provide motivation for her to acquire conceptual knowledge to which she would not have been exposed otherwise. It has also been well documented in the literature that students who act as peer tutors in academic areas learn the related academic content to a greater degree/depth than those who passively listen to or read the material (Fisher, Schumaker, & Deshler, 1995).

From this review, there is little doubt that research over the past 20 years has identified many social and academic advantages of inclusion for students both with and without disabilities. Thus, it seems that Baker et al. (1994-95) were prophetic in saying:

As schools are increasingly challenged to serve a diverse student population, . . . the concern is no longer whether to provide inclusive education, but how to implement inclusive education in ways that are both feasible and effective in ensuring schooling success for all children (p. 34).

Instructional Contexts and Teaching Techniques That Promote Academic Achievement in Inclusive Classrooms

Recognition that inclusion benefits both learners with and without disabilities has led to a body of research which has sought to more clearly define the necessary contexts, techniques, and curricular reforms that support the learning of all students. The most commonly mentioned adaptations in this literature include the use of flexible groupings, co-operative learning and peer tutoring, choice-making opportunities, multi-modality instruction and flexible response activities, curriculum/performance based assessment, and collaborative teaching. The use of technology, and community involvement have also been shown to improve the efficacy of inclusion for all students.

Instructional arrangements. Logan et al. (1997) investigated the effects of interactional and contextual variables on students' academic achievement. The results indicated that 1:1 and small-group instructional arrangements resulted in higher levels of engaged behavior than whole-class arrangements. In addition, the researchers noted that engaged behavior was highest when peers acted as tutors of students with disabilities. In fact, the use of small group and 1:1 instruction (including peer tutoring or partner work), as opposed to whole-class or independent seatwork, has repeatedly been shown to result in superior levels of engagement and achievement for students both with and without disabilities (Altman & Kanagawa, 1994; Helmstetter et al., 1998; Muyskens & Ysseldyke, 1998). For example, in a study of elementary school students with and without disabilities (Muyskens & Ysseldyke, 1998), student academic responding was higher in 1:1 contexts than in whole-class contexts, regardless of student demographics or times of day. Despite this, it is common for students in general education classrooms to spend the majority of their time in either whole-class or independent work activities (Altman & Kanagawa, 1994; Farrell, 2000; Helmstetter et al., 1998; Logan & Malone, 1998). It seems clear that, by simply providing more opportunities for small group or partner learning, inclusive classrooms could increase the engaged behavior and academic achievement of students both with and without disabilities.

Co-operative learning and peer tutoring. Given the above, it is not surprising that one of the most common educational adaptations for inclusion cited in the literature is co-operative learning (Fisher et al., 1995; Hunt, Staub et al., 1994; Jackson, Ryndak, & Billingsley, 2000; King-Sears, 1997). In a co-operative learning program, instructional methods such as direct instruction, small-group instruction,

individualization of roles and accountability, and independent practice are combined in a team-based learning approach. Assessment may then be individualized (i.e. all students may be given an individual assignment/test to assess what they have learned) or may be based on group performance.

In a seminal article on this topic, Slavin, Madden, and Leavey (1984) explored the effects of co-operative learning and individualized instruction on mainstreamed students. The authors concluded that co-operative learning programs resulted in increased sociometric status of students with disabilities. Students in co-operative learning groups also showed improvements with regard to teacher ratings of classroom behavior and self-confidence. There were no significant differences with regard to academic achievement for the students with disabilities, regardless of how they were taught. However, in an analysis of the full sample (i.e., students both with and without disabilities combined), students in the cooperative learning condition demonstrated significantly greater achievement than did those in the individualized instruction group. Subsequent research has repeatedly documented the benefits of co-operative learning for students both with and without disabilities (e.g., Hunt, Staub et al., 1994; Kamps, Barbetta, Leonard, & Delquadri, 1994; King-Sears, 1997). Equally important, the positive impact of co-operative learning on students' social interactions and self-concept development has also been documented (McDonnell, 1998).

Peer tutoring programs are a specialized form of co-operative learning. Students work together to learn academic content, with a typical student playing the role of tutor to a student with disabilities. Programs that have used students without disabilities as tutors have consistently proven to be effective in teaching a wide range of academic, self-help, communication and social skills to students with disabilities (King-Sears & Cummings, 1996; McDonnell, 1998). For instance, Kamps et al. (1994) investigated the impact of a classwide peer-tutoring program on reading skills and social interactions within classrooms that included students with autism. Results showed that reading skills and comprehension improved for students both with and without disabilities, and that social interactions between the students increased as well.

Instructional adaptations. Instructional adaptations have also been found to aid in the successful inclusion of students with developmental disabilities. For example, the provision of choice-making opportunities has been shown to increase engaged behavior and improve performance in children with disabilities (Dunlap et al., 1994; Moes, 1998). As an example, Downing et al. (1996) found that the most common instructional adaptation for three students with autism involved providing choices of activities, materials, groupings, and response methods. In one study (Moes, 1998), four children with autism demonstrated improved task accuracy, task productivity, and affect, as well as decreased disruptive behavior, when they were provided with opportunities to make choices regarding the order of task completion and the type of materials used.

When students are provided with alternatives to traditional written tasks, such as oral presentations, role plays, murals, or other creative projects, they are enabled to use their learning strengths (e.g. visual, auditory, tactile, and kinesthetic) rather than their deficits (Hay, Courson, & Cipolla, 1997). Muyskens and Ysseldyke (1998) found that active tasks increased the engaged behavior of students both with and without disabilities. Downing et al. (1996) also found that opportunities to move around the room, use tactile and kinesthetic learning for hands-on activities, and have multiple response options increased the participation of all three students with autism in their study. The option to use technology as an instructional adaptation has also been shown to increase achievement (Langone, 1998; Wisniewski & Alper, 1994). It can be used as an alternative instructional medium (e.g., for auditory and visual presentations) or as an alternative for student responding, such as occurs when students use augmentative communication devices, type stories, or present computer or slide show projects to demonstrate their knowledge in place of written assignments.

Parallel instruction. Differentiated (or parallel) instruction, in which curricula, goals, methods, pace, or conceptual level of instructional activities are varied according to individualized needs, has been shown to be one of the most effective methods for including students with disabilities (King-Sears, 1997; Maker, Nielsen, & Rogers, 1994; Sapon-Shevin, 1996). A number of case studies have demonstrated the effective use of parallel instruction (Downing et al, 1996; McDonnell, 1998; Ryndak et al., 1999). In all such cases, students were included in regular education classrooms and had assignments modified to their cognitive/skill levels. Parallel instruction increased other students' perceptions that their peers with

disabilities were *a part of the class* and *did work like others do*, leading to an enhanced sense of belonging (Schnorr, 1990).

Collaborative planning. To assist students with diverse learning needs in the context of general education classrooms, it has been found that collaborative planning between special education and general classroom teachers as well as other individuals involved with students with disabilities is essential (Glomb & Morgan, 1991; Hay et al., 1997; Hoerr, 1996; Langone, 1998; Soto, Müller, Hunt, & Goetz, 2001). Teaching techniques and assessment tools from both special and regular education can be combined to determine the best instructional adaptations for an individual child. General education teachers who have regular opportunities to collaborate and consult with professional peers show evidence of increased instructional skills as well as decreased tendencies to make referrals to special education (Karagiannis, Stainback, & Stainback, 1996; Soto et al., 2001). Research has also shown that students without disabilities can be resources for planning and should be included as members of educational planning teams (King-Sears, 1997; Staub et al., 1994). Frequently, students without disabilities who have grown up with a peer with disability can provide important information to new teachers about techniques, individual characteristics, and communication/behavioral needs.

Curriculum- and performance-based assessment. Programs that are tailored to students' learning strengths, rather than focussing solely on remediation, are likely to promote both academic achievement and engaged behavior for students with and without disabilities (Armstrong, 1994; Hearne & Stone, 1995; Jackson et al., 2000). For this to occur, curriculum/performance-based assessment must take place on an ongoing basis. This type of assessment allows teachers to determine whether their teaching methods have resulted in desirable achievement gains in their students, and to tailor progressive lessons/activities to students' strengths and needs (Ellison, 1992; Glomb & Morgan, 1991; King-Sears & Cummings, 1996; Plucker, Callahan, & Tomchin, 1996). The use of performance-based assessments has also been shown to significantly improve academic achievement for students both with and without disabilities (Dalton, Tinvan, Riley, Rawson, & Dias, 1995). Many authors have noted the value of diversifying assessment formats for all students, so that difficulties in one format (e.g. in written abilities) do not prevent students from demonstrating their knowledge and ability.

Community-based instruction. Community involvement and the use of the community as a natural setting for instruction has also been promoted in the inclusion literature (Langone, 1998; Tomlinson, Callahan, & Lelli, 1997). Students with developmental disabilities in particular have difficulties generalizing their learning to new settings (Alper & Ryndak, 1992; Cole & Meyer, 1991). Students without disabilities also benefit from opportunities to see the natural application of skills they have learned in the classroom -- for instance, the use of mathematics for a shopping trip, or the use of mapping concepts for hiking in a forest. Mentoring programs can serve to teach students the application of knowledge and skills to real life careers and settings. Embedded instruction, or the teaching of skills in natural daily activities, occurrences, and settings, has been shown to produce longer-lasting achievement outcomes for students with developmental disabilities (McDonnell, 1998).

Conclusion

The goal of this review was to provide a summary of research outcomes and available pedagogies related to the successful inclusion of students with developmental disabilities in elementary school classrooms. Research detailing the academic benefits for students with and without disabilities has continued to mount. Given that research has delineated such benefits, it is incumbent on educators to investigate and implement educational contexts and strategies that support effective inclusion. A large body of research has identified effective instructional options for inclusive classrooms, including the use of specific educational contexts (e.g., grouping strategies), techniques, curricula, and assessment methods. Use of these strategies appears to facilitate the academic and social success of students both with and without disabilities. In the coming years, research investigating the extent to which these contexts and strategies are implemented and their effects on the social and academic inclusion of both students with developmental disabilities and their typical classmates should continue.

References

- Alper, S., & Ryndak, D.L. (1992). Educating students with severe handicaps in regular classes. *The Elementary School Journal*, 92, 373-387.
- Altman, R. & Kanagawa, L. (1994). Academic and social engagement of young children with developmental disabilities in integrated and nonintegrated settings. *Education and Training in Mental Retardation and Developmental Disabilities*, 29, 184-193.
- Armstrong, T. (1994). *Multiple intelligences in the classroom*. Alexandria, VA: Association for Supervision and Curriculum and Development.
- Baker, E. T., Wang, M. C., & Walberg, H. J. (1994-1995). The effects of inclusion on learning. *Educational Leadership*, 52, 33-35.
- Brinker, R. P., & Thorpe, M.E. (1984). Integration of severely handicapped students and the proportion of IEP objectives achieved. *Exceptional Children*, 51, 168-175.
- Bulgren, J. A., & Carta, J. J. (1993). Examining the instructional contexts of students with learning disabilities. *Exceptional Children*, 59, 182-191.
- Cole, D. A., & Meyer, L. H. (1991). Social integration and severe disabilities: A longitudinal analysis of child outcomes. *Journal of Special Education*, 25, 340-351.
- Dalton, B., Tinvan, T., Riley, M. K., Rawson, P., & Dias, D. (1995). Revealing competence: Fourth-grade students with and without learning disabilities show what they know on paper-and-pencil and hands-on performance assessments. *Learning Disabilities Research and Practice*, 10, 198-214.
- Downing, J. E., Morrison, A. P., & Berecin-Rascon, M. A. (1996). Including elementary school students with autism and intellectual impairments in their typical classrooms: Process and Outcomes. *Developmental Disabilities Bulletin*, 24, 20-45.
- Dunlap, G., DePerczel, M., Clarke, S., Wilson, D., Wright, S., White, R., & Gomez, A. (1994). Choice making to promote adaptive behavior for students with emotional and behavioral challenges. *Journal of Applied Behavior Analysis*, 27, 505-518.
- Ellison, L. (1992). Using multiple intelligences to set goals. *Educational Leadership*, 50, 69-72.
- Farrell, P. (2000). The impact of research on developments in inclusive education. *International Journal of Inclusive Education*, 4, 153-162.
- Fisher, J. B., Schumaker, J. B., & Deshler, D. D. (1995). Searching for validated inclusive practices: A review of the literature. *Focus on Exceptional Children*, 28, 1-20.
- Glomb, N. K., & Morgan, D. P. (1991). Resource room teachers' use of strategies that promote the success of handicapped students in regular classrooms. *Journal of Special Education*, 25, 221-235.
- Greenwood, C. R., Carta, J. J., Kamps, D., & Arreaga-Mayer, C. (1990). Ecobehavioral analysis of classroom instruction. In S. Schroeder (Ed.), *Ecobehavioral analysis and developmental disabilities: The twenty-first century*. New York: Praeger.
- Hay, G. H., Courson, F. H., & Cipolla, J. M. (1997). Strategies for success in inclusive classrooms. *Reading & Writing Quarterly*, 13, 97-100.
- Hearne, D., & Stone, S. (1995). Multiple intelligences and underachievement: lessons from individuals with learning disabilities. *Journal of Learning Disabilities*, 28, 439-448.
- Helmstetter, E., Curry, C. A., Brennan, M., & Sampson-Saul, M. (1998). Comparison of general and special education classrooms of students with severe disabilities. *Education and Training in Mental Retardation and Developmental Disabilities*, 33, 216-227.
- Hoerr, T. R. (1996). Focusing on the personal intelligences as a basis for success. *NASSP Bulletin*, 80, 1-7.
- Hollowood, T. M., Salisbury, C. L., Rainforth, B., & Palombaro, M. M. (1994). Use of instructional time in classrooms serving students with and without severe disabilities. *Exceptional Children*, 61, 242-253.
- Hunt, P., & Farron-Davis, F. (1992). A preliminary investigation of IEP quality and content associated with placement in general versus special education classes. *Journal of the Association for Persons with Severe Handicaps*, 17, 247-253.
- Hunt, P., Farron-Davis, F., Beckstead, S., Curtis, D. & Goetz, L. (1994). Evaluating the effects of placement of students with severe disabilities in general education versus special classes. *Journal of the Association for Persons with Severe Handicaps*, 19, 200-214.
- Hunt, P., & Goetz, L. (1997). Research on inclusive educational programs, practices, and outcomes for students with severe disabilities. *Journal of Special Education*, 31, 3-29.

- Hunt, P., Staub, D., Alwell, M. & Goetz, L. (1994). Achievement by all students within the context of cooperative learning groups. *Journal of the Association for Persons with Severe Handicaps*, 19, 290-301.
- Jackson, L., Ryndak, D. L., & Billingsley, F. (2000). Useful practices in inclusive education: A preliminary view of what experts in moderate to severe disabilities are saying. *Journal of the Association for Persons with Severe Handicaps*, 25, 129-141.
- Kamps, D. M., Barbetta, P. M., Leonard, B. R., & Delquadri, J. (1994). Classwide peer tutoring: An integration strategy for students with autism and general classroom peers. *Journal of Applied Behavior Analysis*, 27, 49-61.
- Kamps, D. M., Leonard, B. R., & Greenwood, C. R. (1991). Ecobehavioral assessment of students with autism and developmental disabilities. In R. J. Prinz (Ed.), *Advances in behavioral assessment of children and families (Vol. 5)*. London, UK: Jessica Kingsley Publishers Ltd.
- Karagiannis, A., Stainback, W., & Stainback, S. (1996). Rationale for inclusive schooling. In S. Stainback & W. Stainback (Eds.), *Inclusion: A guide for educators* (pp. 17-28). Baltimore: Paul H. Brookes Publishing Co.
- Kauffman, J. M. (1993). How we might achieve the radical reform of special education. *Exceptional Children*, 60, 6-16.
- King-Sears, M. E. (1997). Best academic practices for inclusive classrooms. *Focus on Exceptional Children*, 29, 1-24.
- King-Sears, M. E., & Cummings, C. S. (1996). Inclusive practices of classroom teachers. *Remedial and Special Education*, 17, 217-225.
- Langone, J. (1998). Managing inclusive instructional settings: technology, co-operative planning, and team-based organization. *Focus on Exceptional Children*, 30, 1-15.
- Logan, K.R., Bakeman, R., & Keefe, E.B. (1997). Effects of instructional variables on engaged behavior of students with disabilities in general education classrooms. *Exceptional Children*, 63, 481-497.
- Logan, K. R., & Malone, D. M. (1998). Instructional contexts for students with moderate, severe, and profound intellectual disabilities in general education elementary classrooms. *Education and Training in Mental Retardation and Developmental Disabilities*, 33, 62-75.
- Maker, C. J., Nielsen, A. B., & Rogers, J. A. (1994). Giftedness, diversity, and problem-solving. *Teaching Exceptional Children*, Fall, 4-19.
- McDonnell, J. (1998). Instruction for students with severe disabilities in general education settings. *Education and Training in Mental Retardation and Developmental Disabilities*, 33, 199-215.
- McDonnell, J., Thorson, N., & McQuivey, C. (2000). Comparison of the instructional contexts of students with severe disabilities and their peers in general education classes. *Journal of the Association for Persons with Severe Handicaps*, 25, 54-58.
- Merriam-Webster dictionary (pocketbook edition)*. (1978). New York, NY: Merriam-Webster.
- Moes, D.R. (1998). Integrating choice-making opportunities within teacher-assigned academic tasks to facilitate the performance of children with autism. *Journal of the Association for Persons with Severe Handicaps*, 23, 319-328.
- Muyskens, P., & Ysseldyke, J. E. (1998). Student academic responding time as a function of classroom ecology and time of day. *Journal of Special Education*, 31, 411-424.
- Peltier, G. L. (1997). The effect of inclusion on non-disabled children: A review of the research. *Contemporary Education*, 68, 234-238.
- Plucker, J. A., Callahan, C. M., & Tomchin, E. M. (1996). Wherefore art thou, multiple intelligences? Alternative assessments for identifying talent independently diverse and low-income students. *Gifted Child Quarterly*, 40, 81-88.
- Ryndak, D. L., Morrison, A. P., & Sommerstein, L. (1999). Literacy before and after inclusion in general education settings: A case study. *Journal of the Association for Persons with Severe Handicaps*, 24, 5-22.
- Saint-Laurent, L., Fournier, A. L., & Lessard, J. C. (1993). Efficacy of three programs for elementary school students with moderate mental retardation. *Education and Training in Mental Retardation and Developmental Disabilities*, 28, 333-348.
- Salisbury, C. L., Gallucci, C., Palombaro, M. M., & Peck, C. A. (1995). Strategies that promote social relations among elementary students with and without severe disabilities in inclusive schools. *Exceptional Children*, 62, 125-137.

- Sapon-Shevin, M. (1996). Full inclusion as disclosing tablet: Revealing the flaws in our present system. *Theory Into Practice, 35*, 35-41.
- Schnorr, R. F. (1990). "Peter? He comes and goes...": First graders perspectives on a part-time mainstream student. *Journal of the Association for Persons with Severe Handicaps, 15*, 231-240.
- Sindelar, P. T., Smith, M. A., Harriman, N. E., Hale, R. L. & Wilson, R. J. (1989). Teacher effectiveness in special education programs. *Journal of Special Education, 20*, 195-207.
- Slavin, R. E., Madden, N. A., & Leavey, M. (1984). Effects of cooperative learning and individualized instruction on mainstreamed students. *Exceptional Children, 50*, 434-443.
- Soto, G., Müller, E., Hunt, P., & Goetz, L. (2001). Critical issues in the inclusion of students who use augmentative and alternative communication: An educational team perspective. *Augmentative and Alternative Communication, 17*, 62-72.
- Staub, D. & Peck, C. A. (1995). What are the outcomes for non-disabled students? *Educational Leadership, 52*, 36-40.
- Staub, D., Schwartz, I. S., Gallucci, C., & Peck, C. A. (1994). Four portraits of friendship at an inclusive school. *Journal of the Association for Persons with Severe Handicaps, 19*, 314-325.
- Tomlinson, C. A., Callahan, C. M., & Lelli, K. M. (1997). Challenging expectations: Case studies of high-potential, culturally diverse young children. *Gifted Child Quarterly, 41*, 5-17.
- Wang, M. C., & Baker, E. T. (1985-1986). Mainstreaming programs: Design features and effects. *Journal of Special Education, 19*, 503-521.
- Williams, L. J., & Downing, J. E. (1998). Membership and belonging in inclusive classrooms: What do middle school students have to say? *Journal of the Association for Persons with Severe Handicaps, 23*, 98-110.
- Wisniewski, L., & Alper, S. (1994). Including students with severe disabilities in general education settings. *Remedial and Special Education, 15*, 4-13.