The purposes of this organization shall be to advance the education and welfare of persons with developmental disabilities, research in the field of education and training, and legislation needed to help accomplish these goals. The Division shall encourage and promote professional growth, research, and the education of persons with developmental disabilities, competency of educators in this field, public understanding of developmental disabilities, and dissemination and utilization of research findings.
Education and Training in Developmental Disabilities

Editorial Policy

Education and Training in Developmental Disabilities focuses on the education and welfare of persons with developmental disabilities. ETDD invites research and expository manuscripts and critical review of the literature. Major emphasis is on identification and assessment, educational programming, characteristics, training of instructional personnel, habilitation, prevention, community understanding and provisions, and legislation.

Each manuscript is evaluated anonymously by three reviewers. Criteria for acceptance include the following: relevance, reader interest, quality, applicability, contribution to the field, and economy and smoothness of expression. The review process requires two to four months.

Viewpoints expressed are those of the authors and do not necessarily conform to positions of the editors or of the officers of the Division.

Submission of Manuscripts

1. Manuscript submission is a representation that the manuscript is the author’s own work, has not been published, and is not currently under consideration for publication elsewhere.
2. Manuscripts must be prepared according to the recommendations in the Publication Manual of the American Psychological Association (Fifth Edition, 2001). Laser or high density dot printing are acceptable.
3. Each manuscript must have a cover sheet giving the names and affiliations of all authors and the address of the principal author.
4. Graphs and figures should be originals or sharp, high quality photographic prints suitable, if necessary, for a 50% reduction in size.
5. Five copies of the manuscript along with a transmittal letter should be sent to the Editor: Stanley H. Zucker, Special Education Program, Box 872011, Arizona State University, Tempe, AZ 85287-2011.
6. Upon receipt, each manuscript will be screened by the editor. Appropriate manuscripts will then be sent to consulting editors. Principal authors will receive notification of receipt of manuscript.
7. The Editor reserves the right to make minor editorial changes which do not materially affect the meaning of the text.
8. Manuscripts are the property of ETDD for a minimum period of six months. All articles accepted for publication are copyrighted in the name of the Division on Developmental Disabilities.
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Manuscripts Accepted for Future Publication in Education and Training in Developmental Disabilities
Manuscripts Accepted for Future Publication in Education and Training in Developmental Disabilities

December 2009

It all depends on where you stand: Differences between employee’s and supervisor’s evaluations of work performance and support needs. Kyle Bennett, Michael Frain, Michael P. Brady, Howard Rosenberg, and Tricia Surinak, Center for Autism & Related Disabilities, Florida Atlantic University, 777 Glades Rd., Boca Raton, FL 33431.


Impacts of family support in early childhood intervention research. Anna Friend, Jean Ann Summers, and Ann P. Turnbull, Beach Center on Disability, University of Kansas, 1200 Sunnyside Avenue, 3111 Haworth Hall, Lawrence, KS 66045.

Review of teacher involvement in the applied intervention research for children with autism spectrum disorders. Russell Lang, Wendy Machalicek, Mark O’Reilly, Jeff Sigafoos, Mandy Rispoli, Karrie Shogren, and April Regester, 3901 Burning Oak, Side B, Austin, TX 78704.

Comparison of self, other, and subjective video models for teaching daily living skills to individuals with developmental disabilities. Toni Van Laarhoven, Leslie M. Zurita, Jesse W. Johnson, Katie M. Grider, and Kristin L. Grider, Department of Teaching & Learning, Northern Illinois University, Dekalb, IL 60115-2854.


Fourth grade outcomes of children with a preschool history of developmental disability. Christine E. F. Delgado, Department of Psychology, Child Division, P.O. Box 249229, Coral Gables, FL 33124-0751.


Acquisition and generalization of chained tasks taught with computer based video instruction to children with autism. Kevin Ayres, Amy Maguire, and Desiree McClimon, University of Georgia, College of Education, Department of Special Education, 537 Aderhold Hall, Athens, GA 30602-7153.

Functional curriculum models for secondary students with mild mental impairment. Emily C. Bouck, 5146 BRNG Hall, Purdue University, 100 N. University Street, West Lafayette, IN 47907.

Autism spectrum disorders and sibling relationships. Julia Beyer, 104 Longhill Lane, Chatham, NJ 07928.

Field test of a method to assess work task preferences. Virginie Cobigo, Diane Morin, and Yves Lachapelle, 141 Hillcrest, app. 1, Montreal, QC H8R 1J3 CANADA.
Best Practices in Cognitive Disabilities/Mental Retardation, Autism, and Related Disabilities

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On October 8-10 2008, the Council for Exceptional Children Division on Developmental Disabilities (DDD) sponsored its “Practitioner-Focused” Eleventh International Conference: Best Practices in Cognitive Disabilities/Mental Retardation, Autism, and Related Disabilities. The conference was held at the Sheraton San Diego Hotel & Marina. The DDD Board of Directors decided to devote this issue of Education and Training in Developmental Disabilities to conference papers. The conference brought together educators from school and college classrooms from all over the world. The conference included pre-conference training institutes and strands on assistive technology, autism/autism spectrum disorder, cognitive disability-evidence based practices, mild mental retardation, transition, multiple disabilities, and paraprofessionals. The conference provided many parents, teacher educators, researchers, teachers, and other practitioners an opportunity to gather to learn the most current information related to providing services for individuals with mental retardation, autism, and other developmental disabilities.

This special issue can enable those who attended the conference to see expanded papers, prepared by presenters, and also give those who were unable to attend an opportunity to benefit from the thoughtful work done by conference participants.

Presenters were asked to submit papers based on their conference presentations. Papers submitted were reviewed by the Guest Editors who selected the papers for publication. We think the selection of papers represents an interesting assortment of topics and formats ranging from discussion papers to database research to descriptions of classroom techniques. The papers selected do not necessarily represent all the topics covered at the conference but they do give a good idea of the variety and quality of the presentations. We would like to thank those authors who submitted papers for their efforts in making this Special Conference Issue possible.

The first article was based on the presentation entitled “Multiculturalism, Religion and Disability: Implications for Special Education Practitioners” by A. Brooke Blanks and J. David Smith. It examines the fact that educators are often reluctant to discuss religious beliefs when working with students with developmental and intellectual disabilities and their families. It asks, however, whether this limits our ability to fully understand the experience of living with disability. It discusses religious beliefs, traditions, and practices that are important to teacher education and as part of the zeitgeist of working with children and their families. It asks, however, whether this limits our ability to fully understand the experience of living with disability. It discusses religious beliefs, traditions, and practices that are important to teacher education and as part of the zeitgeist of working with children and their families.

In the second article, the authors investigated how individuals with developmental disabilities in children’s books are portrayed to young readers. In “Literature and the Portrayal of Developmental Disabilities,” Tina Taylor Dyches, Mary Anne Prater, and Melissa

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Leininger examined 41 children’s books that qualified for the 2006 or 2008 Dolly Gray Children’s Literature Award sponsored by the Division of Developmental Disabilities (DDD) of the Council for Exceptional Children (CEC) and the Special Needs Project. The individuals with disabilities portrayed in the books reviewed were analyzed and categorized across four themes: “characterization of the individual with developmental disabilities, relationships between the character with developmental disabilities and others, changes in characters without developmental disabilities, and special topics in the field of developmental disabilities.” The themes are described and analyzed precisely based on how the individuals are portrayed in the books. Individual books are cited providing examples of the themes identified. The portrayal of individuals with developmental disabilities is discussed from a variety of contexts and compared to two earlier studies. Recommendations are also made to future authors and to educators.

“Evidence-Based Social Skills Interventions for Children with Autism: A Meta-analysis”, authored by Peishi Wang and Anne Spillane, provides a synthesis of research studies published in the last ten years on interventions to increase social skills for children and adolescents with ASD. Additionally, the article examines the outcomes of these studies and evaluates whether a given intervention meets the criteria for evidence-based practice. Of the 38 studies included in this review, 36 were single subject research studies and 2 were group experimental studies; results varied widely both between intervention types, and with the different studies within each intervention type. While social stories, peer-mediated, and video-modeling interventions all met the criteria for evidence-based, a closer look at the percentage of non-overlapping data points reveals that only video-modeling meets criteria for being evidence-based as well as demonstrating high effectiveness as an intervention strategy. The article concludes with a discussion on the implications for practice, which is of particular importance for practitioners who utilize video-modeling to teach social skills to students with ASD.

With the large number of students with autism entering the educational system, the need for empirically supported treatment (EST) in the classroom, and special education teachers with training in autism and ESTs, is becoming critical. In their article, “Learn by Doing: A Collaborative Model for Training Teacher-Candidate Students in Autism”, Michael B. Ruef, Nicolette Nefdt, Daniel Openden, Sharon Elmensdorp, Kathleen C. Harris, and Suzanne Robinson describe a collaborative model between two universities aimed at (1) providing teacher-candidate graduate students training in ESTs for children with autism and (2) providing empirically supported treatments to local families with children with autism. Pivotal response treatment (PRT) was the treatment selected for inclusion in the teacher training program: PRT is a comprehensive service delivery model that uses both a developmental approach and applied behavior analysis (ABA) procedures and aims to provide opportunities for learning within the context of the child’s natural environment. The article provides an overview on the three components of the model: (1) the community-based service delivery system, (2) the Masters/special education credential program and (3) training in PRT. Issues relating to student, family and university participation are discussed along with possible solutions and future directions. The authors conclude the article with a discussion on the benefits of the model, particularly with respect to producing highly qualified teachers in autism, and the implications for including autism training in teacher training programs.

In their article entitled “Research-Based Techniques for Teaching Early Reading Skills to Students with Intellectual Disabilities,” Jill Allor, Patricia Mathes, Tammi Champlin, and Jennifer Cheatham discuss the orchestrated integration of key skills and strategies that are explicitly linked to meaning. These strategies are organized according to the major components of reading instruction: oral language and vocabulary, phonological awareness, phonics and word recognition, fluency and comprehension. The article describes key techniques used in examining effective methods for teaching students with intellectual disabilities to read.

The next article by Emily Bouck, Laura Basette, Teresa Taber-Doughty, Sara Flanagan, and Kathryn Szwed. It examines the effectiveness of pentop computers in teaching multi-
plication facts to middle school students with intellectual disabilities. A multiple probe design was used to assess the progress of students using this intervention. The results indicated that students using a pentop program improved in the percentage of correct math facts completed. Limitations and suggestions for future research are included.

The natural instructors to teach self-care and domestic skills to children with autism are their parents. In their article, “Effectiveness of Parent and Therapist Collaboration Program (PTCP) for Teaching Self-Care and Domestic Skills to Individuals with Autism,” Atilla Cavkaytar and Elena Pollard present the results from a study they conducted to evaluate the effectiveness of the Parent and Therapist Collaboration Program (PTCP). The researchers developed, implemented and evaluated the PTCP to determine its effectiveness in helping three parents, in collaboration with their child’s habilitation therapist, to successfully instruct their children with autism in the acquisition of specific self-care and domestic skills. The parents and therapists were trained using the “Teaching Self-Care and Domestic Skills Manual” prior to the home-based instruction. The authors describe and discuss the results of their study in terms of each mother’s success in teaching the self-care and domestic skills to their child with autism and its relation to the involvement of the habilitation therapist.

Instructional rubrics can be an effective assessment tool in directing students’ learning. In their article, “Effects of Instructional Rubrics on Class Engagement Behaviors and the Achievement of Lesson Objectives by Students with Mild Mental Retardation and Their Typical Peers,” EunJung Lee and SoHyun Lee investigated the use and effectiveness of instructional rubrics on students’ class engagement behaviors and their achievement of lesson objectives. Their investigation was conducted in three classrooms during Korean language instruction. The participants in each class consisted of one female teacher, and one male student with mild cognitive disabilities and his general education classroom peers. All participants were trained on the rubrics that targeted standard-based lesson objectives (i.e., the original and modified ones) and an on-task rubric application form designed for the students with mild cognitive disabilities. Class engagement behaviors were measured using partial-interval recordings and the achievement of lesson objectives was determined through self-assessment. The investigators provide a thorough discussion of the positive results that were found related to class engagement behaviors of the students with cognitive disabilities, and the achievement of lesson objectives for all student participants.

Literacy is one of the most important educational goals yet educators of students with severe and/or multiple disabilities are often in search of strategies to develop literacy skills. A review of the research on literacy instruction indicates that students with significant intellectual disabilities and visual impairments are underrepresented. In their article, “Increasing Comprehension of Students with Significant Intellectual Disabilities and Visual Impairments during Shared Stories”, Pamela J. Mims, Diane M. Browder, Joshua N. Baker, Angel Lee, and Fred Spooner explore read-aloud, or shared stories, as a potential intervention. Shared stories have been shown to help increase emerging literacy skills in students with significant intellectual disabilities. In this study, the least-to-most prompt system was used to promote listening comprehension, a critical literacy development skill, during shared stories for two students with significant intellectual disabilities. In this study, the least-to-most prompt system was used to promote listening comprehension, a critical literacy development skill, during shared stories for two students with significant intellectual disabilities. Outcomes indicate that both students improved on the correct number of responses to comprehension questions and interestingly, one of the students demonstrated an ability to generalize responses across people and settings as well as maintain results. The article concludes with suggestions from the authors on applying this intervention to practice and a discussion on directions for future research.

Parents, who wanted to improve collaboration with their children’s school, and provide meaningful information (e.g., through scrapbooks and student profiles) about their children with disabilities, helped to initiate the development of the Family Assessment Portfolio (FAP). In the article, ‘Evaluating the Acceptability and Effectiveness of Family Assessment Portfolios,’ Hedda Meadan, James R. Thompson, Mayumi Hagiwara, Julie Herold, Sarah Hoekstra, and Samantha Manser first describe
the FAP, which was developed and enhanced to include multimedia materials (e.g., movies and webpage), then report the purpose of their study which focuses on evaluating the acceptability and effectiveness of the FAPs. The participants of this study were parents, FAP facilitators, and pre-service and in-service teachers. These three groups provided feedback about the goals, procedures and outcomes of the FAP through questionnaires and/or interviews after having some experience with or exposure to the FAPs. Results and discussion of this study center on supporting the social validity of the FAP as a means to communicate meaningful information about a child. The authors provide the perceptions of and suggestions for the FAPs as offered by each group of participants.

The conference provided researchers and educators with the opportunity to explore current research, topical issues and best practices relating to mental retardation, autism, and other development disabilities. We hope readers of this Best Practices Special Conference Issue find the information valuable and timely.
Multiculturalism, Religion, and Disability: Implications for Special Education Practitioners

A. Brooke Blanks and J. David Smith
University of North Carolina at Greensboro

Abstract: Religious beliefs permeate many aspects of culture. Often, however, educators are reluctant to discuss religious beliefs when working with children with developmental and intellectual disabilities and their families. Ignoring the salience of religious teachings about the nature and meaning of disabilities as they relate to both individuals and society, however, limits the opportunity to fully understand the experience of living with disability. Discussion of religious beliefs, traditions, and practices should be incorporated into teacher education, and should be part of the zeitgeist of working with children and families. This article examines images of and teachings about disabilities in three major world religions widely practiced in the United States; Judaism, Christianity, and Islam.

Spirituality and religion are important to millions of individuals across all cultures. Until recently, however, the spirituality of people with disabilities has been largely ignored by both communities of faith and secular social service and educational systems. (Avery-Wall, 2006; Rogers-Dulan, 1998; Stolberg, 2008) Neglecting the importance of religious belief and experience in the lives of many individuals with disabilities and their families, may imply a view of their innate humanity that is incomplete or less complex than other people (Swinton, 1997). Spiritual beliefs may greatly influence perceptions of people with disabilities, of themselves, others, and the world (Dellassoudas, 2000). Multicultural education and programs designed to build cultural competence must necessarily include instruction in religious practices and spiritual beliefs (Richards, Browne, & Forde, 2007). There is a growing body of literature in the helping professions around training practitioners to consider and understand the influence of religion on people with disabilities and their families as part of a system of care (Benjamins, 2005; Forster, McColl, & Fardella, 2007; Hurst, 2007; Selway & Ashman, 1998). Unfortunately, special education has thus far largely neglected considering religion as part of an evolving commitment to multicultural practice, and building cultural competence among students in teacher education programs.

Religion in the Modern World

Only recently has science advanced to the point where humans have a reasonably broad ability to mediate and manage the impact of the natural world in ways that are predictable and stable. People in the so-called developed world tend to believe that they have a fairly high degree of control over their health, lives, and destiny. We now know that vitamin A deficiency can cause blindness and that diet can prevent it. We know that the cognitive impact of phenylketonuria can be avoided through dietary manipulation and control. Technologies now allow 50 year old women to give birth to healthy babies and people without legs can be competitive runners (Robinson, 2008). Prior to the time when the degree of control that we can now exert over the natural and physical world was possible, people largely understood the world only as controlled by unseen, supernatural forces. Religion served to explain many of the mysteries of the natural world. The power to explain the unknown is also the power to control behav-

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ior. Religious teaching often defines what people should believe to be true about the world around them, and it prescribes how people should act in accordance with these beliefs (Goldberg, 2006). Religious beliefs have been the foundations of civilizations. Public and private behaviors were usually governed by the codes of conduct described in religious law. It is relatively impossible to parse religious and civil leadership in ancient (and not so ancient) cultures. Even today despite public discourse around the need to maintain a secular, civil society in this country and elsewhere in the world, it is naïve to underestimate the extent to which religious thought influences thinking on a wide variety of issues, including disability. To deny or ignore religious influences on conceptualizations of disability is to overlook a profound aspect of the human experience and our understanding of what it means to have and live with a disability. As special educators and researchers we are just beginning to explore the relationships between the influence of religion on cultural and personal understandings of disability.

Religion in America

Americans often point to the separation of church and state mandated by the First Amendment as proof that we live in a secular society. However, momentary consideration of the following examples indicates that religious thought clearly pervades our thinking. An obvious example is the continued legal debate over the teaching of intelligent design (Slack, 2007). Religious beliefs have always pervaded attitudes and policies on a variety of controversial issues. The deliverance narratives of the Hebrew and Christian traditions certainly influenced the debates around Civil Rights and desegregation (Cone, 1975; King, 1968). Another example is the interaction between religion and culture that is evident in public school vacation calendars. Without fail, extended periods of vacation coincide with major Christian holidays. For an example from public policy, objections to gay marriage are fundamentally religious objections. Religion matters in modern America and yet we rarely explore how it relates to beliefs about students with disabilities. Understanding what religions say about disability can deepen the ability to understand how to improve the services provided to students with intellectual and developmental disabilities and their families.

Religion and Disability

With these issues and ideas in mind, we can begin to explore images of disability in three major world religions. The intent here is simply to argue that multicultural teacher preparation for special educators is incomplete unless it includes an examination of religion. It is in the best interests of our students and their families that we train and expect special educators to reflect on the ways religious ideas influence practice. We make no claims that our research on religious images of disability is comprehensive. Choices about what information to include and exclude in this discussion were made largely on the basis of the big ideas available in a survey of the literature. What we have tried to do is gather sufficient information to open the conversation. With this goal in mind, this article only provides an introduction to important scholarly work in disability studies and religious studies. Our hope is that this introduction will inspire our colleagues in special education to further explore the scholarly work represented here and continue to reflect on issues around religion, disability, and special education.

Religion in this discussion is limited to the three Abrahamic traditions: Judaism, Christianity, and Islam. The simple criteria for this project were (a) religions with which the authors have sufficient familiarity to comprehend the scholarly work available, and (b) religions that are prevalent enough in the United States that most teachers will have at least heard of them and have an elemental sense of their belief systems.

Abrahamic Traditions

Judaism, Christianity, and Islam fall under the umbrella of the Abrahamic traditions because all three recognize the historical figure Abraham and his descendants as central and original figures in the culture of the faith. There is significant overlap in the sacred texts of each faith and in their treatment of people with disabilities. Similarly, each faith is inconsistent and seemingly contradictory in the images of
disability that are conveyed through sacred text and teachings. When viewed as literary works and policy documents it is evident that they have evolved and changed over time as a function of social need and cultural change. It is easy to see that contradictions in teachings are the result of changes to documents that prescribed behavior and functioned as civil law for many centuries. However, the lingering consequences of these inconsistencies are ambivalence and confusion among teachings about the meaning and origin of disabilities as well as the ways in which people with disabilities should be treated. On one hand there are historical narratives connecting disability to evil. However, people with disabilities are also held up as objects of pity and function as opportunities for the faithful to demonstrate their own goodness through acts of charity (Rose 1997). Recently, however, religious institutions and spiritual communities have begun to understand that individuals with intellectual and developmental disabilities have spiritual lives and religious needs that are fully their own, and quite similar to the needs of individuals without disabilities (Collins, Epstein, Rice, & Lowe, 2003; Swinton, 1997; Yong, 2007).

**Judaism**

The Hebrew bible’s central character, Yahweh, a single deity, is responsible for conditions of disability and this is a major shift from previous polytheistic traditions in ancient Mesopotamia (Hentrich, 2007; Walls, 2007). In the Yahweh stories, disabilities are generally negative degradations of the perfect body God bestowed upon Adam in the creation story. As such, disabilities are perceived as divine punishments. People with disabilities are considered impure and they carry the danger of bringing pollution to their surroundings and other people (Hentrich). The emphases on perfection surrounding the ritual acts involved in making sacrifices as offerings to God as prescribed in Hebrew scripture conflate the ideas of pollution and disability (Melcher, 2007). Jewish law describes in detail the need for perfection in both the sacrificial object and the preparer of the sacrifice (Miles, 2002a). Although there are legal prohibitions about who can perform certain kinds of ritualistic tasks, such as an insistence that the priest who examines an animal before sacrifice have clear vision, there is no scriptural precedent for excluding a man with blindness from memorizing and speaking the sacred texts (Miles, 2002b; Wertlieb, 1988). The David stories, however, communicate more negative images of disability and the roles for people with disabilities in society. David is understood to stand for an idealized man in ancient Israelite culture (Hentrich). As David moves to depose Saul in order to establish the dynastic house of David, Saul’s son Ishboshet is killed, yet his other son, Meribaal, is spared. Apparently, Meribaal is no threat to David because Meribaal has a physical disability that legally excludes him from assuming the throne (Hentrich; Schipper, 2006). Although the historical record is unclear as to the exact nature of Meribaal’s disability, he is described as “lame” or “crippled”. (Hentrich). The legal basis of Meribaal’s inability to rule is unclear. It is possible that either purity laws associated with religious practice or civil laws about physical disabilities were responsible for his disqualification. What is important in the story is the fact that David did not kill Meribaal because he was perceived as no threat because of his disability. The Meribaal story communicates a status of reduced manhood and other-ness resulting from physical disabilities.

The exclusion of persons with disabilities from the temple also appears to originate in the David stories. As David moves to conquer Jerusalem, the defending army surrounds the city with soldiers who have disabilities either congenital or resulting from injuries or illness. The tactical reasons for this action are unclear but some scholars suggest that cultural taboos in ancient Jerusalem would have caused David to hesitate to engage with such a force for fear of pollution (Heller, in Hentrich, 2007). A more positive interpretation offered by Brunet (in Hentrich) is that the city was surrounding itself with a “moral wall” which David would not dare to attack in fear of divine vengeance that would convey disabilities upon David’s soldiers. David, however, continued undeterred and after assuming power in Jerusalem banned people with disabilities from the temple (Hentrich). It is unclear whether David was exacting revenge on those who opposed him or if he was concerned...
about issues of purity and pollution (Henrich). In practical terms, the David narratives of exclusion have continued to influence religious practice. However, as Judaism evolved over time and expanded geographically, the emphasis on physical perfection became secondary to an emphasis on intellectualism (Abrams, 1998). The shift mediated negative attitudes toward people with disability. Jewish philosophers came to believe that physical perfection (as they defined it) was not required to have a relationship with God (Abrams). Consequently, people with certain disabilities, particularly blindness, were gradually brought back into the temple and began to assume important roles. Modern Jewish scholars and theologians continue to revisit and reinterpret sacred texts as they work to become more inclusive and welcoming to Jews with diverse physical and cognitive abilities (Artson, 2006). The Jewish community is re-examining ideas about what constitutes wholeness and what ways of being are considered defects. Artson raises important questions about who among us is truly free of human shortcomings. Arbitrary decisions about what is and is not acceptable to God it is argued, distract Jews from a primary responsibility to "glorify the Torah and to testify to God’s sovereignty as we might" (Artson). In the modern era, the words “as we might” recognize the diversity of human experience and promote inclusion of all Jews, including those with intellectual and developmental disabilities.

Christianity

As the second of the Abrahamic religions, Christianity builds from the history of the Hebrew bible as the Old Testament and becomes a separate tradition with the birth of Jesus. The New Testament contains stories of what happened during and after his birth. It is important to recognize that ancient Christianity inherited the historical perspectives of its Jewish roots and built upon these themes to serve social and political ends (Miles, 2001). Disability serves a markedly different literary function in the New Testament than in the Hebrew bible. Rather than simply functioning as punishment and a visible reminder of God’s wrath, people with disabilities become the media through which God communicates messages of mercy and power.

A story in the book of John has Jesus clarify the meaning of disability. Jesus explains that people are not born with disabilities because of sin but instead they are born with disabilities in order to provide opportunities for God to demonstrate his power (Miles, 2002b). This is a very different message then the one conveyed in Exodus which teaches that children may bear the weight of their parents’ sins which are manifested as disabilities (Miles, 2001).

The Jesus stories are narratives of social reform (Wills, 2006) and not exclusively focused on improving the lives of people with disabilities. Hebrew rules around issues of impurity and pollution (originating in God’s mandates about the priesthood to Aaron and his descendants and furthered through the David narratives) expanded to marginalize people with disabilities in multiple aspects of social life (Bishop, 1995). Stories of Jesus healing people with disabilities in public are also stories of crossing social boundaries and building community (Senior, 1995).

Christian narratives have often served as the basis of civil law and social norms in Western culture since Roman occupiers began to convert around 200 A.D. The New Testament has been interpreted and reinterpreted on a regular basis for centuries and the treatment of people with disabilities has varied with these changes. Since 400 A.D. various Christian theologians have offered interpretations of intellectual disabilities as evidence that immorality is inheritable (Miles, 2001). Fifteen centuries later similar arguments were used to support the eugenics movement in the United States and elsewhere, including Nazi Germany. Sixteenth century reformer, Martin Luther made remarks about drowning children with disabilities based on his belief that these were not actually human children but rather incarnations of the devil (Miles). Not all theological interpretations of disability in Christianity are so negative. Indeed many people with disabilities were treated far more kindly by social service institutions run by the church than they would have been in state operated prisons or asylums. The overwhelming message of the Jesus narratives, however, serves to set people with disabilities apart from
the rest of society until acted upon by God. Implicit in the message is the idea that those who are not healed or do not live well with a disability are in some way removed from God and therefore from the community.

Islam

Of the Abrahamic traditions, Islam is the most recent and in many ways the most inclusive of people with disabilities. The word Islam means “submission to the will of Allah”. Muslims believe that we are each born in the body that Allah intends us to have. Allah is perfect as his work. Therefore, to dishonor or exclude people with disabilities from civil society or religious life is to disrespect and disregard the will of Allah (Miles, 2002b). Health is benevolence from Allah, however, disease and disability are not expressions of divine punishment or wrath. Rather, disability tests individuals and in the process allows opportunities for atonement (Rispler-Chaim, 2007). Disabilities are considered normal aspects of the human experience by the Qu’ran and Islamic law as evidenced by the prescriptions for how and to what extent individuals with disabilities can and should participate in religious and secular life (Miles, 2001; Rispler-Chaim). The Hebrew Bible and Christian Old Testament describe the ways and extents to which participation in religious and social life should be limited or restricted for people with disabilities. Islamic law and the Qu’ran call explicitly for the inclusion of people with disabilities in social life through emphatic denials of ideas about contagion or pollution associated with disability (Rispler-Chaim). Participation in religious life and activities are required of all Muslims, with or without disabilities. Accommodations are offered to people with disabilities to make their participation in religious life possible to the greatest extent. They are also excused without consequence from religious requirements that are simply beyond an individual’s ability. The individual is clearly not defined socially or religiously by his disability (Miles). In marked contrast to its Abrahamic predecessors, Islam treats people with disabilities as fully participating members of the social and spiritual community (Miles).

Perhaps more so than the other two Abrahamic traditions, the Qu’ran and its teachings also function as the basis for modern civil law in Islamic societies. As far back as the seventh century Muslim courts were debating whether or not men with intellectual disabilities should be allowed to own property. Arguments around the issue would be considered progressive today. A man who may not manage property because of an intellectual disability should still be allowed to try to do so. On the other hand is it the responsibility of the community to prevent potential harm from coming to this man by protecting him from the risk of losing property as a result of his inability to manage it? The debate tends to give more weight to the idea that to deny a man the right to own property is a greater harm than would come to him were he to lose his property (Miles). Additionally, part of honoring the will of Allah, according to the Qu’ran, is the idea that people in a community are responsible for each other because each person is created by Allah and should be honored as such. A practical consequence of this teaching is an enhanced sense of community responsibility for providing people with disabilities with what they are unable to provide for themselves (Miles). Contradictions exist however, between Qu’ranic teachings that Allah is perfect and therefore people are created as Allah intends them to be, and teachings that “for each illness, Allah has provided a remedy” (Miles). In practical terms, modern Muslims may find themselves confused as to the appropriateness of interventions that can alter a state of disability. Such acts might be interpreted as an act of rebellion or an avoidance of a trial Allah has intended for the person.

Overall, the Qu’ran and Islamic law are most remarkable in the relative little they say about people with disabilities compared to the other Abrahamic traditions. As previously discussed, images of disability are used repeatedly in the Hebrew and Christian Bibles as representations of God’s wrath, punishment for sins, metaphors for turning away from God, or to provide opportunities for demonstrations of divine benevolence and greatness through miraculous healing. These narratives are conspicuously absent from Islamic writings (Miles, 2001; Rispler-Chaim, 2007). Beyond efforts to clearly articulate ideas of inclusion and civil protection, relatively little else is said about people with disabilities. A possible rea-
son for this absence is an effort to normalize disability and to think of abilities and disabilities as one aspect of human condition within the range of possible characteristics bestowed by Allah. As such, people with disabilities are full members of the community who may have specific needs that must be met in order to fulfill Allah’s will but whose needs do not marginalize them or limit their access to the full experience of living in community with other Muslims (Miles).

Personal Religious and Spiritual Experiences

As interesting as the history of religion and the images of disability presented therein are, none of it matters if disconnected from the lived experiences of individuals with disabilities and their families. As has been examined, there is a long tradition of ambiguity about the meaning of disability and the place individuals with disabilities have in a culture based on religious history. On one hand rarely have individuals with disabilities been allowed to articulate their own needs and faith experiences as fully functioning members of spiritual communities. Recently, however, religious institutions have begun to understand that individuals with intellectual and developmental disabilities have spiritual lives and religious needs that are fully their own and quite similar to the needs of individuals without disabilities (Collins et al., 2003; Swinton, 1997; Yong, 2007).

Religious beliefs, spirituality, and faith traditions provide structure that individuals with disabilities (and others) use to create meaning in their lives. The religious experiences of individuals with disabilities and the religious experiences of their families or other caregivers are often overlooked in the multicultural pedagogy of special education and in the practices of otherwise culturally competent special educators. There is a growing body of literature, however, that indicates that religion is personally relevant and meaningful to individuals with disabilities in their daily lives.

Spirituality and Individuals with Disability

Children with and without disabilities think quite a lot about God, in whatever form dictated by the iconography of their culture (Torstenson-Ed, 2006). The diversity of religious beliefs among children in classrooms should automatically dictate the inclusion of religion in a multicultural pedagogy. As seen in the exploration of the Abrahamic traditions, however, religious teachings about disability add a layer of complexity to children’s religious thinking. Webb-Mitchell (2008) writes about his experiences working with children with emotional disabilities and intellectual disabilities in an institutional setting. He found that spirituality was the common ground on which he could meet and talk with these children. Although the framework is in the Christian tradition, the belief system or the doctrine is not the point of the stories he shares. Rather, children who had great difficulty understanding the external reality of the world around them and the internal workings of themselves because of emotional or intellectual disabilities, expressed deep and prolonged interest in both the practical and metaphysical aspects of their religious experiences. The examples Webb-Mitchell (2008) provides describe products of childhood religious imagination that are not noticeably different from the religious interests of other children.

Nearly 50 years ago Margaret Mead shared her observations of the power religious instruction has to promote wholeness among people with intellectual and developmental disabilities (Smith & Johnson, 1997). She described the implicit recognition of a person’s humanity when she is fully included in the ritual and doctrine of a spiritual community. Israeli parents of children with intellectual and developmental disabilities describe the normative function of the bar and bat mitzvah rituals (Vogel & Reiter, 2004). Temples, churches, and mosques across the country are developing programs and practices to become more inclusive and recognizing the important contributions that people with intellectual and developmental disabilities make to spiritual communities (Harris, 2006; Vogel, Pulloway, & Smith, 2006).

Families and caregivers of individuals with developmental disabilities often report that their faith informs their attitudes and decisions around issues concerning children and other family members who have disabilities. Some interpret their experiences of caring for a child with intellectual or developmental dis-
abilities as an opportunity for spiritual growth. Other families interpret the experience as a test of faith (Marshall, Olsen, Mandelco, Dyches, Allred, & Sansom, 2003). Parents may also interpret children’s disabilities as punishment for their own misdeeds (Glover & Blakenship, 2007) and therefore feel significant shame or guilt. Religious beliefs inform parents’ attitudes about what interventions can or should be implemented for their children. Similarly, families who are adherent to deterministic religious beliefs may not want services they believe will interfere with whatever plan or reason God had by creating their child’s disability (Cho, Singer, & Brenner, 2000). Internalized blame and shame about disabilities can contribute to a parent’s lack of participation in decision processes. Special educators must be sufficiently aware of these issues to be able to include religion in discussions with families when designing individualized education plans and services for children. Parents who believe that God will heal their child through prayer may not be interested in elaborate or involved interventions that schools are eager to try. On the other hand, however, schools should also be aware that participation in religious rituals like Bar and Bat Mitzvahs can be very important to families. Part of culturally responsive teaching is to provide services that allow children increased access to activities that are developmentally, age, and culturally appropriate (Rogers-Dulan, 1998). Special educators need to be aware of religious activities, traditions, and cultural milestones that may be important to students and their families so that they can work together to support children’s full participation in these cornerstones of childhood experiences (Vogel & Reiter, 2004). Reaching beyond the school walls and lending expertise to religious organizations as they work to become more inclusive and accessible to people with developmental and intellectual disabilities and their families is important (Summers & Jones, 2007). Special educators in our global community have an obligation to inquire and understand the spiritual needs of individuals with developmental and intellectual disabilities in order to plan instruction that increases access to the normal functions of daily life to which all people are entitled.

Discussion

Given the extent to which religious and political thought are historically intertwined, it is reasonable to question the extent to which various interpretations of scripture have been influenced and changed over time. We cannot ignore the fact that religious thinking informs conceptions of disability. As special educators we must also understand that the efficacy of our work may depend on the ability to work with individuals and families who are influenced by religious or spiritual conceptions of disability that may or may not agree with our own. The brief and incomplete survey of Abrahamic texts presented here should make clear the extent to which religious teachings are ambivalent and often contradictory in the messages they present about both the nature and responses to disability. Religion and spirituality are meaningful experiences for people with and people without developmental disabilities (Matthewes-Green, 2005). Furthermore, people with disabilities can enrich the spiritual life of a religious community (Vogel et al., 2006). Special educators have a responsibility to inquire about and consider the ways in which faith traditions influence the beliefs, feelings, and behaviors of individuals with developmental and intellectual disabilities so that we can work with them to promote access to the full experiences of life with the greatest autonomy and self determination possible (Dellassoudas, 2000).

Conclusion

Future research should include an exploration of religion and disability that is wider and deeper than the current introductory survey presented here. Other belief systems may interpret disability in ways that are substantially different than the Abrahamic traditions. For example, disability is has an important role in the central tenets of Buddhism and can be seen as a desirable quality when one is seeking to distance oneself from society (Miles, 2002a). How do ideas like these influence students with disabilities, families, and teachers? There is far more to explore in the Hebrew and Christian bibles and the Qu’ran both in the images of disability presented and the act of religious literary criticism itself.

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Qualitative research should explore what teachers think about religion, disability, and the intersection of the two in their practice. Students, parents, and special educators need opportunities in which to reflect on their beliefs about their spiritual and religious beliefs about developmental and intellectual disabilities in order to understand how, when, and why these beliefs influence needs, service delivery and instructional practices.

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Rose, A. (1997). Who causes the blind to see: Dis-


Juvenile Literature and the Portrayal of Developmental Disabilities

Tina Taylor Dyches, Mary Anne Prater, and Melissa Leininger
Brigham Young University

Abstract: Because characters with developmental disabilities (DD) in children’s books are often the first images many children encounter, their accurate and multidimensional portrayal is critical. Therefore, the depictions of characters with DD in 41 children’s books were analyzed. These books were eligible for the biennial Dolly Gray Children’s Literature Award, and were published between 2004 and 2007. Data were analyzed for four main themes, namely characterization, relationships, changes in characters, and special topics. Trends across this and two previous studies (Dyches, Prater, & Cramer, 2001; Dyches & Prater, 2005) include a growing number of books published annually, increasing numbers of characters with DD who are culturally diverse, more positive portrayals, characters who are being more self-determined, engaging in more caregiving and teaching roles, and enjoying more inclusionary recreational activities. Recommendations for future authors and educational service providers are provided.

Many children’s books include characters with disabilities. Each of the 13 disabilities recognized in the Individuals with Disabilities Education Improvement Act of 2004 can be found in fictional works written for children. However, many of these books are written to instruct the reader about the disability rather than to include a character with a disability in an engaging, well-written story (Prater & Dyches, 2008).

Even though tens of thousands of juvenile books are published annually, not all of them are considered of high quality. Quality juvenile literature is judged in terms of characterization, setting, plot, and theme. Characters should be real to children. They should be credible and consistent. Even though they may change and grow, the character should not be a totally different person as a result of what occurs in the story. A dynamic character is well developed, has a variety of traits making him or her believable, and changes throughout the story (e.g., from shy to poised, selfless to selfish) (Lukens, 2007). A static character does not change as a result of the story’s plot.

In terms of other elements impacting quality literature, the setting is defined as the geographic location and time period, as well as the cultural aspects of the environment. The plot refers to the events that take place during the story and the theme is the abstract ideas embedded in the story, such as strengthening friendships, recognizing prejudice, and becoming more independent (Sawyer, 2009).

High quality literature also has an engaging narrative style. “The style is reflected in the choice of words, the figures of speech, the rhythmic pattern of the language, the structure of sentences, and the use of rhetorical devices” (Sawyer, 2009, p. 87). Included in the style is the point of view or the perspective from which the story is told. Children’s books are usually told from the perspective of a child. In addition, high quality illustrations are evaluated in terms of artistic modes (e.g., paint, crayon, chalk), integration with the text, as well as attention to detail, texture, and color (Sawyer). Quality illustrations clarify and amplify the text, “extending it beyond the words or the reader’s imagination” (Lukens, 2007, p. 44).

Given that all literature expresses values, books must be judged on the values they express (Mills, 2002). Books with characters with disabilities often endorse demeaning attitudes.
toward individuals with disabilities, equate low intelligence with poor moral character, present positive attitudes but in a preachy way, or compensate for the character’s disability by giving them more of something else (e.g., heart, soul, compassion) (Mills). Books portraying characters with disabilities should be judged, not only on the attributes of high quality literature, but on the values it promotes as expressed in the portrayal of the character with disabilities.

Several authors have created guidelines against which to evaluate and select such books (e.g., Blaska, 2003; Dyches & Prater, 2000; Heim, 1994). Characters with disabilities in contemporary settings should be both positive and realistic. For example, the character with disabilities should be shown to be acting upon high expectations and choices, as well as making positive contributions. The strengths, not just limitations of the character should be portrayed; and they should be shown engaging in reciprocal relationships with others, and being afforded the same citizenship rights as others (Dyches & Prater, 2005). Portrayals should also be realistic in terms of physical, behavioral, and language attributes. This is not unlike the standard for all quality books—their portrayals should be considered “credible, consistent, multidimensional—characters who continue to grow and develop” (Dyches & Prater, 2005, p. 202).

Books that meet both the high standards for juvenile literature and high standards for the portrayal of disabilities are rare. To recognize books that do meet these criteria, the Division on Developmental Disabilities of the Council for Exceptional Children established the Dolly Gray Children’s Literature Award in 2000. This award is granted to authors and illustrators of high quality literature who portray characters with developmental disabilities in positive and appropriate ways. Since the establishment of the award, three picture books and five chapter books have received the award (see Table 1).

Three previous studies have analyzed the portrayal of developmental disabilities in children’s literature. First, Prater (1999) reviewed 68 children’s fiction books that portrayed individuals with mental retardation published between 1965 and 1996. The books were included in the study if they appeared in at least 2 of the 27 sources. Prater found that few stories were told from the perspective of the character with mental retardation (MR), most characters with MR did not develop, and most served as a catalyst for another character to change. Most of the characters with MR were portrayed as victims, with other characters being the perpetrator or protector. They were also portrayed as being dependent on family members, particularly siblings. Many books portrayed a character without a disability gaining greater appreciation, affection, or understanding of the character with MR. Only a few included schooling, and when they did, the characters were attending segregated schools. Almost all characters lived at home and when

<table>
<thead>
<tr>
<th>Title</th>
<th>Author (Illustrator)</th>
<th>Disability</th>
<th>Year Awarded</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Curious Incident of the Dog in the Night-Time</td>
<td>Mark Haddon</td>
<td>Asperger Syndrome</td>
<td>2004</td>
<td>Chapter</td>
</tr>
<tr>
<td>Ian’s Walk</td>
<td>Laurie Learns (Karen Ritz)</td>
<td>Autism</td>
<td>2000</td>
<td>Picture</td>
</tr>
<tr>
<td>Keeping Up with Roo</td>
<td>Sharlee Glenn (Dan Andreason)</td>
<td>Intellectual Disability</td>
<td>2006</td>
<td>Picture</td>
</tr>
<tr>
<td>Me and Rupert Goody</td>
<td>Barbara O’Connor</td>
<td>Intellectual Disability</td>
<td>2002</td>
<td>Chapter</td>
</tr>
<tr>
<td>My Brother Sammy</td>
<td>Becky Edwards (David Armitage)</td>
<td>Autism</td>
<td>2002</td>
<td>Picture</td>
</tr>
<tr>
<td>A Small White Scar</td>
<td>K. A. Nuzum</td>
<td>Down Syndrome</td>
<td>2008</td>
<td>Chapter</td>
</tr>
<tr>
<td>So B. It</td>
<td>Sarah Weeks</td>
<td>Intellectual Disability</td>
<td>2006</td>
<td>Chapter</td>
</tr>
<tr>
<td>Tru Confessions</td>
<td>Janet Tashjian</td>
<td>Intellectual Disability</td>
<td>2000</td>
<td>Chapter</td>
</tr>
</tbody>
</table>
employment was discussed, it centered on sheltered workshops.

In the second study, Dyches, Prater, & Cramer (2001) analyzed the characterization of mental retardation and autism in 12 picture and chapter books published in 1997 and 1998. Efforts were made to locate all books published during those years. They concluded that more characters with mental retardation or autism were portrayed as being educated in more inclusive settings and making choices for themselves than Prater (1999) had discovered. Most of the portrayals were male and all of the illustrations depicted characters as European-American. Proportionately, more books were picture books than in the Prater study. In terms of relationships, results were similar to the previous study. Many characters were protected from victimization and dependent on others. Characters with MR or autism were beginning, however, to emerge as protectors, teachers, and caregivers.

Dyches and Prater (2005) in the third study examined 34 picture and chapter books portraying developmental disabilities published between 1999 and 2003. They reported similar results from the Dyches et al. (2001) study. A strong majority of portrayals of characters with developmental disabilities (DD) were realistic and positive. However, males with DD were overrepresented. When compared to the previous study, more books (a) depicted autism spectrum disorders, (b) included characters from diverse cultures, and (c) portrayed characters with DD growing and developing in realistic ways. In addition, there were fewer characterizations of Down syndrome and the most common primary relationship for the character with DD shifted from siblings to peers. Also, the characters with DD were receiving more appropriate educational services, but their recreational activities were not aligned with best practices.

In their conclusion, Dyches and Prater (2005) called for authors to add depth and multidimensionality to characters with DD. “These characters should be shown making deliberate choices that significantly impact their lives and the lives of others; serving more as protectors, teachers, and caregivers of others; and engaging in inclusionary recreational activities.” (p. 215). The purpose of this study was to analyze the general characterization of individuals with DD in juvenile literature published initially in 2004–2007 and compare these results with two previous studies.

Method

We examined 41 juvenile books using a qualitative, descriptive design, and compared these characterizations with those described in two earlier studies (Dyches & Prater, 2005; Dyches et al., 2001). The design, method, and purpose are simply descriptive (see Sandelowski, 2000).

Book Selection

To be included in the study, the books were required to meet four criteria. They must have (a) included a main or supporting human character with a developmental disability; (b) been recognized as a picture or chapter book written for children or young adults, in story format, including biographies written in story format; (c) been published initially in English between 2004 and 2007; and (d) been published by a commercial publisher rather than through vanity press.

The first step was to identify children’s books that include characters with disabilities. The authors consulted with children’s literature librarians and used search terms such as developmental disability, mental retardation, intellectual disability, Down syndrome, multiple disability, autism, and Asperger Syndrome to locate books in relevant issues of Children’s Books in Print (R.R. Bowker’s Database Publishing Group, 2007) and from various print and electronic book lists.

Next, each book was reviewed to determine if the main or supporting character had a developmental disability. For this study, developmental disability was defined as a condition which occurs before a person is 22 years of age that limits him/her in at least three of seven major life activities (e.g., receptive and expressive language, self-care, and economic self-sufficiency), and includes conditions such as intellectual disabilities, autism, Asperger Syndrome, Down syndrome, fetal alcohol spectrum disorder, and multiple disabilities. More than 70 children’s books were found which did not qualify for the study, because they included non-human characters, individuals
who did not clearly have a developmental disability or who were minor characters, books that were not written in story format, or were self-published. All books analyzed in this study qualified to be considered for either the 2006 or 2008 Dolly Gray Children’s Literature Award.

Data Analysis

Characterizations were submitted to content analysis according to qualitative methods described by Denzin and Lincoln (1994). Ten reviewers, including special education teachers, parents of children with developmental disabilities, adults with developmental disabilities, children’s literature librarians, special education professors, and children’s literature illustrators, provided written evaluations based upon guidelines adapted from Dyches et al. (2001). These guidelines included evaluations of the portrayal of the individuals with developmental disabilities, social interactions, exemplary practices, and sibling relationships (if applicable), along with literary and artistic elements (see Table 2 for a brief synopsis of the disability-related guidelines).

The researchers then compared data from the reviewers, and compiled a quantitative and descriptive summary of each item on the evaluation instrument. When disagreement existed, two of the authors reviewed sections from the books in question and came to consensus. In addition, the authors conducted a separate analysis which included evaluation of the characterization, personal relationships, changes in characters with developmental disabilities, changes in nondisabled characters, and special topics.

One author performed an audit trail, according to the method described by Sandelowski (1986) to establish trustworthiness of the analysis method and the results. The audit trail confirmed the themes that had been identified, as agreement was shown between the authors and the auditor regarding these themes.

Results

Of the 41 books eligible for review, 13 were picture books and 28 were chapter books, with 42 characters with DD in main or supporting roles. Three books included more than one character with DD, but in two of them several characters were not analyzed because they were considered minor (Accidents of Nature and The Decoding of Lana Morris). In one picture book, We Go in a Circle, the characters with DD were analyzed as a group rather than

| TABLE 2 |
| Sample Guidelines From the Dolly Gray Children’s Literature Award Rating Scale for Evaluating Children’s Books |

| Personal Portrayal |
| Portrays characteristics of DD accurately. |
| Describes the character(s) with DD as realistic. |
| Character(s) with DD are fully developed. |
| Does not portray only disabilities of the character(s), but portrays abilities, interests, and strengths of the character(s). |
| Emphasizes similarities, rather than differences, between characters with and without DD. |
| Uses nondiscriminatory language that avoids stereotypic portrayals. |

| Social Interactions |
| Depicts character(s) with DD engaging in socially and emotionally reciprocal relationships. |
| Depicts acceptance of the character(s) with DD. |
| Promotes empathy, not pity for the character(s) with DD. |
| Portrays positive social contributions of person(s) with DD. |
| Promotes respect for the character(s) with DD. |

| Exemplary Practices |
| Depicts character(s) with DD having full citizenship opportunities in integrated settings and/or activities. |
| Depicts character(s) with DD receiving services appropriate for their age, skill level, and interests. |
| Depicts valued occupations for character(s) with DD (if appropriate). |
| Promotes self-determination. |

| Sibling Relationships (if applicable) |
| Sibling(s) of the character(s) with DD experience a wide range of emotions. |
| Sibling(s) of the character(s) with DD have opportunities for growth that are not typical for siblings of children without DD. |
| The sibling relationship is reciprocal. |
| The sibling(s) are not given unusually burdensome household and family duties. |
| The sibling(s) appear aware of the nature of the disability and its effects on the character with DD. |
individually, due to the brief and non-specific nature of their characterization. A few books also included characters with other disabilities, including selective mutism, stuttering, and orthopedic impairments. A list of the books including the title, author, illustrator (if applicable), year published, and appropriate reading/interest levels is displayed in Table 3.

Themes in the Field of Developmental Disabilities

Portrayals of the 42 individuals with developmental disabilities were analyzed and categorized across four themes: (a) characterization of the individual with DD, (b) relationships among characters with and without DD, (c) changes in characters without DD, and (d) special topics related to the field of DD. Each theme will be discussed in detail, with representative examples from the various books.

Characterization

Characterizations of the individuals with DD were analyzed in terms of (a) level (main or supporting), (b) personal characteristics, (c) realistic depiction, (d) positive portrayal, (e) character development, and (f) point of view from which the story was told. Brief summaries of these characteristics are provided in Tables 4 and 5.

Level (main or supporting). Main characters are critical to the plot, often as protagonists or antagonists, while supporting characters are typically important to the growth of the main characters. Minor characters enrich the plot, but their presence is not essential to the development or resolution of the climax of the story. The level of characterization was determined as main in 20 characters with DD (48%), and supporting in 22 characters (52%). One book, The Very Orderly Existence of Merilee Marvelous, portrayed more than one main or supporting character with DD.

Personal characteristics. Ages of characters with developmental disabilities ranged from infant to adult. One character was an infant, 3 were pre-schoolers, 24 were elementary age children, 10 were teenagers, 2 were adults, the age of one character was not evident (Autistic Planet), and the supporting characters with DD in We Go in a Circle appeared to be of various ages.

Of the 42 characters with developmental disabilities, 22 (52%) were individuals with autism spectrum disorders, almost half of whom (n = 9, 41%) had Asperger Syndrome. The remaining 20 characters with DD included those with intellectual disabilities (n = 8, 19%), Down syndrome (n = 6, 14%), unspecified developmental disabilities (n = 3, 7%), fetal alcohol spectrum disorder (n = 2, 5%) and multiple disabilities (Cerebral Palsy and intellectual disabilities; n = 1, 2%).

A majority of the characters with DD were males (n = 25, 60%). Of those exhibiting symptoms of intellectual disabilities (including Down syndrome, fetal alcohol spectrum disorder, multiple disabilities, and unspecified developmental disabilities), 10 were male and 9 were female. One book, We Go in a Circle, included several boys and girls with various unspecified disabilities. Of the 22 characters with autism spectrum disorders, 14 were male and 8 were female.

Several books depicted characters with developmental disabilities or characters without disabilities either in illustrations or text as being from ethnically diverse cultures. However, the determination of some main or supporting characters’ diversity was subjective if the text and/or illustrations were ambiguous. In this analysis, nine (21%) depictions of characters with developmental disabilities appeared to be culturally diverse, including Hispanic (Cristina Keeps a Promise; The Duchess to the Rescue; Holy Smoke); African American (Accidents of Nature; Jazz Off-Key); Asian (Ann Drew Jackson; Jackson Whole Wyoming), and undetermined (Autistic Planet). The remaining 32 characters did not give any indication of representing ethnically diverse populations, and the characters in We Go in a Circle were considered as a group to be mainly Caucasian.

Realistic depiction. Most of the portrayals of the characters with DD were considered to be realistic (n = 31, 74%) because their disabilities were similar to descriptions found in the professional literature. Portrayals that were partially realistic showed the character exhibiting many of the symptoms of the disability, but also exhibited inconsistencies in using speech or actions, or the author provided lit-
TABLE 3
Juvenile Literature with Main/Supporting Characters with DD Analyzed in this Study

<table>
<thead>
<tr>
<th>Title, Author (Illustrator), Year, Reading/Interest Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autism Spectrum Disorders</strong></td>
</tr>
<tr>
<td>Adam Canfield, Watch Your Back!, Michael Winerip, 2007, Middle</td>
</tr>
<tr>
<td>Adam’s Alternative Sports Day, Jude Welton, 2005, Middle</td>
</tr>
<tr>
<td>Al Capone Does My Shirts, Gennifer Choldenko, 2004, Middle</td>
</tr>
<tr>
<td>Ann Drew Jackson, Joan Clark (Nathan Clark), 2007, Upper Elem.</td>
</tr>
<tr>
<td>Apart, R.P. MacIntyre &amp; Wendy MacIntyre, 2007, High School</td>
</tr>
<tr>
<td>Autistic Planet, Jennifer Elder (Marc Thomas), 2007, Lower Elem.</td>
</tr>
<tr>
<td>The Duchess to the Rescue, Alexandra Eden, 2006, Upper Elem.</td>
</tr>
<tr>
<td>It’s Time, Judith Manmoy (Todd Fargo), 2007, Lower Elem.</td>
</tr>
<tr>
<td>Jackson Whole Wyoming, Joan Clark, 2005, Middle</td>
</tr>
<tr>
<td>Jay Grows an Alien, Caroline Anne Levine, 2007, Upper Elem.</td>
</tr>
<tr>
<td>Kickoff, Donna King, 2007, Upper Elem.</td>
</tr>
<tr>
<td>Looking after Louis, Lesley Ely (Polly Dunbar), 2004, Lower Elem.</td>
</tr>
<tr>
<td>My Best Friend Will, Jamie Lowell &amp; Tara Tuchel, 2005, Upper Elem.</td>
</tr>
<tr>
<td>Playing by the Rules, Dena Luchsinger (Julie Olson), 2007, Lower Elem.</td>
</tr>
<tr>
<td>Rules, Cynthia Lord, 2006, Middle</td>
</tr>
<tr>
<td>Running on Dreams, Herb Heiman, 2007, Middle</td>
</tr>
<tr>
<td>Sundays with Matthew, Matthew Lancelle &amp; Jeannette Lesada, 2006, Lower Elem.</td>
</tr>
<tr>
<td>To Be Me, Rebecca Edlinger (Mark Tomassi), 2005, Upper Elem.</td>
</tr>
<tr>
<td><strong>Down syndrome</strong></td>
</tr>
<tr>
<td>The Best Worst Brother, Stephanie Stuve-Bodeen (Charlotte Fremaux), 2005, Lower Elem.</td>
</tr>
<tr>
<td>Jazz Off-Key, Dandi Daley Mackall, 2007, Upper Elem.</td>
</tr>
<tr>
<td>Me, Hailey, Sheri Plucker, (Todd Fargo), 2005, Lower Elem.</td>
</tr>
<tr>
<td>A Small White Scar, K. A. Nuzum, 2006, Middle</td>
</tr>
<tr>
<td>Sophie’s Encore, Nancy Rue, 2006, Upper Elem.</td>
</tr>
<tr>
<td>The Year of My Miraculous Reappearance, Catherine Ryan Hyde, 2007, High School</td>
</tr>
<tr>
<td><strong>Intellectual Disability</strong></td>
</tr>
<tr>
<td>Brothers, Boyfriends and Other Criminal Minds, April Lurie, 2007, High School</td>
</tr>
<tr>
<td>The Decoding of Lana Morris, Laura &amp; Tom McNeal, 2007, High School</td>
</tr>
<tr>
<td>Hunger Moon, Sarah Lamstein, 2004, High School</td>
</tr>
<tr>
<td>Keeping Up with Ron, Sharlee Glenn (Dan Andreassen), 2004, Upper Elem.</td>
</tr>
<tr>
<td>The Silver Cup, Constance Leeds, 2007, High School</td>
</tr>
<tr>
<td>So B. It, Sarah Weeks, 2004, Middle</td>
</tr>
<tr>
<td>This Side of the Sky, Marie-Francine Hébert; translated by Susan Ouriou, 2006, High School</td>
</tr>
<tr>
<td><strong>Multiple Disabilities</strong></td>
</tr>
<tr>
<td>Cruise Control, Terry Trueman, 2004, Middle</td>
</tr>
<tr>
<td><strong>Unspecified or Various Developmental Disabilities</strong></td>
</tr>
<tr>
<td>Cristina Keeps a Promise, Virginia L. Kroll (Enrique O. Sanchez), 2006, Lower Elem.</td>
</tr>
<tr>
<td>The Very Ordered Existence of Merilee Marvelous, Suzanne Crowley, 2007, Asperger Syndrome and Fetal Alcohol Syndrome, Middle</td>
</tr>
<tr>
<td>We Go in a Circle, Peggy Perry Anderson, 2004, Lower Elem.</td>
</tr>
</tbody>
</table>

tle information by which the portrayal could be judged. For example, in *Brothers, Boyfriends and Other Criminal Minds*, Larry, a 14-year old boy with an intellectual disability, had previously been educated in a special school, but once he entered his neighborhood general
education school, he demonstrated an extraordinary ability to play the drums and was soon included in a rock band.

Positive portrayal. Portrayals of characters with DD were characterized as positive if they were judged to meet most or all of the following values that guide interactions with and services provided to individuals with disabilities: (a) realistic emphasis on strengths rather than weaknesses, (b) high expectations, (c) making positive contributions beyond promoting growth in other characters, (d) becoming self-determined, (e) being given full citizenship in the home and community, and (f) expanding reciprocal relationships (Turnbull, Turnbull, & Wehmeyer, 2007). Of the 42 characters portrayed, 17 (40.5%) were judged to be positive. Characterizations were described as being mixed if some of the attributes of positive characterizations were present \( n = 17, 40.5\% \) and negative if these characterizations were rarely shown \( n = 8, 19\% \).

Most of the books mentioned or alluded to the strengths of the characters with DD; however, only a few authors used these strengths to contribute to the plot of the story. One example of the portrayal of strengths is Verity Buscador, a teenage girl with Asperger Syn-
<table>
<thead>
<tr>
<th>Book</th>
<th>Character(s)</th>
<th>Personal Characteristics</th>
<th>Level</th>
<th>Depiction</th>
<th>Portrayal</th>
<th>Character Development</th>
<th>Point of View</th>
</tr>
</thead>
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<tr>
<td>Accidents of Nature</td>
<td>Margie</td>
<td>Teenage female</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Mixed</td>
<td>Static</td>
<td>Camper, Jean</td>
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<td></td>
<td></td>
<td>Intellectual Disability</td>
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<tr>
<td>Adam Canfield, Watch Your Back!</td>
<td>Theodore</td>
<td>Middle school male</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Positive</td>
<td>Static</td>
<td>Narrator</td>
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<td></td>
<td>(Shadow)</td>
<td>Unspecified Developmental Disability</td>
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<td>Adam's Alternative Sports Day</td>
<td>Adam</td>
<td>9-year old male</td>
<td>Main</td>
<td>Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
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<td>Asperger Syndrome</td>
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<tr>
<td>Al Capone Does My Shirts</td>
<td>Natalie</td>
<td>15-year old female</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
<td>Younger brother, Moose</td>
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<td></td>
<td></td>
<td>Autism</td>
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<tr>
<td>Ann Drew Jackson</td>
<td>Jackson</td>
<td>Fifth grade male</td>
<td>Main</td>
<td>Realistic</td>
<td>Mixed</td>
<td>Static</td>
<td>Classmate, Hillary</td>
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<tr>
<td>Apost</td>
<td>Timmy</td>
<td>10-year old male</td>
<td>Supporting</td>
<td>Partially Realistic</td>
<td>Negative</td>
<td>Static</td>
<td>Older sister, Jess and Sween</td>
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<tr>
<td></td>
<td></td>
<td>Autism</td>
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<td>Bej and the Word Launcher</td>
<td>Baj</td>
<td>Elementary age male</td>
<td>Main</td>
<td>Partially Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
<td>Narrator</td>
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<tr>
<td>Brothers, Boyfriends, and Other Criminal Minds</td>
<td>Larry</td>
<td>14-year old male</td>
<td>Supporting</td>
<td>Partially Realistic</td>
<td>Mixed</td>
<td>Dynamic</td>
<td>Neighbor, April</td>
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<td>Cruise Control</td>
<td>Shawn</td>
<td>14-year old male</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Negative</td>
<td>Static</td>
<td>Older brother, Paul</td>
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<td></td>
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<td>Multiple Disabilities</td>
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<tr>
<td>The Decoding of Lana Morris</td>
<td>Tilly</td>
<td>16-year old female</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Positive</td>
<td>Static</td>
<td>Narrator</td>
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<td>Intellectual Disability</td>
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<tr>
<td>The Duchess to the Rescue</td>
<td>Verity</td>
<td>12-year old female</td>
<td>Main</td>
<td>Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
<td>Officer, Bones</td>
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<td></td>
<td></td>
<td>Asperger Syndrome</td>
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<tr>
<td>Holy Smoke</td>
<td>Verity</td>
<td>12-year old female</td>
<td>Main</td>
<td>Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
<td>Officer, Bones</td>
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<td></td>
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<td>Asperger Syndrome</td>
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<td>Hunger Moon</td>
<td>Eddy</td>
<td>Elementary-age male</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Mixed</td>
<td>Static</td>
<td>Older sister, Ruthie</td>
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<td></td>
<td></td>
<td>Intellectual Disability</td>
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<tr>
<td>Jackson Whole Wyoming</td>
<td>Jackson</td>
<td>Fifth grade male</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Positive</td>
<td>Static</td>
<td>Friend, Tyler</td>
</tr>
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<td></td>
<td></td>
<td>Asperger Syndrome</td>
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<thead>
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<th>Level</th>
<th>Depiction</th>
<th>Portrayed</th>
<th>Character Development</th>
<th>Point of View</th>
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<tr>
<td><em>Jay Grows an Alien</em></td>
<td>Jay</td>
<td>Elementary-age male Asperger Syndrome</td>
<td>Main</td>
<td>Realistic</td>
<td>Positive</td>
<td>Slightly Dynamic</td>
<td>Narrator</td>
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<tr>
<td><em>Jazz Off Key</em></td>
<td>Kendra</td>
<td>13-year old female Down Syndrome</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Mixed</td>
<td>Static</td>
<td>Narrator</td>
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<tr>
<td><em>Kickoff</em></td>
<td>Shirelle</td>
<td>5-year old female ADD, possibly autism</td>
<td>Supporting</td>
<td>Partially Realistic</td>
<td>Negative</td>
<td>Static</td>
<td>Narrator</td>
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<tr>
<td><em>The Moon Children</em></td>
<td>Billy</td>
<td>11-year old male Fetal Alcohol Spectrum Disorder</td>
<td>Main</td>
<td>Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
<td>Narrator</td>
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<tr>
<td><em>Rules</em></td>
<td>David</td>
<td>8-year old male Autism</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Mixed</td>
<td>Static</td>
<td>Older sister, Catherine</td>
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<tr>
<td><em>Running on Dreams</em></td>
<td>Justin</td>
<td>15-year old male Autism</td>
<td>Main</td>
<td>Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
<td>Justin &amp; Narrator</td>
</tr>
<tr>
<td><em>Sariah McDuff Will Walk With You</em></td>
<td>Chrissy</td>
<td>Elementary-age female Autism</td>
<td>Main</td>
<td>Realistic</td>
<td>Mixed</td>
<td>Slightly Dynamic</td>
<td>Sariah</td>
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<td><em>The Silver Cup</em></td>
<td>Thomas</td>
<td>6-year old male Intellectual Disability</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Negative</td>
<td>Static</td>
<td>Narrator</td>
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<tr>
<td><em>A Small White Scar</em></td>
<td>Denny</td>
<td>15-year old male Down syndrome</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
<td>Twin brother, Will</td>
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<tr>
<td><em>So B. It</em></td>
<td>Sofia</td>
<td>Adult female Intellectual Disability</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Positive</td>
<td>Static</td>
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<td><em>Sophie's Encore</em></td>
<td>Hope</td>
<td>Infant female Down syndrome</td>
<td>Supporting</td>
<td>Partially Realistic</td>
<td>Mixed</td>
<td>Static</td>
<td>Narrator</td>
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<td><em>This Side of the Sky</em></td>
<td>Angélique</td>
<td>8-year old female Intellectual Disability</td>
<td>Supporting</td>
<td>Partially Realistic</td>
<td>Mixed</td>
<td>Static</td>
<td>Older sister, Mona</td>
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<tr>
<td><em>The Very Ordered Existence of Merilee</em></td>
<td>Merilee</td>
<td>13-year old female Asperger Syndrome</td>
<td>Main</td>
<td>Partially Realistic</td>
<td>Positive</td>
<td>Dynamic</td>
<td>Merilee</td>
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<tr>
<td><em>Marvelous</em></td>
<td>Biswick</td>
<td>8-year old male Fetal Alcohol</td>
<td>Supporting</td>
<td>Partially Realistic</td>
<td>Positive</td>
<td>Static</td>
<td>Merilee</td>
</tr>
<tr>
<td><em>The Year of My Miraculous Reappearance</em></td>
<td>Bill</td>
<td>3-year old male Down syndrome</td>
<td>Supporting</td>
<td>Realistic</td>
<td>Mixed</td>
<td>Slightly Dynamic</td>
<td>Older sister, Cynnie</td>
</tr>
</tbody>
</table>

*TABLE 5 Continued*
drome in *The Duchess to the Rescue*, who used her computer skills to help identify who painted graffiti in town.

When expectations were set high for the characters, those portrayed positively were able to meet them. For example, Natalie, a 15-year old girl in *Al Capone Does My Shirts*, is expected to learn to speak better and interact appropriately with other children so she will be allowed to attend a special school, which was a privilege rather than a right in the 1930s.

Many of the characters made positive contributions to their families, and some even contributed to their schools and communities. Although most of these contributions were not intentional, such as providing circumstances whereby others can learn patience, tolerance, and compassion, some contributions were intentionally made by the character with DD. For example, Aunt Ruth (Roo) a woman with an intellectual disability in *Keeping Up with Roo*, taught her niece how to read. Also, Verity, a 12-year old girl with Asperger Syndrome, makes critical contributions toward solving cases in *The Duchess to the Rescue* and *Holy Smoke*.

Although most characters with DD made some attempts toward becoming more self-determined, most of their choices did not make much of an impact on the story or on the characters’ development. For example, characters with DD often chose to engage in their favorite activities, such as watching TV or videos. On the other hand, many characters were given opportunities to make important, life-altering choices. One notable example of this positive characteristic was found in *A Small White Scar*, when Denny made the bold decision to follow his brother off the ranch, and continue on horseback into the wilderness.

Many characters with DD were depicted as having age-appropriate citizenship rights in their families, schools, and communities. For example, in *Adam Canfield, Watch Your Back*, Shadow, a middle school boy with an unspecified developmental disability, becomes part of the journalism staff alongside peers without disabilities. Further, the characters with Asperger Syndrome and high functioning autism were most frequently shown to have similar rights as those similar to their age, being included with nondisabled peers in general education environments, recreational activities, and work settings (*Autistic Planet, It’s Time, Looking After Louis, My Best Friend Will, To Be Me, Adam’s Alternative Sports Day, Ann Drew Jackson, Baj and the Word Launcher, The Duchess to the Rescue, Holy Smoke, Jackson Whole Wyoming, Jay Grows an Alien, Running on Dreams, The Very Ordered Existence of Merilee Marvelous*).

**Character development.** Character development in a story helps readers relate to and learn from the characters’ experiences. Characters in children’s literature are developed through their actions, relationships with others, their sense of themselves, and the roles they play in the plot (Temple, Martinez, Yokota, & Naylor, 2002). Dynamic characters are important because they develop or grow through the story, while static characters show no growth. In many stories including characters with disabilities, growth occurs primarily for characters without disabilities. However, characters with DD should not be included in a story only to evoke growth in others, but they should learn and grow, even if their development is slow or difficult to detect (e.g., Betsy, a 3-year old girl with autism trying to talk in *The Flight of a Dove*, Victor winning a Special Olympics race in *Cristina Keeps a Promise*). Of the 42 characters with DD portrayed, 24 (57%) were identified as dynamic, and the remaining were classified as static. Some of the changes in character with DD include: learning to communicate and socialize better (e.g., *Al Capone Does My Shirts; Baj and the Word Launcher; It’s Time; Looking After Louis; Playing by the Rules; The Very Ordered Existence of Merilee Marvelous*), using personal strengths to solve problems (e.g., *The Duchess to the Rescue; Holy Smoke*), successfully venturing out beyond familiar territory (e.g., *A Small White Scar*), and developing new talents or skills (e.g. *Brothers, Boyfriends, and Other Criminal Minds; The Moon Children; Running on Dreams*).

**Point of view.** Most of the stories were told from the point of view of a family member, usually a sibling, or a peer. In one unique book, the family member was the daughter of a woman with DD (So B. It). However, some of the stories (*n = 4; 10%) were told from the point of view of the individual with DD (*Autistic Planet; To Be Me; Running on Dreams; The Very Ordered Existence of Merilee Marvelous*). *Running on Dreams* was uniquely told from the

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perspective of both Jason, a 15-year old boy with autism, and a narrator. The remaining stories were told by a narrator.

Relationships among Characters With and Without Developmental Disabilities

In reciprocal relationships each party contributes, learns, and grows from their association. However, often in books containing characters with DD, relationships are one-sided, with the character with a disability being the recipient of care, being watched after, and the presence of their disability is the primary change agent for another’s growth. In this study, some levels of social reciprocity were found between several characters (n = 19, 45%). For example, David, a 10-year old boy with Asperger Syndrome in *To Be Me*, indicates that he is friends with the students in his class, “even those who wear glasses.” In *The Very Ordered Existence of Merilee Marvelous*, Merilee, a 13-year old girl with Asperger Syndrome, befriends a newcomer to town, Biswick, an 8-year old boy with Fetal Alcohol Syndrome.

The books were evaluated to determine the nature of the relationships found between characters with DD and others. The following were examined: (a) primary relationship, (b) victim, perpetrator, and/or protector, (c) dependent or caregiver, (d) pupil or instructor. Of the 42 characters depicted, most had primary relationships with their families (n = 20, 48%), followed by friends (n = 18, 43%, with 72% of those friends not having disabilities), and paid personnel or volunteers (n = 5, 12%). Eighteen characters with DD (43%) were depicted as victims, usually of teasing, name calling, and ridicule, but occasionally of abuse or neglect (e.g., *Hunger Moon*; *The Very Ordered Existence of Merilee Marvelous*; *The Year of My Miraculous Reappearance*). While most were shown being dependent upon others, in five cases, individuals with DD were caregivers (12%; i.e., *Accidents of Nature*, *The Duchess to the Rescue*, *Holy Smoke*, *Jay Grows an Alien*, *The Very Ordered Existence of Merilee Marvelous*). In two of these instances, care is given to people without disabilities (*The Duchess to the Rescue*; *Holy Smoke*). Finally, 10 characters assumed the role of informal teacher, usually by teaching others about something related to their disability (e.g., *Autistic Planet*; *Me, Hailey; To Be Me*). In one book, an aunt with DD teaches her niece how to read (*Keeping Up with Roo*).

Changes in Characters without Developmental Disabilities

In many books, main or supporting characters without disabilities learned to accept or understand the individual with DD (n = 19, 46%), yet most just maintained their feelings and attitudes (n = 22, 54%), which were generally positive. One book depicted an increase in negative feelings by a significant nondisabled character toward the character with DD (set in the 1060s, Thomas, a 6-year old boy with an intellectual disability is abandoned in the woods by his mother in *The Silver Cup*).

Special Topics

The books were also examined for treatment of special topics in the field of developmental disability, including: (a) schooling and education, (b) recreation, (c) residence, and (d) family characteristics.

Schooling and education. Elements of school life for school-aged characters with DD were evident in 24 books. The types of school settings varied along a continuum of placements including no schooling (e.g., *The Silver Cup*—set in the 1060s, *A Small White Scar*—set in the 1950s, *This Side of the Sky*—era undetermined), boarding school (e.g., *Al Capone Does My Shirts*—set in the 1930s), special schools (e.g., *The Flight of a Dove*, *Jazz Off Key*, *Sariah McDuff Will Walk With You*); special classrooms within general education schools (e.g., *Adam Canfield, Watch Your Back; Brothers, Boyfriends, and Other Criminal Minds; Cruise Control; Running on Dreams*), and general education classrooms with various levels of support (e.g., *It’s Time; Jackson Whole Wyoming; Jay Grows an Alien; Looking After Louis; Me, Hailey; To Be Me*). The most frequently depicted educational placement was inclusionary settings (n = 13, 54%).

Recreation. Individuals with DD engaged in recreational activities, usually as informal events (e.g., playing on computers, making art, playing chess, listening to music, playing with blocks, watching TV). Very few formal activities were included in the stories, and when they were included, they were organized for groups of people with disabilities (e.g.,
Special Olympics). Most of the recreational activities mentioned involved peers or siblings (e.g., Autistic Planet, Keeping Up with Roo, Looking After Louis, My Best Friend Will, To Be Me, Al Capone Does My Shirts, This Side of the Sky) rather than solitary activities.

*Residence.* In the books where residence was depicted, all main and supporting characters with DD lived in their family home, except for characters in *The Decoding of Lana Morris* (Tilly and other minor characters with DD live in a foster home) and *Apart* (Timmy, a 10-year old boy with autism is sent to live in a group home).

*Family characteristics.* Various types of families were depicted in the books, but primarily the characters with DD lived in traditional families (e.g., mother and father at home). However, some lived with single parents (e.g., divorced or widowed), or foster parents. Siblings were portrayed in many of the families, and were often the primary caregivers of the individuals with DD. The book, *So B. It*, is an exceptional illustration of a family situation. In this book the character with a developmental disability, Sofia, is cared for by her daughter who does not have a disability.

**Discussion**

Children’s books in this study were evaluated to determine how characters with developmental disabilities are portrayed to young readers. Specifically, four topics were evaluated: (a) characterization of the individual with DD, (b) relationships between the character with DD and others, (c) changes in characters without DD, and (d) special topics related to DD. Results of this analysis will be discussed and compared to two previous studies of children’s books that include characters with *Developmental Disabilities* (Dyches & Prater, 2005; Dyches et al., 2001).

This study analyzed 41 books that included main or supporting characters with developmental disabilities published between 2004 and 2007. Annually, this rate of publication is 10.25 books per year, which is an increase from 2005 (8.5 per year) and 2001 (6 per year). The criteria for inclusion in this current evaluation excluded several books which were self-published or included non-human characters with developmental disabilities, and no such exclusions existed in the previous studies. Therefore, we can conclude that more commercially-published books with human characters with developmental disabilities are being published than in the recent past.

Books in this study depicted characters with several types of developmental disabilities, with the proportion of characters with intellectual disabilities decreasing from 75% in 2001 to 47% in 2005, and 48% in this study, and characters with autism spectrum disorders increasing from 25% in 2001 to 53% in 2005, and 52% in this study. This representation is disproportionate to reported enrollment of school-aged children with these disabilities in the U.S., where students with mental retardation represent 9.6% of the special education population, and autism represents only 2.3% (U.S. Department of Education, 2007). However, the recent increase in children’s fiction that features characters with autism spectrum disorders may be reflecting the recent media attention to the significant increase in children with this diagnosis with a rate of 6 per 10,000 for autism, Asperger Syndrome, and Pervasive Developmental Disorder—Not Otherwise Specified combined (Dyches, in press). Also, in the present study almost half (n = 9, 41%) of the characters with autism spectrum disorders were portrayed specifically as having Asperger Syndrome. Of the 20 characters identified with intellectual disabilities or unspecified developmental disabilities, only 6 (30%) had Down syndrome, down from 53% in 2005 and 64% in 2001. The books in this study also included characters with Fetal Alcohol Spectrum Disorder and Multiple Disabilities, which were previously not represented.

More male characters than females with DD were depicted in the books reviewed; however, the trend is decreasing (from 86% in 2001 to 87% in 2005, and 61% in this study). A decreasing trend was found in males with intellectual disabilities from 86% in 2001 to 78% in 2005 and only 58% in the present study. The current percentage is lower than actual proportions of those with intellectual disabilities in the U.S. population (1.5 male to 1 female) (American Psychiatric Association, 2000).

Results indicate a decreasing trend of males with autism spectrum disorder (ASD). All characters with ASD in 2001 were male, de-
creasing to 84% in 2005 and 64% in the current study. This most recent proportion of males to females is low, based upon the estimated population ratio for autism being 4–5 boys to 1 girl (75–80%) and at least 5 times higher (80%) for Asperger Syndrome (American Psychiatric Association, 2000).

There was an increase of characters with DD from diverse cultures in this set of books compared to the previous studies, from no characters in 2001 to 14% in 2005 and 21% in the present study. This representation gives readers more realistic perceptions of how developmental disabilities may affect people from all races, cultures, and ethnicities. Current U.S. Census (2004) estimates the population to be 81% White alone (not in combination with another race), 12.7% Black, 12.6% from Hispanic origin, and 3.8% Asian. In the nine books that feature culturally diverse main or supporting characters with DD, Hispanics and Blacks are underrepresented—each with 7% of the 42 characters. Conversely, Asians are slightly overrepresented with 5% of the characters. However, these data should be treated with caution since in some cases the authors and illustrators did not distinctly indicate race or culture of their characters with DD.

Several dimensions of the characterizations of individuals with DD varied across the three studies. Generally, there was an increasing trend of positive portrayals, from 71% of the depictions judged to be positive in 2001, to 72% in 2005, and 81% in the current study. These portrayals were more positive in part because over time the characters were increasingly more self-determined and enjoyed more reciprocal relationships with a wider range of people. While characters in the present study had primary relationships with fewer friends than in the 2005 study, two-thirds of these friendships were with nondisabled peers.

The characters with DD who were victimized increased from the 2005 study (from 39% to 43%), but this rate was far below that of the 2001 study (83%). Most of the victimization occurred by teasing or name calling, and a new derogatory term was introduced in The Decoding of Lana Morris, Snicks (an acronym for “Special Needs Kids” or “SNKs”).

More characters with DD were depicted as having important roles in society, either as informal teachers (24% in the current study, an increase from the previous studies), or as caregivers (12% in the current study, also an increase). Their teaching often went beyond teaching about their disability, to teaching skills and information to others.

Finally, characters with DD were portrayed in increasingly inclusionary recreational activities over the past three studies, including activities such as making art, playing chess, listening to music, and playing with friends. The educational environments for the last study were inclusionary in 46% of the instances, and for the current study it increased to 54%. This level of inclusion is higher than reported in national school data (U.S. Department of Education, 2007), where 43.9% of the students with autism and 51.8% of the students with intellectual disabilities spent greater than 60% of their time outside of the general education classroom. The high level of inclusion portrayed in the books may be explained by the eight students with Asperger Syndrome being educated in inclusionary environments, while only five other characters with DD were educated in general education settings.

**Conclusions**

More commercially-published children’s fiction that features individuals with developmental disabilities is available than in the past. The depictions of these individuals represent a trend of increasing cultural diversity. Also, the proportion of books including characters with ASD is overrepresented based upon national school-based data, in comparison to the underrepresentation of characters with intellectual disabilities.

Previously, male characters with intellectual disabilities were overrepresented, but in the current study, they were underrepresented. Similarly, males with ASD are underrepresented in the present study.

The characters with DD have been depicted more multidimensionally across the past decade. An increasing trend for these depictions to represent more positive portrayals with individuals being more self-determined, engaging in more caregiving and teaching roles, and enjoying more inclusionary recreational activities is positive. This upward trend meets each of the charges given to authors of children’s books in 2005 by Dyches and Prater to
“add depth and multidimensionality to the characters that they portray” (p. 515). Future authors are encouraged to include a more representative sample of characters with intellectual disabilities, more realistic depictions of characters with developmental disabilities, and more characters who make important decisions for their lives which show their self-determination.

Educational services providers are encouraged to seek out quality literature that contains images of children with disabilities who are seen as “people whom readers would like to know or be friends with” (Smith-D’Arezzo, 2003, p. 76). These books should express the values they intend to teach, thereby shaping the “evolving moral character of its readers” (Mills, 2002, p. 531). The current study provides an analysis of 41 books, based upon values often depicted in the professional literature, and the results can serve as a guide for selecting books that include individuals with developmental disabilities.

References


Evidence-Based Social Skills Interventions for Children with Autism: A Meta-analysis

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Abstract: The purpose of this study was to provide a synthesis of research studies published in the last ten years on interventions to increase social skills for children and adolescents with ASD, examine the outcomes of these studies and evaluate whether a given intervention meets the criteria for evidence-based practice. Thirty-eight studies were included in this review, of which 36 were single subject research studies and 2 group experimental studies. Results varied widely both between intervention types, and with the different studies within each intervention type. While Social Stories, Peer-Mediated, and Video-Modeling all met the criteria for evidence-based, a closer look at percentage of nonoverlapping data points (PND) shows that only Video-Modeling meets criteria for being evidence-based as well as demonstrating high effectiveness as an intervention strategy.

Interacting with one’s peers can have a significant positive impact on the lives of individuals with disabilities, allowing them to build and participate more fully in their communities. Numerous interventions to teach social skills have been developed over the years (Carter & Hughes, 2005, Vaughn, et al., 2003, White, Keonig, & Scahill, 2007). However, many of these methods do not meet the requirements for evidence-based practice. New regulations in the reauthorization of IDEA in 2004 require that evidence-based practices be used to ensure individuals with disabilities receive the highest quality instruction.

Autism is a developmental disorder whose prevalence rate has been increasing dramatically over the past decade. One in 150 children in America today have an autism spectrum disorder (Centers for Disease Control and Prevention, 2007). The Autism Society of America (ASA) estimates that 1.5 million Americans and their families are now affected. In fact, autism is growing at a startling rate of 10-17 percent per year, and has become a national health crisis, costing the U.S. at least $35 billion annually (Autism Society of America, 2007).

Deficits in social skills are one of the core features of autism spectrum disorders (ASD), and are a major source of impairment regardless of the intellectual or language ability of persons with ASD (Carter, Davis, Klin, & Volkmar, 2005). Individuals having better social skills are more likely to be accepted in integrated settings, live more independently, and work in integrated settings (Scheuermann & Webber, 2002). However, treating the social deficits of individuals with ASD remains a challenge (Weiss & Harris, 2001).

There have been many interventions used to teach social skills to individuals with ASD. These include social stories (e.g. Delano & Snell, 2006), peer-mediated strategies, (e.g. Laushey & Heflin, 2000), video modeling (e.g. Paterson & Arco, 2007), cognitive behavioral training (e.g. Bock, 2007), pivotal response training (e.g. Jones & Freely, 2007), Theory of Mind (e.g. Chin, Bernard-Opitz, 2000), among others. Additionally, a number of meta-analyses have looked at social skills training for individuals with ASD (Bellini & Akullian, 2007; Carter & Hughes, 2005; Cook,
Defining Evidence-Based Practices

National policies, such as No Child Left Behind (NCLB) require that teachers use evidence-based practices in their classrooms. Also, new regulations in the reauthorization of IDEA in 2004 require that evidence-based practices be used to ensure individuals with disabilities receive the highest quality instruction. However, there has never been a clear definition of what evidence-based practice is. Therefore, in January 2003, the Council for Exceptional Children (CEC) Division for Research established a task force to address the issue of evidence-based practices. A special issue of Exceptional Children (2005) was dedicated to establishing criteria for evidence-based practice in special education.

First, let’s clarify what a practice is. According to Horner, Carr, Halle, McGee, and Wolery (2005), a “practice refers to a curriculum, behavioral intervention, systems change, or educational approach designed for use by families, educators, or students with the express expectation that implementation will result in measurable, educational, social, behavioral, or physical benefit.” (p. 175)

In the 2005 special issue of Exceptional Children, Odom et al. set the context for the development of research quality indicators and guidelines for evidence of effective practices provided by different methodologies in special education, including group experimental or quasi-experimental research, single subject research, correlational research and qualitative research. For the purpose of this article, we will focus on two types of research methodologies: group experimental or quasi-experimental and single subject research. These two methodologies are largely used to identify cause-effect relationships between interventions and target behaviors, therefore, they are more appropriate for identifying evidence-based practices.

Specifically, for group experimental and quasi-experimental research articles and reports, Gersten et al. (2005) presented the following quality indicators: (1) participants in a given study are sufficiently discussed and their disability conditions are confirmed; (2) random assignment to study conditions are attempted and when randomization is not feasible, other alternatives are used to ensure participants are comparable across conditions; (3) sufficient information is provided regarding the interventionists and procedures implemented to ensure they are comparable across conditions; (4) intervention strategies are implemented with fidelity, (5) multiple outcome measures are used to capture the intervention’s effect, (6) data analysis include effect size calculations in addition to inferential statistics (p. 152).

Furthermore, the panel suggested that a practice is considered evidence-based “when there are at least four acceptable quality studies or two high quality studies that support the practice and the weighted effect size is significantly greater than zero.” (Gersten et. al., 2005, p. 162)

When evaluating research studies using the single subject methodology, Horner et al. (2005) stated that “single-subject research documents a practice as evidence based when (a) the practice is operationally defined, (b) the context in which the practice is to be used is defined; (c) the practice is implemented with fidelity; (d) results from single subject research document the practice to be functionally related to change in dependent measures, and (e) the experimental effects are replicated across a sufficient number of studies, researchers, and participants to allow confidence in the findings” (p. 175-176).

Additionally, documentation of an evidence-based practice typically requires multiple single subject studies. “A practice may be considered evidence-based when (a) minimum of five single subject studies that meet minimally acceptable methodological criteria and document experimental control have been published in peer-reviewed journals, (b) the studies are conducted by at least three different researchers across at least three different geographical locations, and (c) the five or more studies include a total of at least 20 participants” (Horner et al., 2005, p.176).

Although there have been a few review articles published on this topic in recent years (e.g. Matson, Matson, & Rivet, 2007; McCon-
nall, 2002; Rogers, 2000; Weiss & Harris, 2001), they tend to be more descriptive of the various interventions and lack quantitative evaluations of treatment effectiveness, that is, the researchers relied on the conclusions drawn by the studies’ authors. In addition, these qualitative reviews do not compare treatment effectiveness across different intervention strategies. Furthermore, they fail to address the critical issue of evidence-based practices. The purpose of this study was to provide a synthesis of research studies published in the last ten years on interventions to increase social skills for children and adolescents with ASD, examine the outcomes of these studies and evaluate whether a given intervention meets the criteria for evidence-based practice.

**Method**

A comprehensive review of the literature was conducted using the following procedures. First, an electronic search was conducted for studies published between 1997 and 2008 August using the Educational Resources Information Center (ERIC) and PsycINFO databases. Searches were carried out using a combination of the following descriptors: autism, autism spectrum disorder, ASD, social skills, social behavior, social development, conversational skills, play skills, social initiations, requesting, social responses, social interactions, social relationships, joint attention, eye contact, video modeling, peer-mediated interventions, videotape modeling, pivotal response training, theory of mind, cognitive behavioral training, incidental teaching, social stories, perspective taking, and naturalistic teaching. Second, a manual search was conducted with the following peer-reviewed journals: Research and Practice for Persons with Severe Disabilities, Journal of Applied Behavior Analysis, Exceptional Children, Education and Training in Developmental Disabilities, American Journal on Mental Retardation, and Focus on Autism and Other Developmental Disabilities. In all, 104 studies were located in this initial search of journal articles.

Studies were selected for review based on the following criteria. First, participants must have been identified as having ASD between the age of birth and 21. Second, study participants were students receiving special education services either at home or in school settings. Studies conducted exclusively in community-based settings, employment settings and other settings that were not clearly described were excluded from this synthesis. Third, the study must have used outcome measures that targeted social skills. Studies that measured functional skills such as daily living skills, reduction of problem behaviors, or non-social communication skills were not included. Fourth, the study must have assessed the effectiveness of social skill interventions. Studies that used pharmacological interventions were excluded from this analysis. Fifth, the review comprised an empirical, intervention-based investigation and was published in a peer-reviewed journal between 1997 and 2008. Dissertation studies were not included in this synthesis. Sixth, the study must meet the criteria for evaluating evidence-based intervention strategies outlined by the Council for Exceptional Children Division for Research (2005). For the purpose of this review, only those studies that utilized group experimental or quasi-experimental and single subject research were evaluated and analyzed. For group designs, presentation of effect sizes along with inferential statistics is recommended. However, some studies included in this meta-analysis did not report the effect size of the intervention in the original study, they were included only when such calculation could be inferred based on available statistics reported. Effect sizes are expressed positively when change occurred in the predicted direction and negatively when changes were opposite to those predicted. An effect size of .20 is small, .50 moderate, and .80 large. The usually accepted minimum clinically acceptable effect size for educational interventions is 0.33 (McCartney & Rosenthal, 2000).

If a study uses single subject research design, the study must demonstrate experimental control through the use of multiple baseline, reversal or alternating treatment designs as outlined by the Council for Exceptional Children Division for Research (2005). Additionally, the study must present data in graphical displays that depicted individual data points as these graphical displays were critical for the calculation of PND (percentage of non-overlapping data points), the metric analysis employed in this meta-analysis. Scruggs, Mastropieri, and Castro (1987) suggested that “PND is the only major evaluative criterion that can consistently be applied in the largest
number of cases of single subject studies” (p. 27). PND is usually computed by dividing the number of treatment data points that exceeds the highest baseline data point in an expected direction by the total number of data points in the treatment phase. A PND between 91 and 100 is considered a highly effective intervention, between 71 and 90 moderately effective, between 51 and 70 mildly effective, and between 0 and 50, non-effective (Scruggs & Mastropieri, 1998).

Using these methods and criteria, we identified 38 studies for inclusion in this review, of which 36 were single subject research studies and 2 group experimental studies.

Classification

For the 36 single subject research studies, we used a coding system established by Mastropieri and Scruggs (1985-1986) and made modifications based on the criteria outlined by Horner et al. (2005). Each study was analyzed across the following categories: (1) participant characteristics, including the number of participants, diagnosis, settings, age and functional levels; (2) description of target behaviors and skills; (3) description of intervention; (4) research design; (5) intervention results including intervention, maintenance and follow-up, and generalization effects as measured by PND; and (6) confirmation of whether the study measured treatment integrity and social validity.

Interrater Agreement

To establish interrater reliability for the coding procedure and the PND analysis, the first author coded all the single subject studies and calculated the PND while the second author randomly selected 30% (12) of single subject studies, independently coded and calculated the PND for those studies. Interrater agreement was obtained by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. The mean interrater agreement between the two authors was 97% (range 78%-100%).

Results

A summary of the participants, target behaviors, intervention strategies, and research design was constructed and presented in Table 1. Table 2 provides descriptive information on intervention results, study effect size or PND, maintenance, follow-up and generalization results, treatment integrity and social validity measures.

Overall Findings

Single subject designs were used to evaluate intervention effects in 36 studies and group designs were used in 2 studies. Five categories of different interventions emerged from these 38 studies, including Social Stories (n = 6), Peer Mediated (n = 9), Video Modeling (n = 11), Cognitive Behavior Training (n = 3), and Others (n = 9).

A total of 147 participants were included. Thirty-one studies used a variation of a multiple baseline or probe design, five studies used a reversal design, and two studies used pretest and posttest with a control group design. Treatment integrity was reported in 14 studies, of which 11 reported agreement percentage, ranging from 77% to 100%. Social validity was measured in 16 studies.

Participants and Settings

Of the 147 participants with ASD, among the studies that reported on gender, 73 participants were boys, and 6 were girls. Additionally, seven studies reported participation of a total of 68 typical peers. Participants with ASD ranged in age from 2 to 17 years old. The vast majority of participants were between the ages of 6-12 (82 participants), with thirty participants being five years or younger, and three participants being over 12 years of age. Not all studies reported ages of participants.

The studies primarily took place in integrated settings at public schools. Some studies were conducted across more than one setting. Ten studies reported being conducted in integrated public school settings not otherwise specified, 9 in specialized class settings at a public school. Six studies reported lunch, hallway, or other integrated school settings, three studies took place in general education classroom settings. Four studies took place in home or community settings, three studies took place in private segregated settings, and one study took place in a private integrated setting.
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants/Settings</th>
<th>Target Behavior</th>
<th>Interventions</th>
<th>Research Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sansosti &amp; Powell-Smith (2006)</td>
<td>3 boys with Asperger Syndrome (Ages 9, 10, 11 yrs) 2 boys in integrated private schools 1 in private school for children with LD  All three boys have average or above-average IQ</td>
<td>Social Stories ($n = 6$) Sportsmanship Maintaining conversation Joining in</td>
<td>Social Story was read twice a day</td>
<td>Multiple-baseline across participants</td>
</tr>
<tr>
<td>Delano &amp; Snell (2006)</td>
<td>3 boys with autism (Ages 6, 6, &amp; 9) Integrated settings 6 typical peers (3 boys &amp; 3 girls) served as training peers and play partners</td>
<td>Duration of appropriate social engagement behavior Frequency of 4 social skills: seeking attention, initiating comments, initiating requests, contingent responses</td>
<td>Social Story was read once a day</td>
<td>Multiple-probe-across participants</td>
</tr>
<tr>
<td>Thiemann &amp; Goldstein (2001)</td>
<td>5 boys with autism (Ages 6-12 yrs) 3 boys were fully integrated, 2 were integrated for 30% of the day 10 typical peers</td>
<td>4 target behaviors: contingent responses, securing attention, initiating comments, initiating requests</td>
<td>Social stories, pictorial written text cues, video feedback</td>
<td>Multiple baseline design across two or three behaviors</td>
</tr>
<tr>
<td>Barry &amp; Burlew (2004)</td>
<td>1 7-yr-old girl &amp; 1 8-yr-old boy with severe autism in self-contained setting</td>
<td>Prompting needed for choice making; appropriate play (with peers &amp; materials)</td>
<td>Social stories*</td>
<td>ABCD multiple-baseline design across two subjects</td>
</tr>
<tr>
<td>Scattone, Tingstrom, &amp; Wilczynski (2006)</td>
<td>3 boys 8-13 with ASD free time activities across the school day</td>
<td>Appropriate social interactions</td>
<td>Social Stories written to address initiations and responses for appropriate social interactions for target students during free time activities</td>
<td>Multiple baseline across participants</td>
</tr>
<tr>
<td>Dodd, Hupp, Jewell, &amp; Krohn (2008)</td>
<td>2 boys, 9 &amp; 12 yrs old with PDD-NOS both in inclusive settings Average IQ</td>
<td>Decrease excessive directions to siblings, increase compliments to siblings</td>
<td>Social Story</td>
<td>Multiple baseline across behaviors &amp; multiple baseline across participants</td>
</tr>
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<tr>
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<tbody>
<tr>
<td>Laushay &amp; Heflin (2000)</td>
<td>Peer Mediated (n = 9)  2 boys, 5 yrs  1 with severe Autism; 1 with mild PDD-NOS</td>
<td>Asking &amp; responding  Getting attention  Waiting for turn  Eye contact</td>
<td>Buddy System-Multiple peers as tutors</td>
<td>ABAB</td>
</tr>
<tr>
<td>Pierce &amp; Schreibman (1997)</td>
<td>Two boys with autism; moderate and profound MR</td>
<td>Maintains interactions;  Initiates conversation;  Initiates play</td>
<td>Multiple peer use of pivotal response training</td>
<td>Multiple baseline design across peer trainers and across 2 participants</td>
</tr>
<tr>
<td>Hwang &amp; Hughes (2000)</td>
<td>3 preschool boys with autism (32-43 months) play area in an early intervention program classroom</td>
<td>Frequency of eye contact;  frequency of joint attention; frequency of motor imitation</td>
<td>Social interactive training strategies (peer-mediated): contingent imitation; naturally occurring reinforcement; expectant look; &amp; environmental arrangement</td>
<td>Multiple baseline across participant</td>
</tr>
<tr>
<td>Petursdottir, McComas, McMaster, &amp; Horner (2007)</td>
<td>One five-year old boy with ASD &amp; DD; high functioning; Study took place in the special ed classroom</td>
<td>Social interaction</td>
<td>Peer-Assisted Learning Strategies; common stimuli activities; peer tutoring</td>
<td>ABA withdrawal and multiple baseline across peers</td>
</tr>
<tr>
<td>Loncola &amp; Craig-Unkefer (2005)</td>
<td>5 boys &amp; 1 girl with mild/moderate autism (ages 6-8) study took place in a sectioned off area of a large hallway in a public school with high % of children with autism</td>
<td>Peer directed commenting;  language diversity &amp; complexity</td>
<td>Two children with autism were paired and received the plan-play-report treatment simultaneously</td>
<td>Multiple baseline across three dyads</td>
</tr>
<tr>
<td>Garrison-Harrell, Kamps, &amp; Kravits (1997)</td>
<td>3 primary grade students with autism and 15 typical peers study took place during scheduled play and academic times in regular education settings</td>
<td>Social interaction between target students and their peers, use of augmentative communication systems  Collateral behaviors: expressive verbalizations, reduction of inappropriate behaviors, non-target peers use of communication system, peer acceptance</td>
<td>Augmentative communication training, peer training, implementing peer networks (cooperative group activities with augmentative communication system)</td>
<td>Multiple baseline probe design across settings, nested with multiple baseline across students with autism</td>
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<tr>
<td>Carter, Cushing, Clark, &amp; Kennedy (2005)</td>
<td>3 students (2 with autism) ages 12, 13, &amp; 17, 6 general education students in classes with target students in a middle and high school English and science class.</td>
<td>Social interactions (acknowledgement of another student using verbal or nonverbal behaviors), coded for who they occurred with, and the quality of interaction; Contact and consistency with general education curriculum</td>
<td>Peer training to adapt class activities, provide instruction, implement behavior plans, provide frequent feedback, promote communication for the participating students with disabilities</td>
<td>ABAB, and BABA: working with 1 or 2 peers</td>
</tr>
<tr>
<td>Koegel, Werner, Vismara, &amp; Koegel (2005)</td>
<td>2 primary grade children with autism, 14 typically developing peers play dates occurring in natural settings</td>
<td>Synchronous reciprocal interactions, child affect</td>
<td>Contextually supported play dates: activities selected to be mutually reinforcing for both child with autism and typically developing peer, cooperative arrangements set up by adults within activities (participation of both critical to the activity)</td>
<td>Multiple baseline across participants</td>
</tr>
<tr>
<td>Harper, Symon, &amp; Frea (2008)</td>
<td>2 boys, 8 and 9 yrs old with autism in inclusive settings</td>
<td>Gaining attention, # of turn taking exchanges, # of initiations to play</td>
<td>Triads were developed—with two peers and one target child with autism during recess; naturalistic intervention</td>
<td>Concurrent multiple baseline across participants</td>
</tr>
<tr>
<td>Paterson &amp; Arco (2007)</td>
<td>2 boys with autism (Ages 6 &amp; 7 yrs) high functioning play room in the school’s special education center</td>
<td>Video Modeling (n = 11)</td>
<td>Video modeling (by male adult); social praise</td>
<td>Multiple baseline across play behavior with a withdrawal phase</td>
</tr>
<tr>
<td>Nikopoulos &amp; Keenan (2007)</td>
<td>Experiment I: 3 boys with autism (Ages 6.5; 6.5; &amp; 7) in a semi-naturalistic room of a special school</td>
<td>Experimenter I: Social initiation; reciprocal play; imitative response; object engagement; other behaviors</td>
<td>Video modeling (by a 10yr old boy with LD &amp; average social skills); Verbal instructions; modeling in vivo; Behavior rehearsal</td>
<td>Multiple baseline across subject</td>
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<tbody>
<tr>
<td>Nikopoulos &amp; Keenan (2004)</td>
<td>3 boys with autism (btwn 7-9 yr) setting unspecified</td>
<td>Social initiation; reciprocal play behavior</td>
<td>Video modeling (by a peer)</td>
<td>Multiple baseline across subjects</td>
</tr>
<tr>
<td>Gena, Couloura, &amp; Kymissis (2005)</td>
<td>3 preschool boys with autism (Ages 5, 4, 3 yr)</td>
<td>Affective responses: showing sympathy; showing appreciation; showing disapproval</td>
<td>Video modeling (by a peer of the same age and sex); In-vivo modeling</td>
<td>Multiple baseline across subjects with a return to baseline</td>
</tr>
<tr>
<td>Hine &amp; Wolery (2006)</td>
<td>2 girls with autism (Ages 30, 43 months) inclusive setting</td>
<td>Different types of pretend play actions performed</td>
<td>Video modeling (with adults hands only)</td>
<td>Multiple baseline across behaviors (gardening &amp; cooking tasks) across two participants</td>
</tr>
<tr>
<td>Wert &amp; Neisworth (2003)</td>
<td>4 boys with autism (Ages 5.5; 4.5; 4; 5 yrs) unspecified school setting</td>
<td>Spontaneous requests</td>
<td>Video self modeling</td>
<td>Multiple baseline across subjects</td>
</tr>
<tr>
<td>Simpson, Langone, &amp; Ayres (2004)</td>
<td>2 boys and 2 girls with autism (Ages 5, 5, 6, &amp; 6)</td>
<td>Complying with teacher directions; greeting others; sharing materials</td>
<td>Embedded video modeling (by typical peers) and computer based instruction*</td>
<td>Multiple probe across participants</td>
</tr>
<tr>
<td>Charlop-Christy, Le, &amp; Freeman (2000)</td>
<td>5 boys and 1 girl with autism (Ages 8, 7, 10, 11, &amp; 7) after-school behavior therapy program therapy room</td>
<td>Subject 1: Expressive labeling of emotions Subject 2: Independent play Subject 3: Spontaneous greetings; oral comprehensions Subject 4: Conversational speech; cooperative play Subject 5: Social play</td>
<td>In vivo and video modeling (by familiar adults)</td>
<td>Multiple baseline across subjects; multiple baseline with child across two modeling conditions and within each modeling condition across two tasks</td>
</tr>
<tr>
<td>Apple, Billingsley, &amp; Schwartz (2005)</td>
<td>Experiment I: 2 boys with Asperger’s Syndrome (both 5 yrs) Study took place in integrated preschool classroom during free play time</td>
<td>Compliment-giving behaviors</td>
<td>Experiment I: 1) Video modeling 2) VM + reinforcement 3) reinforcement only</td>
<td>Multiple baseline across subjects</td>
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<td></td>
<td></td>
<td></td>
<td>2) Self-management</td>
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<tr>
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</thead>
<tbody>
<tr>
<td>Buggy (2005)</td>
<td>2 students with autism during lunch, recess, and free time in a small inclusive school</td>
<td>Social initiations</td>
<td>Videotaped self-modeling, 3-minute video showing typical positive social interactions</td>
<td>Multiple baseline across participants</td>
</tr>
<tr>
<td>Charlop-Christy &amp; Daneshvar (2003)</td>
<td>3 boys with autism, ages of 6, 6 and 9 yrs, low functioning</td>
<td>Perspective taking and perspective initiating</td>
<td>Video modeling of 5 first-order perspective taking tasks</td>
<td>Multiple baseline across children and within child across tasks</td>
</tr>
<tr>
<td>Jones &amp; Freely (2007)</td>
<td>3 preschool age children with autism</td>
<td>Joint Attention: responding and initiating</td>
<td>PRT, discrete trial format</td>
<td>Multiple probe design across two joint attention skills</td>
</tr>
<tr>
<td>Chin, Bernard-Opitz (2000)</td>
<td>3 high-functioning children with autism, 5-7 years old, primary caregivers, one peer who participated in the generalization sessions, participants homes</td>
<td>Conversational skills, shared interest, contextually appropriate responses, false beliefs (ToM)</td>
<td>Cognitive Behavioral Training, (n = 3)</td>
<td>Pre and posttest design: Problem solving measure, Emotions of Social Interaction, and Social Skills Rating (SSRST)</td>
</tr>
<tr>
<td>Lopata, Thomeer, Volker &amp; Nida (2006)</td>
<td>21 boys with AD, 6-13 years old, participated in a 6-week summer treatment program to enhance social behaviors</td>
<td>Theory of Mind (n = 1)</td>
<td>Social Skills, Adaptability, and Atypicality from the BASC, parent rating scales (PRS) and teacher rating scales (TRS)</td>
<td>6 weeks of the treatment program 6 hrs/day, 5 days/week, 4 70-minute treatment cycles daily One group had a behavioral management point system with response cost</td>
</tr>
<tr>
<td>Baumringer (2002)</td>
<td>15 high-functioning children with autism</td>
<td>Social cognition and emotional understanding, overt social functioning</td>
<td>Adapted social skills curriculum taught, 5 hours/week over a 7 month period</td>
<td>Pre and posttest design: Problem solving measure, Emotions of Social Interaction, and Social Skills Rating (SSRST)</td>
</tr>
<tr>
<td>Bock (2007)</td>
<td>4 boys, 9-10 years old, elementary school where students attended social studies cooperative group activities, organized sport games, and visit with peers during lunch</td>
<td>Participate in cooperative learning activities, organized sport games, and visit with peers during lunch</td>
<td>Social-behavioral learning strategy intervention (SODA)*</td>
<td>Multiple baseline across settings</td>
</tr>
<tr>
<td>Study</td>
<td>Participants/ Settings</td>
<td>Target Behavior</td>
<td>Interventions</td>
<td>Research Design</td>
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<tr>
<td>Krantz &amp; McClannahan (1998)</td>
<td>3 boys with autism (ages 4-5) small classroom at the participants’ school</td>
<td>Spontaneous interaction; elaborations, unscripted interaction</td>
<td>Textual cues were embedded in the child’s activity schedules; script fading</td>
<td>Multiple baseline across participants</td>
</tr>
<tr>
<td>Nelson, McDonnell, Johnston, Crompton, Nelson (2007)</td>
<td>4 preschool children with autism (ages 3-4)</td>
<td>Play initiation; engagement time; play repertoire</td>
<td>Keys to Play</td>
<td>Multiple baseline probe</td>
</tr>
<tr>
<td>McGee &amp; Daly (2007)</td>
<td>3 preschool boys with autism university based preschool, with majority of typically developing children</td>
<td>Two social phrases: “all right” and “you know what?”</td>
<td>Incidental teaching</td>
<td>Multiple baseline across participants</td>
</tr>
<tr>
<td>Charlop-Christy, Carpenter, Le, LeBlanc, &amp; Kellet (2002)</td>
<td>3 boys with autism 3-12 years old Sessions were conducted in empty training rooms, the child’s classroom, and the child’s home</td>
<td>Speech: spontaneous speech and imitation</td>
<td>PECS training</td>
<td>Multiple baseline across participants</td>
</tr>
<tr>
<td>Shabani et al. (2002)</td>
<td>3 kindergarten boys with autism, typically developing peers at school and home</td>
<td>Verbal initiations, and verbal responses to peer initiations</td>
<td>Tactile prompting device for initiating</td>
<td>ABAB</td>
</tr>
<tr>
<td>Gonzalez-Lopez &amp; Kamps (1997)</td>
<td>4 children with autism, ages 5-7 years old, 12 typical kindergarten and first grade children in the same elementary school special education classroom</td>
<td>Behavior management skills for typical peers Greetings, using names and conversations, imitation and following instructions, sharing and turn-taking, asking for help</td>
<td>Social skills training using training scripts, social skills training plus reinforcement</td>
<td>Reversal design with two intervention conditions</td>
</tr>
<tr>
<td>Charlop-Christy &amp; Kelso (2003)</td>
<td>3 boys with autism, ages 8, 8, and 11 verbal, literate</td>
<td>Conversational speech</td>
<td>Conversational Scripts, cue cards</td>
<td>Multiple baseline across subjects with embedded multiple probes within each child across conversations</td>
</tr>
</tbody>
</table>

* Interventions were implemented by classroom teachers, paraprofessionals or parents.
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<tr>
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<tbody>
<tr>
<td>Sansosti &amp; Powell-Smith (2006)</td>
<td>Increased target behavior (2/3) PND=59.57%</td>
<td>Social Stories (n = 6) Follow-up data were collected two weeks after the treatment FPND=50% Maintenance results not reported</td>
<td>Two participants data were reported, 88% &amp; 92% 3rd child’s family failed to provide needed info</td>
<td>Yes</td>
</tr>
<tr>
<td>Delano &amp; Snell (2006)</td>
<td>Improved performance on all target behaviors across all three participants (3/3) PND=90%</td>
<td>Intervention was gradually faded (2 phases) 2 participants demonstrated gains in their general ed classroom settings</td>
<td>Mean=93% (78%-100%)</td>
<td>Yes</td>
</tr>
<tr>
<td>Thiemann &amp; Goldstein (2001)</td>
<td>3/4 target behaviors were obtained by 3 boys; 2/4 target behaviors were obtained by 2 boys PND=47%</td>
<td>2 boys generalized to untrained social behaviors; 1 generalized within classroom MPND=37.97%</td>
<td>Not reported</td>
<td>Yes, 7 gen ed teachers and 6 SLP graduate students who are blind to the study rated participants’ performance pre-and post-treatment via 2-min video vignettes.</td>
</tr>
<tr>
<td>Barry &amp; Burlew (2004)</td>
<td>Both participants made gains in making independent choices and play appropriately during free play time in the self-contained setting PND=100%</td>
<td>Generalization effects were reported via anecdotal evidence—the girl transitioned to a general ed classroom due to the significant gains in her social skills</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Scattone, Tingstrom, &amp; Wilczynski (2006)</td>
<td>Increase in appropriate social interactions for 2/3 participants PND=46.7%</td>
<td>None</td>
<td>100% for 2 students, 86% for 1 student</td>
<td>IRP-15 scores all in the acceptable range</td>
</tr>
<tr>
<td>Dodd, Hupp, Jewell, &amp; Krohn (2008)</td>
<td>Increased target behaviors for both boys PND=60% (zero baseline)</td>
<td>Reported for only 1 subject MPND=100%</td>
<td>Participant 1=100%; Participant 2= 97.1%</td>
<td>Yes</td>
</tr>
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<tbody>
<tr>
<td>Laushey &amp; Heflin (2000)</td>
<td>Significant improvement in social skills for both children</td>
<td>Peer Mediated (n = 9)</td>
<td>Yes</td>
<td>Focus group was used to validate the DV &amp; IV</td>
</tr>
<tr>
<td></td>
<td>PND=100%</td>
<td></td>
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<tr>
<td>Pierce &amp; Schreibman (1997)</td>
<td>Both participants made significant gains in their social skills</td>
<td>Both participants generalized their gains into other settings with novel people as well</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td></td>
<td>PND=71.01%</td>
<td></td>
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</tr>
<tr>
<td>Hwang &amp; Hughes (2000)</td>
<td>3/3 participants increased target behavior;</td>
<td>Generalization of eye contact and motor imitation were found across new setting and different partner; joint attention rarely generalized</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>PND=72.22%</td>
<td></td>
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<tr>
<td>Petursdottir, McComas, McMaster, &amp; Horner (2007)</td>
<td>No effects of peer tutoring alone on social interactions. Adding play-related common stimuli to the peer-tutoring activity increased social interactions during free play. PND=56.17%</td>
<td>Not reported</td>
<td>81% (range 56%-92%) for the K-PALS; 91% (range 86-96%) for common stimuli activities</td>
<td>Yes</td>
</tr>
<tr>
<td>Loncola &amp; Craig-Unkefer (2005)</td>
<td>All dependent variables improved across all subjects</td>
<td>Not reported</td>
<td>98% (80%-100%)</td>
<td>Not reported</td>
</tr>
<tr>
<td></td>
<td>PND=56.72%</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Garrison-Harrell, Kamps &amp; Kravits (1997)</td>
<td>Increased duration of peer interactions across settings, increased use of augmentative communication system, some increase in verbalizations, increase in peer acceptance</td>
<td>None</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Carter, Cushing, Clark, &amp; Kennedy (2005)</td>
<td>Higher level of social interactions, and contact with the general curriculum when supported by 2 peers</td>
<td>None</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Koegel, Werner, Vismara, &amp; Koegel (2005)</td>
<td>Significant increases in unprompted synchronous reciprocal interactions</td>
<td>None</td>
<td>Not reported</td>
<td>Frequency of reciprocal invitations—more invitations extended by peers after treatment</td>
</tr>
<tr>
<td>Harper, Symon, &amp; Frea (2008)</td>
<td>Both participants improved their social peer interactions during recess PND=75% (zero baseline)</td>
<td>Yes GPND=100%</td>
<td>Yes</td>
<td>Data were reported in a table, ranging from 78%-100%</td>
</tr>
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<tr>
<td>Paterson &amp; Arco (2007)</td>
<td>Both participants increased their appropriate verbal and motor play behavior across toys; their repetitive verbal and motor play behavior decreased; PND=100%</td>
<td>Video Modeling (n = 11) 1 boy generalized motor play with three related toys; follow up data were recorded 1 week after treatment was withdrawn for both boys FPND=100%</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Nikopoulos &amp; Keenan (2007)</td>
<td>Experiment I: mixed results across subjects and behaviors FND=90.57%</td>
<td>Generalization to a novel peer was measured for all three participants; Follow up data were taken at 1- and 2-months. FPND=100%</td>
<td>Not reported</td>
<td>The social validation of the treatment outcomes was assessed by ten mothers of school-aged children.</td>
</tr>
<tr>
<td>Nikopoulos &amp; Keenan (2004)</td>
<td>All participants increased the duration of reciprocal play; social initiation improvement results were mixed PND=72.41%</td>
<td>Follow-up tests conducted at 1 and 3 months after the study FPND=100%</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Gena, Couloura, &amp; Kymissis (2005)</td>
<td>All 3 participants increased their affective categories In vivo modeling PND=88% Video modeling PND=79%</td>
<td>Follow-up at 1- and 3-months GPND=100% FPND=100%</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Hine &amp; Wolery (2006)</td>
<td>Both participants showed improvement in both pretend play behaviors PND=70.45%</td>
<td>Generalization across materials and across settings were measured M=95% (83.3% to 100%)</td>
<td>Yes</td>
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<tbody>
<tr>
<td>Wert &amp; Neisworth (2003)</td>
<td>All 4 participants showed significant improvement PND=97%</td>
<td>Yes</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Simpson, Langone, &amp; Ayres (2004)</td>
<td>All 4 participants showed significant improvement PND=97.30%</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Charlop-Christy, Le, &amp; Freeman (2000)</td>
<td>Overall, video modeling led to quicker acquisition of skills than in vivo modeling. In vivo modeling PND=72.88% Video modeling PND=76.92%</td>
<td>Generalization probes across different stimuli, persons, and setting were conducted during baseline and also 3 to 5 days after criterion performance was demonstrated in treatment.</td>
<td>Yes. For the in vivo condition, the modeling sessions were videotaped and rated at 99%.</td>
<td>Not reported</td>
</tr>
<tr>
<td>Apple, Billingsley, &amp; Schwartz (2005)</td>
<td>During video modeling, both participants were able to acquire the skills of compliment-giving responses Experiment II: Self-management increased subjects’ independence in monitoring their own compliment-giving behavior Video Modeling Respond to others PND=100% Initiate PND=0%</td>
<td>Experiment I Initiation FPND=20% Response FPND=100%</td>
<td>M=90% (84%-97%)</td>
<td>Parents and teachers reports</td>
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<tbody>
<tr>
<td></td>
<td>Gains made in frequency of social initiations (0 to 4.4; and .17 to 4.25 initiations/day)</td>
<td>Results maintained</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td></td>
<td>PND = 90.91%</td>
<td>MPND = 100%</td>
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<tr>
<td></td>
<td>(Zero baseline for one participant)</td>
<td>FPND = 100%</td>
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<tr>
<td>Buggy (2005)</td>
<td>Various gains made by all participants</td>
<td>Wider range of generalizations were reported</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td></td>
<td>PND = 52.21%</td>
<td>GPND = 40.35%</td>
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</tr>
<tr>
<td>Charlop-Christy &amp; Daneshvar (2003)</td>
<td></td>
<td>MPND = 46.67%</td>
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<tbody>
<tr>
<td>Jones &amp; Feely, (2007)</td>
<td>All 3 children achieved mastery (90% independent correct responding, across 2 consecutive sessions and days)</td>
<td>Performance continued during 6-30 maintenance sessions, and during generalization probes</td>
<td>Video-taped recordings: 86.97% presentation 80-100% prompting 77-96% consequences</td>
<td>Not reported</td>
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<tr>
<td></td>
<td>PND=66.11%</td>
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<tr>
<td>Chin, Bernard-Opitz</td>
<td>Increased time spent in shared interest in conversations</td>
<td></td>
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<tr>
<td>(2000)</td>
<td>Increased percentage of responses appropriate to context of conversation</td>
<td></td>
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<tr>
<td></td>
<td>Score of 0 for all students on first or second order False Belief tasks. PND=80.77%</td>
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<tr>
<td>Lopata, Thomeer, Volker, &amp; Nida (2006)</td>
<td>Significant main effects were found from parent ratings for general improvement for social skills, adaptability, and atypicality. Staff ratings had significant improvements for social skill, but nonsignificant ratings for adaptability, and significant ratings in the opposite direction for atypicality. Effect size social skills: .24 Effect size adaptability: .59 Effect size atypicality: .39</td>
<td>None</td>
<td>Not reported</td>
<td>Not reported</td>
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<tr>
<td>Baumringer (2002)</td>
<td>Post treatment results indicated significantly greater ability to suggest relevant solutions, higher number of social solutions, few non-social solutions</td>
<td>None</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td></td>
<td>Significant improvement in knowledge of emotions</td>
<td></td>
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<tr>
<td></td>
<td>Significant main effects for initiating positive interactions, and responding positively to peers</td>
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<td>Significantly higher post-treatment scores on cooperation and assertion on SSRS-T</td>
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<td></td>
<td>Effect size positive interactions: 1.24</td>
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<td>Effect size cooperation: .47</td>
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<td>Effect size assertion: .69</td>
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<td></td>
<td>Increase in participation in cooperative learning activities, playing organized sport games at recess, and visiting with peers at lunch for all students</td>
<td>Maintenance probes 1/month for 5 months indicated high performance levels maintained after intervention training</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Bock (2007)</td>
<td>PND= 100%</td>
<td>MPND= 100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Krantz &amp; McClannahan (1998)</td>
<td>Verbal elaborations and unscripted interaction increased; (Zero baseline)</td>
<td>Others (n = 7)</td>
<td>Gains maintained to new interactions/activities</td>
<td>Not reported</td>
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</tbody>
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<tr>
<th>Study</th>
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<tr>
<td>Nelson, McDonnell, Johnston, Crompton, Nelson (2007)</td>
<td>Increased initiation &amp; engagement duration; improved sophistication PND=48.57% Initiations are generalized within the classroom MPND=100%</td>
<td>Not reported</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>McGee &amp; Daly (2007)</td>
<td>Children were able to acquire target social phrases, and transfer use of those phrases to situations where there were no prompts or reinforcement for their use PND=36.78% (Zero baseline) Generalization probes occurred during free-play activities at least 2 hrs after teaching sessions GPND=44.44%</td>
<td>Teaching sessions videotaped, monitored occurrences of procedural errors</td>
<td>Solicited opinions from local area preschool teachers using questionnaires</td>
<td></td>
</tr>
<tr>
<td>Charlop-Christy, Carpenter, Le, LeBlanc, &amp; Kellet (2002)</td>
<td>Increases in spontaneous speech and imitation Increases in initiations, requests, and joint attention MLU PND=27.78% Cooperative Play, Joint Attention, Eye Contact &amp; Combined Frequency of Initiation and Requests PND=76.92%</td>
<td>Results maintained during post training follow-up MLU FPND=100% Cooperative Play, Joint Attention, Eye Contact &amp; Combined Initiations and Requests FPND=96.67%</td>
<td>Not reported</td>
<td></td>
</tr>
<tr>
<td>Shabani et al. (2002)</td>
<td>Increases in verbal initiations and responses PND=89.13%</td>
<td>Partial maintenance of behavior during prompt-fading MPND=100%</td>
<td>Not reported</td>
<td></td>
</tr>
<tr>
<td>Gonzalez-Lopez &amp; Kamps (1997)</td>
<td>Increased frequency and duration of interactions for all students Frequency of interactions PND = 59% Duration of interactions PND=67%</td>
<td>None</td>
<td>Not reported</td>
<td></td>
</tr>
<tr>
<td>Charlop-Christy &amp; Kelso (2003)</td>
<td>All participants made gains PND=89.47%</td>
<td>Generalization probes were taken with different conversational partners, settings and topics GPND=72%</td>
<td>Not reported</td>
<td></td>
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</tbody>
</table>
Target Behaviors

A number of social behaviors were targeted across the studies; many studies targeted more than one behavior. Maintaining conversation and/or appropriate social behavior was targeted in 28 studies, 17 studies targeted initiating conversations or social behavior (including greetings and requests), 5 studies targeted initiating play. Eight studies targeted appropriate play skills (including turn-taking), two studies targeted eye contact, and two studies targeted perspective-taking.

Research Designs

The vast majority of studies (31) utilized a multiple baseline design. Twenty-four studies were conducted across participants, six studies were conducted across behaviors, three studies were conducted across settings, three studies were conducted across other individuals, and two studies were conducted across tasks. Some of the studies were conducted across multiple categories within the study.

Of the other seven studies, five utilized the ABAB or reversal design, and two studies utilized the group experimental design. Both of the experimental studies followed a pre-post-test format with a control group.

Outcome Measures across Interventions

Social Stories. Six studies used Social Stories to teach social skills. The PND scores ranged from 46.7% to 100% with a mean of 67.21%, which represents questionable effectiveness as an intervention according to Scruggs and Mastropieri (1998). Although Social Stories met the criteria for evidence-based practice according to Horner et al. (2005), the effectiveness of Social Stories as an intervention for improving social skills is questionable due to the low PND scores.

Peer Mediated. A total of nine studies in this category examined the effects of peer mediated strategies on social skills, two of which were group experimental designs. We used available data reported in the original studies to obtain the effect size due to the absence of such results in the original studies. The effect size for Lopata et al (2006) ranged from .59-.24 indicating moderate to mild effects, while the effect size for Baumringer (2002) ranged from 1.24-.47 indicating high to moderate effects. The third study used a multiple baseline across settings design. The PND for intervention was calculated at 100%, which is very promising. However, more studies are needed to confirm the efficacy of cognitive behavioral training.

Others. In this category, most of the interventions were represented by only one study, i.e. pivotal response training (n = 1), Theory of Mind (ToM, n = 1), scripts and cue cards (n = 2), Keys to Play (n = 1), incidental teaching (n = 1), PECS training (n = 1), tactile prompting device (n = 1) and social skills training with scripts and reinforcement (n = 1). Even though some of the studies reported fairly promising PND scores, (e.g. ToM PND = 80.77%, indicating an effective intervention), more studies are needed with more participants and by different researchers to further evaluate their effectiveness as evidence-based and effective interventions.

Intervention Maintenance and Generalization Effects

Twelve out of 36 studies reported the maintenance effects of the intervention. The PND scores ranged from 38% to 100%, with a mean of 78.5%. Nine studies reported the generalization effects of the intervention. The PND
scores ranged from 40% to 100% with a mean of 80.95%. In addition, nine studies reported the follow-up data of the intervention. The PND scores ranged from 60% to 100%, with a mean of 92.15%. However, these averages were obtained across five categories of interventions, making it impossible to conclude whether the impact of individual interventions was effectively maintained and generalized due to limited number of studies in each category reporting such results.

Discussion

Results varied widely both between intervention types, and within each intervention type. While Social Stories, Peer-Mediated, and Video-Modeling interventions all met the criteria for evidence-based practices according to Horner et al. (2005), a closer look at PND scores shows that only Video-Modeling meets criteria for being evidence-based as well as demonstrating high effectiveness as an intervention strategy. The PND scores of two of the six Social Stories intervention studies (Barry & Burlew, 2004; Delano & Snell, 2006), and three of the nine Peer-Mediated intervention studies (Garrison-Harrell, Kamps, & Kravits, 1997; Koegel, Werner, Vismara, & Koegel, 2005; Laushey & Heflin, 2000), demonstrated high effectiveness. Looking more closely at those highly effective studies could provide clues to implementing interventions in ways that will be effective. Cognitive behavioral training is another intervention that shows great promise; more research is needed in this area to demonstrate both its status as an evidence-based practice, and its overall effectiveness.

Zero Baseline Effects

Seven out of the 36 single subject studies reported zero baseline, by which is meant all baseline data are equal to zero. Such data are problematic due to the fact that a minor effect could result in relatively high levels of non-overlapping data. In the case of zero baselines, it is often difficult to believe that “the subject was exhibiting no task-relevant behavior at all. It often seems that the observational measure was not sensitive to relevant levels of behavior that were being examined” (Scruggs, et al., 1987, p. 30). Therefore, during final data analysis, we need to be more cognizant whether a specific treatment was effective only in the presence of “zero baseline” data. In such case, conclusions regarding the effectiveness of a particular treatment should be interpreted with caution.

Implications for Practice

This review described a variety of interventions that have been developed and evaluated...
to promote social skills in children with autism spectrum disorders. The results of the present study are consistent with those of previous meta-analysis indicating that social skills interventions are minimally effective for children with ASD (Bellini et al. 2007; Vaughn et al., 2003). The exception to this is video modeling; that intervention was shown to meet the criteria for evidence based practice, as well as being highly effective. Practitioners implementing video-modeling as a method for teaching social skills can do so with greater confidence of its effectiveness. While social stories and peer-mediated strategies can be said to be evidence-based practices, practitioners should monitor these strategies closely when implementing them as they may have limited effectiveness. Other strategies should be implemented carefully, with the understanding that they have not met criteria as evidence-based practices, and require continuous monitoring for effectiveness.

Most of studies included in this review were conducted by researchers with a few exceptions that were implemented by classroom teachers, paraprofessionals or parents. However, social skills training in general is carried out by teachers and parents in integrated settings. If the interventions implemented by professional researchers yield mixed results, it would be a real challenge for classroom teachers and parents with limited resources and time to achieve the same or better outcomes.

Limitations

This synthesis only evaluated social skills interventions for children with ASD published between 1997 and August 2008. Evaluating studies over a longer period of time may have resulted in more interventions meeting the criteria for evidence-based practice, or more studies demonstrating a higher level of effectiveness. However, the criteria for evidence-based practices were only recently established; studies done before 1997 would have been even more less likely to meet those criteria. We also only looked at studies that were primarily implemented in school-based settings; the effectiveness of these interventions on social skills in community settings or for adults with ASD cannot be determined from this meta-analysis.

Suggestions for Future Research

Although our initial search of the literature found 104 studies that targeted social skills, in the end only 38 of those met criteria to be evaluated as evidence-based practice, as well as allowing for the calculation of treatment effects. Future research in this area should be planned and implemented in such a way that meets the criteria for evidence-based practice, as well as reports treatment effects.

Most of the studies targeted students between the ages of 5-12; many of the remaining studies targeted preschool children. Only three studies were implemented with individuals over 12 years of age. Studies targeting these older children would be beneficial in determining if particular interventions are more effective with this age group.

Generalization of skills is an integral component of social skills interventions. Future studies are needed to examine the generalization of skills across multiple settings and with multiple persons. Researchers and teachers should create an explicit plan for promoting generalization when developing a social skills intervention.

Single subject designs were used to evaluate intervention effects in 36 out of the 38 studies included in this review. Multiple baseline designs were utilized in almost all of the studies to establish the experimental control. Although such designs are well-suited to demonstrate analyses, certain limitations do apply—it does not allow for comparison of different interventions. Future research is needed to determine which intervention is most effective for which students. Compounding this limitation is the presence of near or at zero baseline performance by the participants in many studies. Because most social skills interventions are likely to boost social interaction above the floor levels, comparative analysis can assist researchers in identifying which intervention achieves this objective most effectively.

References

References marked with an asterisk indicate studies included in the meta-analysis.


Learn by Doing: A Collaborative Model for Training Teacher-Candidate Students in Autism

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Abstract: With the large number of students with autism entering the educational system, the need for empirically supported treatment (EST) in the classroom and special education teachers with training in autism and ESTs is necessary now more than ever. This paper describes a collaborative model between 2 universities aimed at providing teacher-candidate graduate students training and community-based practice in an EST, pivotal response treatment (PRT). Three components of the model are described: (1) the community-based service delivery system, (2) the Masters/special education credential program and (3) training in PRT. Additionally, issues around student and family participation are discussed along with possible solutions and future directions. Finally, model benefits are described with regard to graduate students, children with autism, families and the community.

The prevalence of children and youth diagnosed with an autism spectrum disorder (ASD) has increased at an alarming rate. Recent statistics from the Centers for Disease Control and Prevention indicate that as many as one in every 150 children today may be affected. The number of cases of autism now surpasses that of all types of cancer, diabetes, and AIDS combined. 560,000 individuals in the US birth–21 years of age are living with ASD. Of the children born in the US in 2007, more than 26,000 will eventually be diagnosed with ASD (Centers for Disease Control and Prevention, 2007).

Due to this increase, along with an unfortunate longstanding tradition and legacy of accepting, condoning, and even promoting methods and strategies that lack efficacy and proven utility (Gresham, Beebe, Frankenberger, & MacMillan, 1999; Simpson, 2005), there is a need for widespread access to empirically supported treatments (EST's) for these children and their families. Even with the body of research supporting behavioral analytic intervention procedures as effective EST’s for individuals with autism (DeMyer, Hingtgen, & Jackson, 1981; National Research Council, 2001), effective dissemination of these EST’s has not grown along with the disorder, creating a large need for families often drawn to a myriad of highly promoted, non- efficacious treatments (Croen, Grether, Hoogstratge, & Selvin, 2002; Koegel, Koegel, Harrower, & Carter, 1999; Sperry, Whaley, Shaw, & Brame, 1999; Stahmer & Gist, 2001; Symon, 2001). Although the gap between research and practice in education has been well-documented (Brown, Odom, & Conroy, 2001; Iovannone, Dunlap, Huber, & Kincaid, 2003; King-Sears, 2001; Lerman, Vorndran,
Addison, & Kuhn, 2004; Simpson, McKee, Teeter, & Bevtien, 2007; Snell, 2003; Stahmer, Collings, & Palinkas, 2005), bridging the research-practice gap in the field of special education is even more difficult due to a number of challenges present in the training of special education teachers.

Problems with Special Education Certification

One problem cited by the Study of Personnel Needs in Special Education [SPENSE] (2002) and others (Scheuermann, Webber, Boutot, & Goodwin, 2003; U.S. Department of Education, 2002) is the chronic shortage of special education teachers (Bergert & Burnett, 2001; Billingsley, 2004; Boyer & Gillespie, 2000; Gerten, Keating, Yovanoff, & Harniss, 2001; Sach, 1999). This shortage has prompted states to hire uncertified or partially certified teachers and has also prompted a movement to alternative certification programs. The goal of such alternative programs is to shorten the length of time required to earn a teaching certificate. Although students in alternative programs perform adequately in terms of pass rates on certification exams (U. S. Department of Education, 2002), research conducted by Darling-Hammond (2002) suggests that these students are less able when evaluated on measures of student performance.

A second problem stems from the nature of the teacher certification programs themselves. While certification requirements vary from state to state, the shortage of special education teachers nationwide has produced a trend favoring noncategorical or multicategorical certification where disability-specific training and licensure is not provided (Mainzer & Horvath, 2001; National Information Center for Children and Youth With Disabilities [NICHY], 1997; Scheuermann et al., 2003). Those concerned with these traditional and alternative special education teacher preparation approaches question the ability of such programs to provide instruction in the range of specialized skills needed by special education teachers whose students enter classrooms with widely diverse backgrounds and with widely diverse needs (Kleiner, Porch, & Farris, 2004; McLeskey, Tyler, & Flippin, 2004). In particular, traditional categorical and alternative “fast track” programs may be of limited usefulness for special educators who serve specific populations with significant need, such as students with autism and/or behavioral challenges (Henderson & Klein, 2005) unless such programs include autism-specific training or training in applied behavior analysis.

Autism Specific Training

A major concern related to the training of special education teachers is the lack of training specific to the education of children with autism. Given the complexity, comprehensiveness, and spectrum of autism symptoms, coupled with the fact that only a small percentage of the vast array of interventions for children with autism are supported by rigorous research (Simpson, 2005), there is also a need to ensure that teachers in training learn about those interventions that are empirically validated (Lerman et al., 2004).

In an effort to create a model that would attempt to address these concerns, two universities collaborated and adapted an existing non-categorical special education teacher training program in mild to moderate disabilities to include training in an EST for children with autism. Since one of the universities was well-known for the development of the EST, Pivotal Response Treatment (PRT), this was the method chosen to include in the teacher training.

PRT is documented as one of only four of 33 interventions/treatments to receive the highest ranking, a “scientifically based practice,” in a study conducted by Simpson (2005). PRT is a comprehensive service delivery model that uses both a developmental approach and applied behavior analysis (ABA) procedures and aims to provide opportunities for learning within the context of the child’s natural environment. Pivotal areas are those that, when targeted, lead to large collateral changes in other-often untargeted-areas of functioning and responding. Pivotal responses, once acquired, result in widespread and generalized improvement in children with autism (Koegel, Openden, Fredeen, & Koegel, 2006, p. 4). PRT is also characterized by the coordinated involvement of relevant stakeholders (e.g., parents, siblings, teachers, consultants, peers) so that the intervention
implemented is consistent across people and environments thus providing the child with the most comprehensive of treatments with the primary goal of movement toward a typical developmental trajectory (Koegel et al.).

This article describes the collaborative effort to: 1) train teacher-candidate graduate students in EST’s for children with autism, and 2) provide empirically supported treatments to local families with children with autism. Also described are issues that arose during program implementation, and the benefits the program yielded for teacher-candidate graduate students, children with autism and their families.

The Collaborative Model

The following section will describe: a) the nature of the two universities participating in the collaborative model, b) the three tiered service delivery system used by the “research university” to provide PRT to families, c) the Integrated M.A./Special Education Credential Program of the “teacher prep university” and d) the inclusion of teacher-candidate graduate students in the three tiered service delivery model.

Universities

The program was delivered by two collaborating western institutions of higher education located 100 miles apart. One university is a master’s-granting university with a primary mission of training teachers. This university will be referred to hereafter as the “teacher prep university.” Although, clinical services are available to families in the “teacher prep university” county, this university had not been active in the provision of PRT or any other EST for families with children with autism prior to the start of the program.

The second university is a research institution with an established autism research center, clinic, and a doctoral training program in special education with a specialization in autism intervention. This research center and clinic is particularly well known for its work in PRT. Clinical services are provided by this research center both to local families as well as to families located in other states and countries. This university will hereafter be referred to as the “research university.”

Community-based Model and Training of Teacher-Candidate Graduate Students

The three tiered service delivery model used to deliver clinical intervention for children with autism and training for their families by the “research university” was adapted to fit the collaborative, two university project.

Tier One

In Tier One, undergraduates or B.A. level persons receive clinical training in PRT and provide direct support to children with autism. Tier One clinicians receive initial didactic training and then videotape themselves as they work with children each week and bring their tapes to supervision/training sessions held each week with their Tier Two supervisor (see description of Tier Two below). Tier One clinicians are paid employees whose salaries are generated by State monies used to support services for children with disabilities and their families.

Tier Two

In Tier Two, M.A. level clinicians with both training and experience in PRT provide parent/family training as well as view and provide feedback on videotaped footage provided by Tier One clinicians. Tier Two clinicians also provide direct support to children with autism as needed. As they have more training and are responsible for parent training, Tier Two clinicians are paid employees at a higher rate of pay than Tier One clinicians.

Tier Three

In Tier Three, a Ph.D. Level or doctoral candidate clinician views videotaped footage of all children on a weekly basis, provides feedback and supervision to Tier Two clinicians, and visits families/children on an as-needed basis. As the Tier Three clinician is the person primarily responsible for the clinical program and has advanced training, s/he is paid at a higher rate of pay than Tier Two clinicians.
TABLE 1
Theoretical and Practical Components of Program: Autism Emphasis

<table>
<thead>
<tr>
<th>Theory</th>
<th>Practice</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td><strong>Objectives</strong></td>
</tr>
<tr>
<td>1. Learn basics of qualitative and quantitative research methods</td>
<td>1. Students matched to families</td>
</tr>
<tr>
<td>2. Learn to access the research literature</td>
<td>2. Students meet families and begin to visit families weekly</td>
</tr>
<tr>
<td><strong>End product</strong></td>
<td><strong>End product</strong></td>
</tr>
<tr>
<td>Literature review related to student interest</td>
<td>3. Students receive a manual describing the procedures of Pivotal Response Treatment</td>
</tr>
<tr>
<td></td>
<td>4. Students observe intervention by trained clinicians</td>
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</table>

**Winter**

<table>
<thead>
<tr>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learn to evaluate published research</td>
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<tr>
<td>2. Begin to learn how to formulate a research study</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>End product</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiry Project Begun</td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Objectives</th>
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</thead>
<tbody>
<tr>
<td>Students complete research project:</td>
</tr>
<tr>
<td>• A research question</td>
</tr>
<tr>
<td>• Dependent &amp; Independent Variables</td>
</tr>
<tr>
<td>• Procedure</td>
</tr>
<tr>
<td>• Baseline &amp; Intervention data</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>End product</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Present research projects to families and local and educational community</td>
</tr>
</tbody>
</table>

**Integrated M.A./Special Education Credential Program**

Approximately 15–20 graduate students are carefully selected each year from a competitive pool of applicants to participate in a one-year, full-time professional training program. Successful completion of the program results in both an M. A. in Special Education with autism as the special education emphasis area and a non-categorical preliminary special education credential for mild to moderate disabilities.

To be admitted into this program, all applicants must have: (a) experience with children and youth both with and without disabilities, (b) successfully completed pre-requisites including coursework and tests (e.g. basic skills, subject matter competence exams, health and fingerprint screening) and (c) demonstrated the potential to become educational leaders.

Admitted teacher-candidate graduate students represent a range of age-ranges and experiences.

The program is cohort based and courses are strategically clustered across the year in a way that maximizes the opportunity for student learning. The program consists of 12 courses and related fieldwork experiences. The courses and fieldwork are spread equally across the academic year. The first cluster of courses (fall quarter) emphasizes family systems theory, collaboration, assessment and instruction of culturally and linguistically diverse students and an introduction to research methods including the collection of baseline data. The second cluster of courses (winter quarter) emphasizes positive behavioral support (PBS), the initiation of a PRT intervention, current educational issues and teaching methods for students with mild to moderate disabilities. The last cluster of courses (spring quarter)

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concludes the program with an emphasis on educational assessment, student teaching, and analysis of intervention data taken while implementing PRT. Major themes embedded across the cohort-based program include: a) collaboration, b) family support, c) positive behavioral support and d) autism/PRT.

Inclusion of Teacher-Candidate Graduate Students in Service Delivery Model

As part of the integrated M. A. in Education/preliminary special education credential program (in mild-moderate disabilities), teacher-candidate graduate students at the “teacher prep university” are required to take a three course, year-long, research sequence. As a function of this sequence, “teacher prep university” graduate students receive didactic training in PRT, are subsequently matched with families, and begin their year-long “learn by doing” practicum in the provision of intervention using PRT. A doctoral student from the “research university” nearing degree completion serves as “teacher prep university” adjunct faculty and assists in teaching the courses in the research sequence that focus on empirically supported treatment methods and supporting families of children with autism. The description that follows focuses on the portion of the integrated M.A. in Special Education/preliminary Special Education Credential program that addresses training in autism (See Table 1).

First 10 Week Period

During this first 10 week period (fall quarter), the program plan combines both academic/theoretical and clinical work in autism. In their academic/theoretical work, students: a) learn the basics of single subject research, b) learn the basics of PRT, c) learn to access literature in the area of autism, and d) learn how to write literature reviews and evaluate research literature.

Simultaneously, teacher-candidate graduate students gain clinical experience. They are organized in pairs, and each pair is assigned to one family. In their clinical position, the teacher-candidate graduate students: a) become members of existing family support teams organized by the “research university”, b) observe trained clinicians supporting children using PRT, c) establish a schedule of weekly visits, d) support families in meaningful ways that preclude expertise in PRT, and e) collect videotaped baseline data of themselves as they provide generic support to the children with autism.

Second 10 Week Period

The second ten week phase (winter quarter) also involves a combination of academic/theoretical and clinical work. Academically, students: a) continue their learning regarding how to evaluate published research, b) are given didactic instruction in PRT procedures, c) learn how to formulate a research question and d) plan a single subject research study. Clinically, students: a) learn to assess child/family needs and identify intervention goals, b) begin to implement PRT procedures, and c) receive weekly videotape supervision on their performance. Videotape supervision occurs in the context of their university course where each pair of students brings videotape footage filmed in the family context the previous week. Based on “research university” adjunct faculty feedback provided to each student pair, student pairs then adjust and improve their ability to employ PRT during the following week. Students communicate with families on an ongoing basis. The student-provided PRT support, thus, provides families with no cost, “value added” extra hours of PRT that overlaps with the support provided by trained clinicians already being provided by the “research university” in the community-based service delivery model.

Third 10 Week Period

In the third 10 week phase (spring quarter), teacher-candidate graduate students continue implementation of the intervention weekly. As in the second 10 week period, graduate students: a) present videotape footage and other data with analysis to faculty members, b) adjust their clinical methods based on faculty feedback, and data analysis, and c) communicate with families on an ongoing basis. An expectation in this period is that the students
become more active participants in videotape analysis. In addition, teacher-candidate graduate students conclude their training by presenting both written summaries and Microsoft PowerPoint presentations of their data analysis and conclusions.

**Issues and Adjustments**

As the collaborative model evolved, program staff made adjustments to better meet the needs of the teacher candidate graduate students and the families and children with autism. This section will describe the issues that arose and the adjustments recommended for improved program success.

**Teacher-Candidate Graduate Students**

The issues that arose for the graduate students and faculty included: a) the overall stress encountered as part of the training program, b) logistical difficulties in matching teacher candidate graduate students with families (time available, geography, age, sex, and characteristics of child etc.) and c) personal characteristics/"goodness of fit".

**Stress**

Participating in a one year integrated training program leading to both an M. A. in Special Education and a preliminary special education teaching credential is a time intensive experience. Given both the “fast track” nature of the 10 week quarter system, programmatic requirements to assume leadership roles in class as well as participate in year-long, “learn by doing” fieldwork placements in both schools and with families, students were challenged to exercise time management as well as to maintain the level of energy needed to fulfill all requirements. This resulted in reported stress for most teacher-candidate graduate students. In addition, the cohort nature of the program (with each course offered only one time per year and the consequent necessity to wait a calendar year to complete or retake any course not taken or completed) and the high level of performance expected (overall 3.0 GPA), intensified the stress for some students who had either underestimated the demands of the program or incurred health problems over the course of the year.

**Stress solutions.** Efforts to ameliorate this stress consisted of a collaborative effort to build the course of study and provide student advisement. Courses were collaboratively planned by faculty so that they could be offered in a logical sequence and so that students could see the interconnectedness of the subject matter. Collaborative planning also enabled faculty to view learning outcomes across a series of courses vs. course by course, and space major assessments across the term. For example, one faculty planning session resulted in a decision to overlap the readings from one text in two courses being concurrently taught—family support and collaboration.

As the training program is truly a “program” and not just a series of courses, and as expectations for student initiative and performance are high, the nature and expectations of the training program along with faculty and student responsibilities was presented to students both individually, and as a cohort, at multiple points. These points included program information meetings for potentially interested candidates, pre-program counseling for admitted students, orientation seminar immediately prior to the beginning of the program, individual meetings as per faculty or student request, planned class periods to elicit feedback, formative assessments (See Table 2 for The Scholar Pretest) and intermittent informal conversations during social opportunities. In addition, faculty communicated regularly with both participating mentor teachers and families of children with autism to gather information about teacher-candidate graduate student performance and stress level which increased predictably as each quarter progressed.

Through the aforementioned efforts to frequently meet with students and to create a “cohesive” program, students’ stress level may have been lowered. Despite these efforts, however, it was evident that some of the students still experienced difficulty. Students, used to taking single courses and being told what to do, were less familiar with having to make connections between and among courses and to participate actively in their own learning. While the stress level
seemed in some cases intensified, in challenging students to participate actively in their own learning, faculty hoped to stimulate life-long learning.

Logistical Difficulties in Matching Teacher-Candidate Graduate Students with Families

Matching teacher-candidate graduate students with families involved several factors: a) time, b) geography, and c) “goodness of fit” between the personal characteristics of teacher-candidate graduate students and the families and their children with autism.

Time. The time available for teacher-candidate graduate students and children with autism to work with one another was limited. Graduate students had class beginning at 4:10 p.m. four days/week. Children with autism often had multiple appointments after school (2:00 p.m. and later) several days/week with speech therapists, occupational therapists, or other therapists.

Geography. In addition, even though graduate students and children with autism all

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<th>2</th>
<th>3</th>
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<th>5</th>
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<tbody>
<tr>
<td>1. Skill in managing positive environments for all students.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>2. Knowledge of connections between preventing discipline problems and curriculum, instruction, and management.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Knowledge of general information on disability, disability policy and laws relating to special education.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Skill in preparing instruction to meet the needs of students with disabilities in general education classrooms.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>5. Knowledge about the structure of language and the process of acquiring a second language.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>6. Knowledge of instructional and assessment practices for English Language Learners (ELL).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>7. Knowledge of cultural diversity, cultural awareness, and culturally responsive schooling.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<td>8. Knowledge of contemporary issues facing American Education.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>9. Skill in diagnosing and remediating reading problems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Knowledge of reading instruction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Knowledge of ethical and legal practices in special education.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Skill in applying the Family Systems Framework.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>13. Knowledge of the essential components of an Individualized Transition Plan.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>14. Knowledge of norm referenced, criterion referenced, and curriculum based assessment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>15. Skill in interpreting student assessment data.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. Skill in designing instructional programs based on student assessment data.</td>
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<td>17. Knowledge of instructional strategies for students with mild/moderate disabilities.</td>
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<td>18. Knowledge of organization of classroom environments for students with mild/moderate disabilities.</td>
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<td>19. Knowledge of school collaboration activities.</td>
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<td>20. Skill in conducting school-based collaboration activities.</td>
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<td>21. Skill in using effective communication, interpersonal, and problem solving skills.</td>
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<td>22. Skill in searching professional literature.</td>
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<td>23. Skill in using Pivotal Response Training (PRT).</td>
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<td>24. Skill in designing, implementing, and interpreting action based research.</td>
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lived in the same county, the county encompassed 3600 square miles with driving distances between families ranging up to 60 miles. Given the time constraints for both teacher-candidate graduate students and children with autism, geography was an important variable when establishing “matches.”

“Goodness of fit” between teacher-candidate graduate students and families. Finally, it was challenging to anticipate the “goodness of fit” with regard to personal characteristics during the matching process. Over the course of the program, some teacher-candidate graduate students seemed more interested and/or more able to function as clinicians and interact with children with autism and their families than others. Although initially no data were taken on this phenomenon, many teacher-candidate graduate students described feeling “nervous” or “anxious” in the initial stages of interacting with families and providing generic support for children with autism. For their part, some participating families also reported some concern over the students’ ability to provide support for their child in the home. Over the course of the year, as they became more knowledgeable in the areas of family systems theory, PBS, and PRT, the students’ sense of nervousness dissipated and families reported more confidence in the students’ abilities. In many cases the teacher-candidate graduate students and families developed friendships and have remained in contact years after they completed their program. In a few cases, discomfort continued on the part of the student or family and required additional involvement by faculty members (see below).

Logistical Solutions in Matching Teacher-Candidate Graduate Students with Families

Logistical difficulties were initially addressed on a case by case basis. There were, however, enough commonalities to eventually result in programmatic changes important to consider when implementing a program of this nature. These are detailed below.

Time. With regard to the students’ limited time, in cases where children with autism had no free period of time between the hours of 2 and 3:30 p.m. during the week, teacher-candidate graduate students provided support on Saturdays. In other instances, faculty members “pushed back” the start time for particular courses from 4:10 to 4:30 or 4:45 to accommodate student and family schedules. After the second year of the program, faculty moved the start time for university coursework back one hour from 4:10 p.m. to 5:10.

Geography. In terms of the geographic distance that separated teacher-candidate graduate students from families with children who had autism, faculty began by placing students who lived or worked in communities farthest from the university with families who also lived in those same, more geographically distant communities. Then, once the logistically difficult matches were made, faculty placed the remainder of the teacher-candidate graduate students who lived closest to campus.

“Goodness of fit” between teacher-candidate graduate students and families. With all families parental preferences (e.g., preference for a particular sex or level of experience) were taken into account when matches were made. In an effort to increase “goodness of fit” between family/child and teacher-candidate graduate students, faculty increased their contact with families to more closely monitor family-graduate student interactions. This included regular contact made in person, via telephone or via e-mail. In addition, after the second year of the program, instead of matching one graduate student with one family, two graduate students were paired and then each pair was assigned to a family. This solution simplified matching and facilitated “goodness of fit.” Matching pairs of teacher-candidate graduate students with a family helped lessen student anxiety.

Even after these adaptations, however, problems persisted. For example, one family during the program’s three-year history asked that a teacher-candidate graduate student not return to their home to provide services. Although these instances of poor matches are very infrequent, they create substantial difficulty and unneeded stress for families. In an effort to identify students who may need extra support in order to function successfully in providing clinical support to children with autism faculty plan to implement an additional strategy. Faculty will create early opportunities in school settings to observe teacher-candidate graduate students working with small groups of children, and where, possible, chil-
dren with autism. If, through these observations and subsequent conversations with teacher-candidate graduate students, faculty members determine that “hands-on” work with families and children may not be appropriate for particular teacher-candidate graduate students, those graduate student will be given the opportunity to support families of children with autism in other important ways such as organizing and conducting sibling support groups.

Children and Families

Time availability and family satisfaction arose as areas that needed to be addressed for the families with children with autism.

*Time.* Time availability was also a constraining factor for families and children. Lack of available time was addressed on a case-by-case basis but, in cases where family schedules were too full, participation was not possible.

*Family satisfaction.* The second issue that arose involved family satisfaction. That is, families differed in their level of satisfaction. Dissatisfaction with the training program, although infrequent, sometimes resulted in a family exiting the program. As the “research university” was one of many providers of service, families were able to switch from one provider to another. Reasons for switching to another service provider included lack of satisfactory progress toward designated goals, desire for more hours of support than could be provided, and differences in philosophy regarding behavioral intervention. In one case, for example, the family was unable to participate at home as intervention agents. As parents are viewed as an integral part of their child’s program and as primary intervention agents in the PRT model (Koegel et al., 2006), this served as a cause for the parents to change service providers.

In an effort to address the family satisfaction, faculty members will begin administering The Family Partnership and Quality of Life Survey (Beach Center on Disability, University of Kansas, 2003) to participating families. This survey will be administered each year at the onset of the program and again as the academic year comes to a close. The purpose of the Family Quality of Life Scale will be to measure if, as a result of the autism support services provided, a family’s quality of life had improved. Families are asked questions about a) the services they receive or need, b) how families feel about the main person who works with them and their child, c) things that make life together as a family good, and d) information about the families in general. Based on the results of the Family Quality of Life Scale, faculty members will review both what services are provided, who is providing them, and how they are provided, and make adjustments as necessary in order to better meet family needs. For example, if a family marked “receives behavioral support but not enough”, the number of hours of behavioral support could be increased.

Unresolved Issues and Recommendations

Unresolved issues fall into two categories: a) university issues and b) state agency disability funding issues.

*University issues.* University issues were largely the result of the small nature of the special education program at the “teacher prep university”. Small programs by definition mean that more responsibilities fall on fewer people. In the case of this program, with only two tenure track faculty members, the program’s very existence was completely dependent on the extra time the two faculty members were willing to devote. In addition, since the adjunct faculty member providing supervision for the children’s programs was based at the “research university” (located 100 plus miles away from the participating families), it was difficult to maintain ideal levels of supervision and contact with the families.

*University recommendation.* A third tenure track faculty member at the “teacher prep university” with expertise in autism would help ensure the institutionalization of this program.

*State agency issues.* As the state agency authorized and paid providers, such as the autism center at the “research university,” to provide services to families with children who have disabilities, their participation was essential for the training program’s existence. Challenges presented in working with this agency included: 1) their schedule of meetings and 2) their vendor reimbursement rate.
The local office of the state agency’s requirement for face-to-face quarterly meetings for every child exacerbated the issue of limited time. The practice of holding face-to-face quarterly meetings, vs. telephone or web cam conferencing, was determined locally and was not a procedure that was practiced statewide. While time consuming for local service providers, this practice worked an undue hardship on “research university” staff as they spent four or more hours on the road in order to attend each of these meetings.

Service providers that are authorized by the local branch of the state developmental services agency are reimbursed for services they deliver to children and families at relatively low pay rates. In an effort to maintain fiscal viability, service providers seek to provide service to large numbers of families using tiered service delivery systems. In tiered systems, direct service provision is provided by less well trained staff members who work for a modest hourly rate. These direct service staff, in turn, are supervised by higher paid staff persons with more experience and training. The supervisory staff persons interact directly with families on a less frequent basis.

Given the reimbursement-for-service rate provided by the developmental services agency as well as the sometimes inadequate number of hours of funded support families were allowed, all local vendored service providers are challenged to provide the quality and intensity of services necessary to achieve agreed upon goals. In addition, as mentioned above the “research university” and their supervisory staff were located 100 or more miles away from the participating families, the amount of compensation the “research university” as authorized service provider received, was barely enough to cover out-of-pocket costs.

State agency recommendations. 1) Grant a one-time funding increase to service providers based on the average rate provided to service providers statewide. 2) Grant a one-time research grant to evaluate the results of integrating teacher-candidate graduate students in the provision of services to children with autism and their families. 3) Grant yearly cost-of-living increases to all service providers. 4) Allow for phone and video conferencing for quarterly meeting and require face-to-face meetings once a year only. 5) Initiate an independent review process for families who believe the authorized number of vendored intervention hours is inadequate to meet the targeted needs of their children. 6) Lobby for the passage of a law mandating insurance companies to cover the costs of autism services.

Model Benefits

This section will describe those possible benefits for the following stakeholder groups: a) teacher education graduate students, and b) children with autism and their families c) community.

Teacher-Candidate Graduate Students

Teacher-candidate graduate students benefit from this training program in many ways. First, they receive clinical training and hands-on practice in two empirically supported strategies, PBS & PRT, methodologies that will not only equip them with necessary skills needed to work in their future classrooms but will also allow them to provide state of the art services to the children they will be teaching. Secondly, they learned how to assess, to critique and to present the intervention plans they developed and implemented over the year. During this process of analysis and critique students also learned how to collect and analyze data, a skill that will improve their ability to provide effective interventions and monitor the progress of their students. Thirdly, they learned to review the literature and discriminate effective EST’s from passing fads. This important ability will serve them well when faced with a variety of choices and demands for specific intervention strategies that may or may not be empirically based. Fourthly, in times of limited state funds for schools, teacher use of EST’s in classrooms is fiscally defensible and can help position schools for both external funding and recognition. Lastly, teacher-candidate graduate students learned to support, communicate and collaborate with the families they supported.

For the majority of teacher-candidate graduate students in special education programs, “learn by doing” experience is limited to the
classroom. This program not only gave students an opportunity to support children with disabilities in the classroom and understand the teacher perspective, but also to experience disability at home and understand the family perspective. Both the setting (child’s home) and the teacher-candidate graduate students’ position as a “learner” created possibilities for: 1) parent-graduate student relationships to develop, and 2) graduate students to recognize parents as a source of knowledge on their child. These experiences may help facilitate future partnerships that are truly collaborative; partnerships where both parents and professionals view each others’ knowledge as important and/or equal as they work together to meet the unique needs of individual children. Characteristic of teacher-candidate graduate student feedback, one commented, “I learned the necessity of effective and motivating reinforcers to build a new skill that is extremely difficult for a child. I also learned the importance of involving the whole family in behavioral interventions. It also became clear to me that autism looks very different in every child . . . I realized that autism has very serious impacts on high-functioning children as well”.

Children with Autism and their Families

The first major benefit for children and families with autism was the extra support they received from teacher-candidate graduate students. The teacher-candidate graduate student support was provided at no charge to the state agency or to parents and was in addition to the amount of support they received via the state agency vendored intervention program provided by the “research university.” Support was also provided in the form of respite services, information gathering, and advocacy. Secondly, as no service providers in the community had previously provided PRT as a choice to families, the entry of the “research university” as a service provider allowed families one more EST from which to choose.

The third major benefit for children and families resulting from the experience was the opportunity to participate in and receive research-based didactic training. The students, under the guidance and supervision of two Ph.D. level faculty members, provided clinical support to parents and children with autism that was analyzed, critiqued and improved on a weekly basis.

Community

Community benefits, although not as well defined, were clearly present. Since the program was publicized by the “teacher-prep university” it increased autism awareness in the “teacher-prep university” community. In addition to services provided by graduate students, “teacher-prep university” sponsored trainings and lectures which allowed parents and the public at large to access nationally and internationally known figures in the field, an opportunity they may not have had without this program.

Conclusion

Although data documenting the positive change both in graduate students and in the children with autism they supported are still being analyzed, the purpose of this article was to describe a) the model, b) the difficulties that arose as it was implemented, c) adjustments that were made in response to the difficulties, and d) the positive effects such a program can produce for various stakeholder groups. While this training program was not able to address all of the issues challenging special education teacher preparation programs (as described by Scheuermann (2003), it was successful in many respects. First, the training program serves as an example of how a small, non-categorical special education teacher education program, by creatively integrating M.A. and credentialing requirements and by collaborating with a neighboring university, provides teacher candidates with a level of competence in autism treatment procedures previously absent. Second, the program provides an example of how a university can deliver an integrated M.A./special education credential program within the one year timeline mandated by the state. Third the program provides empirically based support for children with autism and their families. Fourth, and perhaps most importantly, the program produces highly qualified teachers in autism; teachers, who over the course of their
careers, will support thousands of children with autism and their families.

Although the training program is a “work in progress” and will continue to be refined in the coming years, it is the authors’ hope that readers will be prompted by this article to discover other ways to include autism training within their teacher training programs.

References


Research-Based Techniques for Teaching Early Reading Skills to Students with Intellectual Disabilities

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Southern Methodist University

Abstract: Teaching students with intellectual disabilities (ID) to read is extremely challenging. Fortunately, the outlook for students with ID is improving because we now know much more about how to teach reading to students who struggle, including those with ID. The central theme of this article is that reading instruction for students with ID must be a carefully orchestrated integration of key skills and strategies that are explicitly linked to meaning. Organized according to the major components of reading instruction, including (a) oral language and vocabulary, (b) phonological awareness, (c) phonics and word recognition, (d) fluency, and (e) comprehension, this article describes key techniques used in research examining effective methods for teaching students with ID to read. We provide specific examples from our research study describing how these skills are being taught to students with ID.

Teaching students with intellectual disabilities (ID) to read is extremely challenging. These students face severe deficits in memory and language that make it very difficult for them to learn to read. Further, behavior issues may interfere with their learning. Although there are many examples of students with ID who successfully learn to read, most students with ID learn very few, if any, basic reading skills. In fact, only 1 in 5 students with ID achieve even minimal literacy skills (Katims, 2001). Fortunately, the outlook for students with ID is improving because we now know much more about how to teach reading to students who struggle, including those with ID (Allor, Mathes, Jones, & Roberts, in press; Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, in press; Mathes & Denton, 2002; O’Connor, Bocian, Beebe-Frankenberger, Linklater, in press; Torgesen, 2002). The encouraging news is that we are currently gathering evidence indicating that the same general techniques proven to work with struggling readers who have average to high IQs are also effective for students with ID (Allor et al., in press; Browder et al., in press).

Reading research has advanced tremendously in recent decades as we have learned how good readers read and how to assist struggling readers so that they can become good readers. Theoretical models of the reading process reflect that good readers employ multiple language systems as they fully process text, including phonology, orthography, and the meaning of language (Adams, 1990). Good readers simultaneously process the internal structure (i.e., complete spellings) of words as they effortlessly read with expression and deeply comprehend the meaning of text (Adams, 1990; Ehri, 2005). Research on effective methods for teaching students who struggle to read is extensive. Effective early reading interventions include multiple components that are explicitly integrated, including oral language, phonological awareness, phonics, word recognition, fluency, and comprehension (see National Reading Panel, 2000; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001; Snow, Burns, & Griffin, 1998).
Typically students with low IQs, including those with ID, have been excluded from research on effective early reading interventions (O’Connor et al., in press); however, recent studies including these students are demonstrating that the same general techniques are effective for both types of students (see Allor, Mathes, Jones, & Roberts, in press; Browder et al., in press). For some time, we have known that students with ID are capable of learning isolated skills, such as sight word recognition and basic phonics (see Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Browder & Xin, 1998; Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006). What is new is that we are now measuring the impact of comprehensive programs that address multiple skills simultaneously and include explicit instruction to teach students to integrate and apply those skills in context. An important finding from our research is that students with ID who received comprehensive reading instruction, on average, outperform their peers on measures of phonological awareness, word recognition, oral language, vocabulary, and basic comprehension. In other words, when taught explicitly and carefully, most students in our study are able to read at least simple connected text with meaning, demonstrating their ability to successfully apply phonemic awareness and phonics skills (Allor, Mathes, Jones, & Roberts).

One factor contributing to the low numbers of students with ID who learn to read is that typically teachers of students with ID have been provided very little training about how to teach reading. College courses focused on teaching students with ID most often include very limited information about how to teach reading or no information at all (Katims, 2000). In this article, we take some preliminary steps in remedying this problem by describing effective techniques for teaching early reading in the context of students with ID who are in the primary grades. The central theme of this article is that reading instruction for students with ID must be a carefully orchestrated integration of key skills and strategies that are explicitly linked to meaning. This article is organized according to the major components of reading instruction, including (a) oral language and vocabulary, (b) phonological awareness, (c) phonics and word recognition, (d) fluency, and (e) comprehension. These are the 5 components identified by the National Reading Panel with the addition of oral language, which is particularly important for students with ID who typically experience severe deficits in oral language (National Reading Panel, 2000). We provide specific examples from our research study describing how these skills are being taught to students with ID, including how we explicitly integrate skills to one another and link skills to meaning. We provide a brief discussion of how these multiple strands overlap and are integrated in effective reading programs, such as the one used in our research, Early Interventions in Reading (Allor, Mathes, & Jones, in press; Mathes & Torgesen, 2005; Mathes, 2005). We chose this curriculum because Levels 1 and 2 already had a proven track record of efficacy with other populations (Mathes et al., 2005; Tong, Irby, Lara-Alecio, & Mathes, 2008; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Linan-Thompson, Mathes, Duradola, & Cardenas-Hagan, 2007).

Instructional Strands within Comprehensive Early Reading Programs

Effective early reading instruction is comprehensive, including multiple strands that are carefully and explicitly taught so that students will apply multiple skills and strategies as they fluently read with comprehension (see Coyne, Zipoli, & Ruby, 2006; Carnine, Silbert, Kame’enui, & Tarver, 2004; O’Connor, 2007). Before describing techniques for teaching each of these strands individually, we emphasize the importance of conspicuously teaching students to integrate and apply skills by teaching students how skills relate to one another and specifically how to use those skills as they read connected text. Any one lesson includes instruction and practice in multiple strands. As skill in one strand increases, that skill is applied to other strands. To illustrate, here are two brief examples. In the first example, students combine phonemic awareness blending skill and letter-sound correspondence as they sound out words. First, students practice a basic phonemic awareness skill, blending spoken phonemes into words. When the teacher says individual sounds, /s/ /a/ /t/,
the students blend those sounds to form the word, *sat*. Then students practice the sounds of printed letters, including the sounds represented by *s*, *a*, and *t*. In early lessons, students practice both of these skills daily. Once students begin to develop these skills, blending individual phonemes orally and saying the sounds of a few letter-sound correspondences, then the teacher integrates these skills into a new activity in which they sound out printed words, such as *sat*. The teacher uses language in the new activity that is consistent with the language in the two separate activities, clearing linking activities. Teaching students to transfer skills from one activity to another is extremely important for students with low IQs, who typically do not spontaneously apply learned skills to new activities. A second example of skill integration is connecting the recognition of individual words to the comprehension of sentences. As students gain skill in recognizing sight words and decodable words, they practice reading these words from word cards and use the cards to build logical, meaningful sentences. Although these examples may seem simple, designing instruction that follows a sequence within and across strands while fostering successful integration of skills is challenging, particularly when teaching students with ID who often experience extreme difficulty retaining skills and applying them. In each of the sections below, we discuss developing skills in isolation and then provide brief examples of how these skills are connected to other strands.

**Three Students**

As we describe the teaching techniques, we will refer to three specific students who participated in our research study, Jacob, Carl, and Rachel. Jacob, a student with Williams’ Syndrome and an IQ in the moderate range of ID (44), began the project when he was 8 years old. Carl, whose IQ is also in the moderate range of ID (55), began the project when he was 9 years old. Rachel, whose IQ is in the mild range of ID (63), began the project when she was 6 years old. All three students have participated in the research project for approximately three years. We chose to highlight these three students because they reflect a range of performance within our study. It is important to mention that it is difficult to identify truly representative cases as students with ID are highly variable and must be considered individually. However, all three of these students faced significant challenges in learning to read due to memory and language deficits, but all three have made important progress. Although each student is friendly and generally eager to please, when they began the project they all experienced significant difficulty staying on task and required consistent reinforcement to participate fully in lessons. Early in the study each of these students was taught in a small group of 2 to 3 students; however, by the end of the study Jacob and Rachel were both being taught individually. Jacob is being taught individually because the students with whom he was originally grouped made much faster progress than he did. Rachel is being taught individually because of scheduling conflicts.

**Techniques for Teaching Oral Language and Vocabulary**

Oral language and vocabulary underlie all other strands of reading instruction. The meaning of our spoken language should be explicitly connected to all reading activities, including phonemic awareness and phonics; however, during the early stages of reading development when students are able to read very little, if any, text, it is critically important to focus on the development of oral language through books read aloud to them. In our research, we selected narrative and expository books to read to the students. We targeted specific vocabulary words and provided students with structured opportunities to talk about the books read to them.

**Using Read Alouds to Foster Vocabulary Development**

In teaching vocabulary, we employed one or more of several techniques, depending on which technique best fit the vocabulary word. When appropriate, we used kid-friendly definitions, such as *Protect means to keep from being hurt*. We also used pictures, videos, and gestures to demonstrate the meanings of words. Words were practiced with a simple game of thumbs up or down during which students
applied the vocabulary word to a given situation. For example, Jacob successfully participated in this activity as he learned the meaning of the words *disturb* and *delight*. Jacob correctly responded as his teacher asked him, “Give me a thumbs up if what I say might disturb someone who is sleeping.” She then listed specific situations one at a time as Jason responded with a thumbs up or down: turning on a bright light, playing loud music, whispering, etc. As stories were read, students listened for and discussed the target words. Teachers encouraged students to use these words appropriately in complete, spoken sentences. Teachers provided scaffolding by using target words in appropriate sentences and extended student language by modeling sentences that built on student sentences or phrases.

Using Read Alouds to Foster Oral Language Development

Most often books were read aloud to students on three separate occasions. Prior to a story being read for the first time, teachers guided the students to predict story events and describe what was happening in the pictures. The first story reading was followed by brief discussion. The second time a story was read the teacher stopped occasionally and encouraged discussion of events and vocabulary within the story. After the third reading of a story, the teacher guided discussion through questions designed to assess student comprehension and provide opportunities to develop oral language. During all discussion, teachers supported student language by restating student responses, extending student language, and using targeted vocabulary words in sentences. The primary goal was to improve expressive language skills, specifically focusing on increasing sentence length and using targeted vocabulary words in context. For example, if a student pointed to the cat and the girl in a book saying, “Cat, girl,” the teacher would say, “The cat lived with the little girl.” Then the teacher would encourage the student to repeat the new sentence. Jacob, Carl, and Rachel all participated in these activities.

Integrating Skills

One technique we used to relate oral language to print was through an activity we called *Point and Read*. Simple sentences related to the storybook read aloud were printed in large text with picture support. During this activity the teacher would first read the sentence to the students, pointing to each word as it was read. Then the students repeated the sentence as they pointed. In this manner, students were building oral language, relating oral language to print, and being exposed to concepts of print such as text being read from left to right. Initially, Carl was unable to repeat sentences with more than two words, but as he practiced, he was able to “point and read” the sentences in the curriculum, including those with four to seven words. Jacob and Rachel experienced more success with this activity. The purpose of the activity was not to identify specific printed words, but to recognize that print is meaningful and related to spoken language.

Techniques for Teaching Phonological Awareness

Focusing on Key Skills

In teaching phonological awareness to the students in our research study, we employed several techniques. First, we chose to focus specifically on blending and segmenting at the phoneme level. For younger students, teachers should work with larger units of spoken language (syllables within words or words within sentences), but currently research has not proven that these levels of phonological awareness must be mastered prior to developing phonemic awareness (i.e. phonological awareness at the phoneme level). Therefore, in our research with students with ID who were in the primary grades we chose to focus most of the instructional time on the two most important phonemic awareness (PA) skills to develop, blending and segmenting. Although we used a variety of activities to keep student engagement high while they practiced blending and segmenting, our routines and teacher language were consistent. When blending, the teacher said the individual phonemes one sound at a time and the child blended those sounds into the correct word. The script in our intervention used the following terminology:
Teacher: Now we are going to play Say the Word. Remember, Maxwell (puppet) can say words only in a funny way. Whenever he says a word, it is stretched. You have to tell me what word he said the fast way. Listen. /mmmaaat/. What word? (cue students)

Students: mat

When segmenting, the teacher said the whole word and the child segmented the word, saying each phoneme one at a time. The script for segmenting was as follows:

Teacher: Now we are going to play Stretch the Word. Remember, I will say a word, and you will tell me the sounds you hear in the word. Sit. (pause) Stretch sit.

Students: /sss/ /iii/ /t/

Focusing instruction on these two critical skills and keeping teacher language consistent was successful with the students in our study, although they required extensive practice.

**Stretch and Connect**

A second technique we found to be successful in teaching phonemic awareness was stretching and connecting phonemes during the activities. We found our students much more readily blended words when we stretched continuous sounds (such as /fff/ /mmm/ /sss/) for 1–2 seconds and connected continuous sounds to the sound following the continuous sound. For example, it was easier for students to blend /s/ /a/ /t/ into sat when the teacher stretched the continuous sounds and did not stop between sounds (i.e. /sssaaat/). It was important not to pause after continuous sounds. We also used stretching sounds as a method for providing scaffolding. For example, if a student was unable to say the first sound in sun, the teacher asked again, “What is the first sound in /sssun/?” stretching the /sss/ for emphasis. A word of caution worth noting is that it is important to carefully pronounce sounds in isolation just as they are pronounced in words. Speech therapists, reading coaches, or other reading specialists are excellent resources for assistance. For example, students will find it difficult to blend /suh/ /a/ /tuh/ into sat. In other words, it is important not to distort sounds by adding /uh/ to the end of the consonant as many people do without realizing it.

**Careful Sequencing**

A third technique was carefully increasing the difficulty of the blending and segmenting tasks. Initially, students blended and segmented words at the onset-rime level. At this level, students segmented by identifying the first sound in a spoken word (teacher: What’s the first sound in sun? student: /sss/). When blending, the teacher provides the onset and rime before the child says the word (teacher: /sss/ /un/, What word? student: sun). Gradually, students blended and segmented one phoneme at a time (Say the Word and Stretch and Blend, as above). A carefully designed curriculum should also gradually increase the phonological difficulty of the words being blended and segmented. For example, words with continuous sounds in the initial position (e.g., sat, man) are easier to blend and segment than words beginning with stop sounds (e.g., tag, bat).

**Making Phonemic Awareness Activities Meaningful**

PA was linked to oral language by linking meaning to the words practiced during the activities. We did this in several ways. Early on, we used a set of picture cards that were carefully developed to represent words that gradually increased in phonological difficulty, but were also clearly recognizable from the picture. For example, the teacher asked, “Which word begins with /sssun/?” and the students responded by pointing to the picture of the sun. For some students we supplemented the intervention with poster scenes and practiced blending and segmenting words related to the scene. As needed, teachers referred to the scene to support the meaning of the words being practiced (i.e., after blending run, the teacher would point to the boy running and say a sentence, such as “The boy likes to run in the park.”). As students progressed, words were practiced in the PA activities prior to being read in connected text.
Jacob, Carl, and Rachel Develop Phonemic Awareness

Jacob, Carl, and Rachel each responded well to PA instruction, though their progress was very slow. Jacob began the study with some PA skills, scoring approximately 25 segments per minute on the phoneme segmentation fluency (PSF) measure of Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002), while Carl and Rachel began the study scoring 0 on this measure. Even though Jacob began the study with some PA, he struggled to increase his skills in this area because of severe deficits in short-term memory. However, within about 5 months he reached the benchmark and within approximately 10 months, his scores never dipped below benchmark again, indicating he had clearly mastered the skill. Carl and Rachel responded more slowly to instruction in PA, requiring extensive practice and scaffolding at the earliest levels of PA. With Carl and Rachel, we used picture support and extensive practice and scaffolding at the onset-rime level of PA. Carl began to show progress after approximately 5 months of instruction and now performs very near the benchmark of 35. Rachel began to show progress on PSF after approximately one year of the intervention and reached mastery a few months later.

Techniques for Teaching Phonics and Word Recognition

Focusing on Key Skills

Like PA instruction, phonics and word recognition activities focused on several key skills that were integrated over time and gradually increased in difficulty. The first skill was basic letter-sound correspondence which began with students identifying the most common sound of individual letters and gradually students learned the sounds for various letter patterns. Second, students were taught to read words sound by sound. These words were made up of the letters and patterns that had been taught, with students initially reading words in which each letter represented its most common sound (ex. ran, last, milk, sun, etc.) and gradually increasing in difficulty as students learned long vowel patterns (ex. like, rain, light) and variant vowel patterns (ex. sound, claw, clown). Finally, students learned high frequency words by sight if the words were irregularly spelled (ex. was, have) or if the sounds in the word had not been taught yet (ex. the word on is taught before the sound for short o is taught).

Teaching Letter-Sound Correspondence

Although teaching letter-sound correspondence is fairly straightforward, we do wish to highlight a few teaching techniques that are important. As with most early reading interventions, we used meaningful mnemonic clues when introducing new letter sounds to link the abstract sound to something concrete (ex. nose associated with n). We also provided extensive, cumulative review through a quick activity during which students simply pronounced the sound for the letter on the chart when the teacher touched under the letter. To facilitate memory and the transfer of letter-sound correspondence to the sounding out strategy, teachers held a finger under the letter for two seconds when the letter was a continuous sound (ex. /mmm/) and tapped under the letter if it was a stop sound (ex. /t/). In this way, students became accustomed to stretching sounds when they saw letters that represented continuous sounds and more easily stretched those sounds during sounding out activities. Our curriculum also sequenced letter-sound introduction carefully, introducing the most common sounds early, introducing easier sounds prior to more difficult sounds, and separating confusing letters and sounds.

Jacob, Carl, and Rachel Develop Letter-Sound Correspondence

At the beginning of the study, Jacob, Carl, and Rachel knew very few, if any, letter sounds. We measured their progress on this skill using DIBELS Nonsense Word Fluency (NWF) and all three consistently scored 0 on this measure early in our study. Jacob’s scores began to improve somewhat after only one month of instruction, but he did not reach the benchmark of 50 letter sounds per minute until he had participated in the intervention for approximately two and a half years. Carl strug-
gled with letter-sound correspondence because of severe speech problems preventing him from articulating sounds correctly. Carl’s speech therapist and teacher used gestures to help Carl remember sounds and pronounce them correctly. Within about 5 months of instruction, Carl’s NWF score began to increase, and he is currently very near mastery on this measure. Rachel’s NWF scores began to improve somewhat after a few months of the intervention, but she did not reach the benchmark of 50 until she had participated in the intervention for almost two years.

**Teaching Students to Read Words Sound by Sound**

In our curriculum, students are taught the strategy of reading words sound by sound (i.e., sounding out). As described earlier, this strategy requires students to apply their knowledge of letter sounds and PA. As letter sounds are taught, students quickly apply letter sound knowledge to words made up of those letters. The sequence is also carefully organized to gradually increase in difficulty. Initially, the teacher leads the pacing of sounding out, requiring students to slowly say each sound before saying the entire word. As student skill with sounding out increases, the amount of time the teacher allows for sounding out decreases. Eventually the students no longer say the sounds aloud, but are taught to say the sounds only when they do not know the word immediately. Later in the curriculum, students learn to become flexible decoders. In other words, they are taught that many words do not sound out quite right, but that sounding out usually produces a pronunciation that is close enough to figure out the word.

**Integrating Phonemic Awareness and Word Recognition Skills**

A technique we used to assist students in transferring PA skills to print was *Stretch and Spell*. Using the same terminology used during PA activities, students stretched each word and wrote the correct spelling of the word. After participating in the intervention for approximately one year, Jacob was stretching and spelling words such as *sack*, *star*, and *help*. As Jacob wrote each word, he repeated the sounds one at a time, writing the letters that represented each sound. This technique linked PA (i.e., segmenting), letter-sound correspondence, and sounding out words.

**Jacob, Carl, and Rachel Develop Sounding Out Skills**

Jacob, Carl, and Rachel have all made progress with sounding out, but to varying degrees. Early in the intervention, sounding out was a challenge for both Jacob and Carl, as they struggled with severe deficits in short-term memory. While sounding out a word, they would frequently forget the first sound, so *mat* became *at* and *run* became *an*. Currently, Jacob is able to read many words without sounding them out first, though Carl continues to struggle in this area. Rachel has made excellent progress with this strategy and is now learning to decode words more flexibly, including multisyllabic words.

**Teaching High Frequency Sight Words**

The last skill in the word recognition strand was high frequency sight words. These words were presented as tricky words that should be recognized quickly. Once students recognized letters, a few sight words were introduced, but the pace of the introduction of sight words increased as phonics skills developed. Jacob struggled to keep up with the other students in his group. His teacher provided him with extra time to practice these words so he could remain with his instructional group. Carl and Rachel also needed extensive practice with these words, but progressed at least as quickly as the other students in their instructional group. Teachers assisted students in applying this skill during text reading. They provided scaffolding by reminding students that a word was a “tricky word” and asking them to read it fast, supplying the word when needed.

**Making Word Recognition Activities Meaningful**

One technique we used to link meaning to word recognition activities was building sentences with word cards. Although not specifically found in our intervention, our teachers adapted sentences from the decodable text, writing the words on sentence strips and cut-
ting them apart. Jacob responded particularly well to this activity as he would frequently be able to read words in lists or from cards, but continued to struggle with those same words in connected text. By building his own sentences, he practiced reading words in a meaningful context. His teacher provided scaffolding during this activity, but this scaffolding was gradually decreased as his ability to make meaningful sentences improved. In one lesson, his teacher gave him four words (Zip, a, rabbit, is) to use to build a sentence, asking him to read them all and build a sentence that made sense. His teacher prompted him to read all four words aloud before making the sentence. He first made and read, “A rabbit is Zip,” but immediately recognized that this did not make sense. The teacher provided further scaffolding by asking him, “How could you make it make sense?” and “If you want to tell about Zip, what should come first?” Then he made and read, “Is a Zip rabbit?” He immediately realized it did not make sense. His teacher asked again, “What should come first if you want to tell about Zip?” “Where is first position?” He then moved Zip to the beginning of the sentence and made “Zip is a rabbit.” He then made the next sentence without assistance, “A truck is in the mud.”

**Techniques for Teaching Fluency**

**Teaching Word Level Fluency**

Several techniques were used in our study to improve fluency. First, the word level activities just described included techniques to gradually increase student fluency with individual words. During these activities, teachers prompted students to gradually increase the speed with which they were able to recognize whole words. For example, students were instructed to read the words “the fast way” when they did not need to sound out the word. This specific prompt was very important as many of the students in our study continued to read words sound by sound even when they were able to identify the word without sounding out. Many of the students in our research project, including Jacob, Carl, and Rachel needed to be taught when to use the sounding out technique and when it was no longer necessary (i.e., when you knew the word).

**Teaching Passage Fluency**

Other techniques used to build fluency were reading decodable text, unison reading, and repeating decodable storybooks until fluency goals were reached. Early in the curriculum, reading connected, decodable text was a part of every lesson, with the text gradually increasing in complexity as students learned new skills. Over time, the text became increasingly more engaging and challenging. Teachers modeled good pacing and guided students to gradually increase their pace during teacher-led unison reading. Students also read decodable storybooks two to three times until predetermined fluency criteria were met. Across time, the criteria required increasingly faster reading, even as the text difficulty became more complex. Both Jacob and Carl struggled to meet these goals and required extensive practice with stories. Rachel consistently met fluency goals during lessons.

**Jacob, Carl, and Rachel Develop Fluency**

All three students have made important progress toward becoming fluent readers, though their rates of growth are quite different. Carl has made the least amount of progress in this area. After participating in the intervention for approximately one year, he began to show slight improvement on DIBELS oral reading fluency (ORF) passages on ending first-grade level. However, he is currently far from the ending first-grade level benchmark of 40, as his recent scores are approximately 10 words per minute. Jacob has made more progress, though he showed no improvement on first-grade ORF passages until he had participated in the intervention for about two years. Currently he is reading approximately 36 words per minute, which is near the first-grade end of the year benchmark of 40 words per minute.

Rachel has made excellent progress in fluency. Although she did not show any improvement in ORF until after two years of intervention, since then her rate of improvement has been remarkable. Currently, she is in 4th grade and working toward grade-level goals. She met ending first-grade level goals in just over two years of intervention. After three years of intervention, she met ending second-
They have learned about mountains in a previous lesson and then read text about animals to infer where different animals live. For example, the text about mountain goats includes clues that help students figure out that mountain goats live on the rocky slopes of mountains (i.e., mountain goats use their hooves to climb rocks and steep slopes).

**Jacob, Carl, and Rachel Develop Comprehension**

Jacob, Carl, and Rachel are able to read text with comprehension at levels at least commensurate with their oral language ability. They consistently demonstrate their understanding of stories and expository text, answering literal comprehension questions and discussing the details from text. As would be expected, their comprehension is better when text is more concrete and familiar, rather than abstract and unfamiliar. It is also not surprising that these students struggle with inferential comprehension; however, their ability to apply basic strategies is gradually improving. In spite of their significant challenges with oral language, all three students are reading with basic levels of comprehension.

**Conclusion**

The purpose of this article is to provide teachers of students with ID specific information about practical, research-based techniques for teaching their students to read. As Jacob, Carl, and Rachel illustrate, students with ID who face significant challenges can make important progress in early reading skills. The curriculum and techniques that are effective for students with much higher IQs are also effective for students like Jacob, Carl, and Rachel, but they must be implemented with high degrees of fidelity by skilled teachers. Curriculum and techniques should provide for explicit, systematic instruction that is comprehensive and includes extensive cumulative review. Further, students should be explicitly taught how to integrate and apply strategies in the context of reading connected text. Unfortunately, most teachers of students with ID receive very little training about effective techniques for teaching reading. This article is only one step toward providing these teachers with specific guidance. Obviously, teachers...
cannot provide this type of instruction without adequate support. We encourage teachers to seek out additional resources (Coyne et al., 2006; Carnine et al., 2004; Kame‘enui, Carnine, Dixon, Simmons, & Coyne, 2002), including those that focus on oral language and vocabulary (e.g., Arnold & Whitehurst, 1994; Coyne, Simmons, Kame‘enui, & Stoolmiller, 2004), word recognition (e.g., O’Connor, 2007) and comprehension (e.g., Klingner, Vaughn, & Boardman, 2007). In addition to effective curricular materials and training, teachers need access to educators with expertise in reading and behavior who can assist them in tailoring instruction to meet the needs of their students and providing the positive behavioral support necessary for students to participate fully in lessons. We also wish to emphasize the importance of persistence on the part of the students and teachers. The journeys of Jacob, Carl, Rachel, and their teachers have been ones of patience, dedication and perseverance. Finally, we urge teachers to make all aspects of their reading instruction as meaningful as possible. Letter sounds should be taught for the purpose of applying those sounds to words that mean something to students. If students with ID are to understand what they read, it is imperative that reading instruction be linked to meaning that is relevant to them.

References


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Pentop Computers as Tools for Teaching Multiplication to Students with Mild Intellectual Disabilities

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Purdue University

Abstract: The effectiveness of a pentop computer when teaching multiplication facts to three middle school students with mild intellectual disabilities was examined. A multiple probe design was used to assess the students learning of one and two digit multiplication facts over a 2-3 week intervention period. During the intervention phase, students used a FLY™ Pentop Computer (LeapFrog©) to practice multiplication problems. Following intervention, students were assessed on their ability to solve multiplication problems without the tool. The results indicated that all three students improved in the percentage of correct math facts completed and support the use of the pentop computer when teaching multiplication to students with mild intellectual disabilities. Limitations and suggestions for future research are discussed.

Mathematics education is a high priority in the United States (Ellis & Berry, 2005). The majority of students in the third through eighth grades are now annually evaluated on their mathematical abilities under the requirements of No Child Left Behind (NCLB, 2002). Additionally, these students are expected to reach proficiency in this domain by the 2013-2014 school year (Yell & Drasgow, 2005). Research suggests that students in the United States perform worse than their international counterparts (Beaton, Mullis, Martin, Kelly, & Smith, 1996); as such, mathematics is considered an important and critical content domain for instruction and evaluation for students with and without disabilities. Yet, researchers and teachers document that many students with disabilities struggle with mathematics (Grise, 1980). These struggles can include skills ranging from computational fluency to knowing one’s basic facts as well as problem solving (Cawley, Parmar, Fley, Salmon, & Roy, 2001; Jitendra, DiPipi, & Per-

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level (Butler, Miller, Lee, & Pierce, 2001). In their review of the literature on mathematics and students with intellectual disabilities, Butler et al. found only three studies that involved secondary students: two focusing on middle school students with mild intellectual disabilities and one that involved students with mild intellectual disabilities in elementary through high school. One study involved basic computation instruction and the other two focused on technology. In the computation study, Morin and Miller (1998) taught three middle school students with intellectual disabilities multiplication facts using the concrete-representational-abstract teaching method, along with mnemonic devices that were added during the abstract phase. The results indicated that all students learned their basic multiplication facts and improved from pretest to posttest.

Other recent research suggests that students with mild intellectual disabilities benefit from developing fluency in mathematical skills, such as multiplication (Cooke, Guzaukas, Pressley, & Kerr, 1993). Fluency can be defined as “the effortless, automatic ability to perform mathematical operations” (Houchins, Shippen, & Flores, 2006, p. 324). In other words, mathematical fluency refers to the speed, accuracy, and monitoring of errors that students have when completing mathematical problems. In addition, fluency with basic facts or basic operations assists students in problem solving, such as when solving word or story problems (Houchins et al.). Several strategies focused on increasing the mathematical fluency of students with developmental disabilities, such as mild intellectual disabilities, were examined: teaching via the concrete-representation-abstract method (Morin & Miller, 1998); using timed trials, including constant time delay (Mattingly & Bott, 1990; Miller, Hall, & Heward, 1995); use of a supplemental program (Jolivette, Houchings, Lingo, Barton-Arwood, & Shippen, 2006); and peer tutoring (Harper, Mallette, Maheady, Bentley, & Moore, 1995). In addition to these strategies, another way suggested to increase the mathematical fluency of students with mild intellectual disabilities was through the use of technology (Maccini & Gagnon, 2005).

Despite the increased emphasis of technology in the teaching and learning of students with disabilities and increased opportunities for technology in the area of mathematics, little research examined technology, mathematics, and students with mild intellectual disabilities. Although Mastropieri, Scruggs, and Shian (1997) called for increased attention in this area a decade ago, the focus on technology, mathematics, and students with mild intellectual disabilities never materialized. Within the research that does exist, Mastropieri et al. used a computer-assisted instruction (CAI) program to teach problem solving to four upper elementary students with mild intellectual disabilities. They concluded that these students improved their scores from pretest to posttest as well as reported enjoyment using the computer program.

Additionally, Horton, Lovitt, and White (1992) examined the use of calculators as compared to traditional paper-and-pencil method for solving subtraction with middle school students with mild intellectual disabilities. They concluded that students improved in their performance on the subtraction problems after they used calculators. The use of calculators was attributed to increased accuracy in the students. Jaspers and Van Lieshout (1994) also found benefits from integrating technology into mathematics instruction for students with mild intellectual disabilities across the span of elementary to high school. They found that allowing students to touch key words on a computer screen in a story problem was beneficial to students when they took paper-pencil tests.

**Smart Toys**

Prior research on technology and mathematics for students with mild intellectual disabilities is limited to more traditional forms of educational technology (i.e., calculators, CAI), and this field failed to take advantage of exploring more advanced technological ways to educate these students. One type of new technology includes smart toys. Smart toys are an innovative form of technology which has recently increased in popularity (Bouck,
Okolo, & Courtad, 2007). Smart toys are described as toys that are programmed to respond to a child through microprocessors that recognize and transmit input from the child (Roderman, 2002). An early example of a smart toy is the Furby, which is a toy that spoke English (Maine, 2004). Other examples of smart toys further incorporated computer technology and include: LEGO Mindstorms which are programmable bricks and Logo Turtles a robotic creature which could be programmed to perform commands (Papert, 1993). More recent smart toys include I-Dog a robotic dog which reacts to music; Share-A-Story from Care Bears where the bears read “children stories” aloud to the children (Gibson, 2005); and the FLY™ Pentop Computer from LeapFrog© (Pogue, 2005).

The FLY™ Pen is a pentop computer that provides auditory output and prompts users to complete a variety of tasks. The FLY™ Pen includes a variety of software options that can be used with the pen (Pogue, 2005). The different software options allow the pen to be used as a calculator, a calendar, a piano keyboard, a journaling assistance tool, a Spanish dictionary, as well as provide assistance with mathematics, social studies, science, spelling, and writing. Although this software is marketed for students to use with academic areas, little research explored its potential for assisting students. Furthermore, despite its potential, no research could be found that examines the impact of using this tool as a form of assistive technology for students with disabilities.

Research Project

Previous research illustrated that secondary students with mild intellectual disabilities experience a variety of difficulties at school in regards to learning their mathematics curriculum (Parmar et al., 1994; Van Luit & Naglieri, 1999). Additionally, there is a lack of research which focuses on ways to improve mathematics instruction for students with mild intellectual disabilities (Butler et al., 2001). The use of a pentop computer (i.e., the FLY pen) as a form of assistive technology may provide assistance in a uniquely beneficial way for students with mild intellectual disabilities who struggle with mathematics by improving the student’s fluency. Previous research that focuses on using assistive technology to improve math skills indicates that these students can benefit from similar types of interventions (Mastropieri et al., 1997; Horton et al., 1992). Yet, no studies could be found that analyzed the effects of the FLY™ Pen technology as an effective instructional strategy for teaching mathematics to students with mild intellectual disabilities. The purpose of the present investigation was to determine if students with mild intellectual disabilities who use the FLY™ Pen could improve their multiplication skills. It was hypothesized that instruction with the FLY™ Pen would improve the students’ abilities in learning to solve multiplication problems.

Method

Participants

Three middle school students, Diane, Joe and Sam, participated in this study. Each was selected to participate based on a) a mild cognitive level of functioning (IQ 55-70), b) similar chronological age, c) similar mathematics skill level, d) willingness to participate, e) absence of sensory disabilities, and f) no previous training or experiences in using the FLY™ Pen. All students were educated primarily in the same special education pull-out classroom, although all participated in “specials” within general education settings (i.e., art, music, physical education, and keyboarding). Table 1 provides information about the three participants.

Diane was a 12 year-old Hispanic female who was shy in her classroom and sought to please her teachers. At home, Diane primarily spoke Spanish. She was a diligent student and always tried to complete her work on time. She tended to be quiet and would only interact with her closest friends. All of Diane’s content areas were taught in the special education classroom and she was in general education for less than 40% of the day, where she was included in specials. At the start of the study, Diane was performing at a fourth-grade mathematics level and her assignments primarily included one- and two-digit addition and subtraction problems.

Joe was a 12 year-old Hispanic male who
enjoyed interacting with his peers whenever possible and was well liked by his classmates due to his good sense of humor. At times, however his sense of humor could become a distraction, as he would interrupt himself and others from completing work by talking to his classmates. Joe primarily spoke English at home. Like Diane, he was primarily served in a self-contained resource setting for more than 60% of the day and was only included in specials. He was also performing at a fourth-grade math level at the beginning of the study and his math work prior to the study included arithmetic and subtraction problems.

Sam was a 12 year-old Hispanic male who enjoyed playing sports, particularly soccer. At home, Sam spoke both Spanish and English. Sam was outgoing and was well received by his peers and teachers. He was typically a hard worker and enjoyed answering questions in class; however, at times he would allow himself to be distracted from his work. Sam participated in academic instruction in an inclusive classroom during more than 60% of the day including language arts and specials. He participated in the same special education math class as Diane and Joe. He was also performing at a fourth-grade math level with a focus on addition and subtraction problems prior to the start of the study.

### Settings

All participants attended a self-contained mathematics class during the same class period and were provided mathematics instruction by their primary special education teacher. The students were taught their math lessons using the Saxon mathematics curriculum (grades 4/5) (Saxon Math, 2008). The class included six other students who were not included in the study, of which four participated were in the same mathematics lessons as the target students. The other two students were taught separately with a paraprofessional. In the students’ classroom, the desks were arranged in rows with Sam and Joe seated next to each other in the back row and Diane seated in front of Joe. The students who were taught by the paraprofessional worked at a separate table which was sectioned off from the rest of the classroom.

The assessments for each of the phases (baseline, intervention, and maintenance) as well as the FLY™ Pen training sessions were conducted in a separate room (the school counselor’s room), which was across the hall from the self-contained classroom so the other students were not distracted. In the separate room, the students worked at a round table. The students were either seated next to each during times when the phases overlapped, or were assessed individually. Typically, only the researcher and the students were in the room during the assessments, however during some of the sessions the school counselor was in the room working at his desk which was placed behind the table where the students worked. During the intervention phase, the participants used the FLY™ Pen (with ear phones) during their regular math instruction as well as in the separate classroom.

### Independent and Dependent Variable

The use of the FLY™ Pen as a mathematical instructional strategy was the independent variable for the study. After demonstrating mastery in how to correctly use the FLY™ Pen, students were instructed to use the pentop

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**TABLE 1**

**Student Demographic Information**

<table>
<thead>
<tr>
<th>Student</th>
<th>Age/Grade</th>
<th>Ethnicity</th>
<th>WISC-R IQ</th>
<th>ISTEP overall</th>
<th>Time in General Education</th>
<th>Secondary Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diane</td>
<td>12, 6th grade</td>
<td>Hispanic</td>
<td>63</td>
<td>417/646</td>
<td>Less than 40%</td>
<td>None</td>
</tr>
<tr>
<td>Joe</td>
<td>12, 6th grade</td>
<td>Hispanic</td>
<td>62</td>
<td>422/464</td>
<td>Less than 40%</td>
<td>Communication</td>
</tr>
<tr>
<td>Sam</td>
<td>12, 6th grade</td>
<td>Hispanic</td>
<td>62</td>
<td>427/464</td>
<td>Less than 40%</td>
<td>None</td>
</tr>
</tbody>
</table>
computer for all multiplication problems that they worked on during their mathematics class. Students used the FLY™ Pen to complete assigned multiplication problems given on a worksheet designed by the teacher or assigned problems from their textbook.

The percentage of multiplication problems solved correctly during each assessment session was the dependent variable. Prior to the start of the study, all three of the students received instruction from their special education teacher on how to solve multiplication problems. Additionally, at the start of the study (and throughout the completion) the students’ understanding of basic multiplication facts was assessed through daily timed tests. A set of 57 random multiplication problems was created for the assessments. Of the 57 problems, 31 were basic multiplication facts (single digit numbers multiplied by single digit number, i.e., $3 \times 4$) and 26 were mixed problems (double digit numbers multiplied by a single digit number, i.e., $34 \times 5$).

The problem set was developed based on the Saxon mathematics curriculum used by the students’ teacher. The set was generated through stratified random sampling to ensure that the multiplication problems included a wide range of numbers from 1-99. The researcher created the set by arbitrarily selecting non-sequential multiplication problems that used an assorted selection of digit combinations. Specifically, diverse problems such as $8 \times 8$, $2 \times 7$, and $6 \times 5$ were chosen for the set and sequential problems such as $8 \times 8$, $8 \times 7$, and $8 \times 6$ were intentionally omitted from the set. A variety of the basic and mixed problems totaling ten or fewer questions per assessment were randomly drawn from the set of problems during each phase of the study. During the baseline phase, four basic facts problems and three mixed problems were used. Initially, three, two digit times two digit problems (i.e. $42 \times 63$) were assessed during the baseline phase, however the students were not assigned problems like this to work on in class with the FLY™ Pen therefore these data were not included in the final data analysis. During the intervention and maintenance phases, the probes consisted of five basic facts problems and five mixed problems.

Materials

**FLY™ pentop computer.** The FLY™ Pen, a pentop computer developed by LeapFrog®, was used during the intervention phase. This pentop computer is a device slightly larger than a pen and uses special paper called FLY™ Paper. The FLY™ Pen writes as a pen, can assist students with calculations, and includes various games that support the pen’s use. In addition, educational software can be purchased for this device, such as software for spelling, multiplication and division, algebra, and writing. When the software cartridge is inserted into the top of the FLY™ Pen and used with the special FLY™ Paper, students have access to assistance in spelling activities, solving multiplication and division problems, and organizing one’s writing. The FLY™ Pen comes with a Launch Pad which provides instructions for the pentop computer and activities that can be done with the FLY™ Pen.

**Multiplication and division software.** This study used the FLY™ Pen multiplication and division mathematics software. The multiplication and division software included a software cartridge, the FLY™ Control Panel tablet, FLY™ Paper used to complete the math problems, and a manual with example problems and directions. The FLY™ Control Panel tablet contained 40 pages of the FLY™ grid paper for students to write multiplication or division problems following a format specified in the manual. This software required students to use specific steps while solving their multiplication or division problems. To ensure that steps were followed correctly, the FLY™ Pen provided auditory prompts about which functions needed to be completed before moving to subsequent steps. When each student started the intervention phase of the study, s/he was assigned a box with the study materials that were stored in a nearby cabinet for easy access during each math class.

Experimental Design

A multiple probe across students design was used to determine the effectiveness of a FLY™ Pen on the acquisition of multiplication skills. The multiple probe design was chosen since it provided a means to decrease the collection of data across the multiple baselines while at the
same time ensuring that no significant changes occurred before the introduction of the intervention. Additionally, the multiple probe design allowed the researchers to determine if a functional relationship existed between the intervention (practicing multiplication with the FLY™ Pen) and students improving their multiplication skills as measured by the assessments (Kennedy, 2007). A multiple baseline design is frequently used when academic learning is involved (Alberto & Troutman, 2006); as such, this design was selected because it best controlled for possible learning or carry-over effects as a result of student exposure to the FLY™ Pen.

Data Collection

Event recording was used to determine the number of multiplication problems solved correctly during each of the phases in the study. This method was selected because it provides simplicity and accuracy with discrete event data collection (Kennedy, 2007). Each assessment conducted provided a record of the student’s work when solving the assigned multiplication problems, which was used to analyze the effects of the FLY™ Pen.

Procedure

Baseline. Prior to intervention, students were assessed on multiplication facts learned through traditional instructional methods, two or three times per week for a minimum of two weeks. These assessments included a random selection of four basic math problems (single-digits multiplied by single-digit problems) and three mixed math problems (double-digit numbers multiplied by single-digit numbers) for a total of seven problems per assessment. The percentage correct out of seven was calculated for each baseline session. Students continued in the baseline phase based on the order they were selected to begin the intervention. The order of the students was based on the teacher’s suggestion. Diane began the intervention first while Joe and Sam continued in the baseline phase with the traditional instruction. Joe began using the FLY Pen second; Sam continued in the baseline phase using the traditional instruction and was the last student to begin the intervention. The students only began the intervention phase once baseline stability was established.

Pre-training. During the baseline period, students were introduced to the FLY™ Pen. Initially, students used the Launch Pad, an orientation booklet to the FLY™ Pen software. Launch Pad activities included selecting objects using the FLY™ Pen, responding to prompts, and playing various games. Students also operated the FLY™ Pen while completing multiplication activities using the FLY™ Pen math paper. During this time, students were taught how to properly use the FLY™ Pen to solve multiplication problems. Tasks included teaching the student how to hold the pentop computer to ensure the software recognized the numbers they wrote, teaching the students how to write the multiplication problems on the FLY™ Pen paper, and teaching the student how to use the buttons on the FLY™ Pen math tablet so they could enter and solve the multiplication problems (as well as use the hint button as needed). The pre-training phase also served as an opportunity for the students to ask questions about how to use the pentop computer. The pre-training phase was considered complete when each student was able to individually complete three practice multiplication problems using the FLY™ Pen.

Intervention. The intervention phase took place over a minimum of three weeks. During this phase, students participated in mathematics instruction using the FLY™ Pen, software, and worksheet materials for learning their targeted multiplication facts. During each mathematics lesson in their regular classroom, students were instructed to get their assigned FLY™ Pen and then use the pentop computer to solve the multiplication problems assigned for that day. Typical assignments included teacher made worksheets or problems assigned from the students’ textbook. These assignments provided an opportunity for the students to write and solve multiplication problems using the large grid FLY™ Pen paper.

When using the FLY™ Pen for their multiplication problems, students were first prompted to tap “start” so that the pen would recognize that the student was writing a problem. Next, the student pressed “Start Problem” in the FLY™ Control Panel tablet. As the student wrote the multiplication problem, the
software immediately repeated the numbers aloud. This allowed the student to hear what the FLY™ Pen interpreted from their writing. Students were then able to re-write the number if the FLY™ Pen misidentified a number or they were able to move on to the next step. After the pentop comptuer correctly recognized each number and operation (i.e., multiplication), students were prompted to confirm that the problem was correct and press the “Enter” button on the tablet. The student was then prompted to select “Yes” or “No” if the entire problem was read correctly. Additional assistance was provided only after the problem was read correctly and the student selected “Yes.”

As the students worked to solve the problems, they were required to complete the multiplication steps in the correct order, as specified by the FLY™ Pen, which allowed the software to recognize what the student had written. For example, when the problem involved the multiplication of two numbers, the student was first required to write the numbers in their answer from right-to-left placing the correct digit in the ones place prior to writing the number to be carried or before writing a number in the tens or hundreds place (i.e., When solving 12 × 9, first the student must multiply the 9 digit by the 2 digit and write the number eight or write the carried one before proceeding to write the zero in the tens place or the one in the hundreds place [12 × 9 = 108]). As the student continued to solve the problem, the FLY™ Pen provided reinforcement (i.e., beeps) for correct responses, prompts for incorrect ones such as “switch your digits” or “remember to carry” hints, and page numbers for example problems in the Launch Pad. Once the student finished writing what they believed was the solution, the student tapped “Finish” and the pentop computer responded by indicating whether the solution was correct or incorrect. If the solution was incorrect, a specific hint about where the error was made was provided. For example, when solving 13 × 4 if the student put a 53 instead of a 52, a hint may have prompted the student to multiply 3 × 4 again.

During the intervention phase, students were required to use the FLY™ Pen and associated multiplication and division software for all multiplication problems. The materials used by the students during the intervention included the pen, multiplication and division software cartridge, earphones, FLY™ Pen Math paper, and the pen storage container. When each student started the intervention phase of the study, s/he was assigned a box with the study materials that were stored in a nearby cabinet for easy access during each math class.

Following their in-class practice with the pentop computer, students were then assessed on the multiplication facts acquired during instruction three or four per week. These assessments required the students to solve similar types of problems to what they had previously practiced; however, they were not allowed to use their FLY™ Pen during the assessment sessions. The assessment sessions included a random selection of five basic multiplication problems (single digits multiplied by single digits problems) and five mixed multiplication problems (double digit numbers multiplied by single digit numbers) for a total of ten problems per assessment. The percentage correct out of ten was calculated for each intervention session.

**Maintenance.** Following a minimum of a one week break from intervention, students completed a maintenance assessment in which their maintenance of the multiplication facts was determined. These assessments were conducted in the same format as the baseline and intervention assessments. Specifically, they included a random selection of five basic multiplication problems (single digits multiplied by single digits problems) and five mixed multiplication problems (double digit numbers multiplied by single digit numbers) for a total of ten problems per assessment. The percentage correct out of ten was calculated for each maintenance session.

**Social Validity**

Twice during this investigation—first following the pre-training phase and again after the intervention phase—students and their teacher were interviewed to determine the social validity of using FLY™ Pens for acquiring multiplication skills (see Table 2 for a list of the student and teacher pre and post social validity questions). Students and teachers were interviewed individually and were asked
about their likes and dislikes of the FLY™ Pen when learning multiplication. All students indicated that they liked the FLY™ Pen after using it during the pre-training phase. Additionally, all indicated that they liked that the pen gave audible hints about ways to solve math problems. After using the FLY™ Pen during the intervention phase, students indicated they enjoyed using it and felt it helped them learn their multiplication; however, there were some aspects of the tool that the students did not like. Specifically, Diane did not like using the pentop computer in front of the rest of the class because she believed it made her stand out and she was more comfortable using it in the separate room. Joe and Sam disliked that the FLY™ Pen required them to rewrite the multiplication problems on the FLY™ Pen paper. Typically, the teacher handed out worksheets with the problems already written on them so the students just had to solve the problems and not write them out. Both Joe and Sam felt that having to rewrite every problem slowed them down in completing their work.

When asked about her opinions of the FLY™ Pen, the teacher also expressed likes and dislikes about using it as an instructional

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**TABLE 2**

*Pre and Post Social Validity Questions*

**Student Interview Questions (pre intervention)**

1. What do you think about the FLY™ Pen?
2. Do you think you will like using the FLY™ Pen to do your math or spelling?
3. What do you like most about it?
4. What do you like least about it?
5. Do you think it is important to learn spelling or math skills? Why?
6. How do you think the FLY™ Pen will help in learning spelling or math?

**Student Interview Questions (post intervention)**

1. Did you like using the FLY™ Pen?
2. Did the FLY™ Pen help you to learn writing skills?
   a. If it did, how do you think it helped?
   b. If it did not, why do you think it did not?
3. What did you like most about the FLY™ Pen?
4. What was the worst thing about the FLY™ Pen?
5. Would you want your teacher to let you keep using the FLY™ Pen to do your writing?
6. Would you like to use a FLY™ Pen for other school work like science or math?
7. Would you like to use the FLY™ Pen in other classes?
8. Did it help you learn?

**Teacher Interview Questions (pre intervention)**

1. What do you think about the FLY™ Pen?
2. Do you think the FLY™ Pen will assist students in acquiring and maintaining writing skills?
3. What traits or characteristics of the FLY™ Pen do you think are useful in the learning process?
4. Do you think that using the FLY™ Pen and its software will allow you as the teacher to be more efficient and effective in teaching?
5. What are your concerns about using the FLY™ Pen with students for writing activities?
6. What benefits do you foresee in using the FLY™ Pen for instruction?
7. Do you think the FLY™ Pen is something you would use often with students?

**Teacher Interview Questions (post intervention)**

1. Did you like the FLY™ Pen?
2. Do you think it was helpful in teaching students writing skills?
3. Do you think it was better, worse, or equivalent to traditional instruction? Why?
4. What did you like most and least about the FLY™ Pen?
5. What did you like most and least about the FLY™ Pen software?
6. Would you use the FLY™ Pen again?
7. Would you consider using the FLY™ Pen to teach or reinforce other academic skills if software were available?
tool. Prior to the intervention, she believed that the pen would help the students learn multiplication because it provided audible hints and feedback to the students which she felt would help engage the students and be more fun. Following intervention, she believed that using the pen was helpful, particularly for Diane. She also stated that it did slow the students down in completing their work. Overall, the students and the teacher felt that using the FLY™ Pens was beneficial for learning multiplication.

Reliability

Interobserver agreement data were collected by a trained second observer. For Diane and Sam, reliability data were collected for 40% of the baseline sessions, 43% of the intervention sessions, and 50% of the maintenance sessions. For Joe, reliability data were collected for 43% of the baseline sessions, 43% of the intervention sessions, and 50% of the maintenance sessions. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements of the number of problems solved correctly and then multiplying this number by 100. Agreement was 100% for all three students in each of the phases of the study. When given the assessments, the students were asked to write each problem and answer legibly. These instructions helped ensure clarity in the students’ writing; thus, the second observer did not find any errors in the calculations conducted by the primary observer.

Treatment Integrity

A checklist was developed to assess treatment integrity during the intervention phase. The checklist included three steps to ensure that the teacher was instructing the students to use the FLY™ Pen to practice solving their multiplication problems in their mathematics class. Treatment integrity data were collected during 44% of the observations for Diane, 53% of the observations for Joe, and 66% of the observations for Sam. During each observation in which treatment integrity data were collected, the researcher assessed whether the teacher implemented each step as indicated. For Diane, treatment integrity was 100% for all of the sessions observed, for Joe, treatment integrity was 96%, and for Sam the treatment integrity was 100%. For Joe, the treatment integrity was lower because the teacher forgot to prompt Joe to get his FLY™ Pen and he had to be reminded by the researcher to get his pen. The teacher corrected this oversight during subsequent sessions.

Results

Results indicate that students demonstrated increases in the percentage of multiplication problems solved correctly from baseline. Each student showed relevant gains in correct performance between baseline and intervention and baseline and maintenance conditions. Figure 1 illustrates the percent of multiplication problems solved correctly while using the FLY™ Pen during each of the study conditions.

Diane

During Diane’s baseline, the mean percent of problems solved correctly was 11.4%. A visual analysis of data demonstrate that there was a considerable increase in the number of problems solved correctly during intervention with a mean performance score of 62.9%. The percentage of non-overlapping data between the baseline phase and intervention phase was 100% indicating that the intervention was effective for Diane. Similarly, the maintenance mean (75%) increased from both the baseline and intervention means. Additionally, the percentage of non-overlapping data between the baseline phase and maintenance phase was 100% showing that the results of the intervention were able to be maintained over time.

Joe

Joe’s mean percent of problems solved correctly during baseline was 30.6%. During intervention, he achieved a mean of 50.0%, indicating an increase over baseline levels. His mean performance score during the maintenance condition decreased slightly to 45%. Visual analysis indicated some variability in Joe’s performance; however, he did demonstrate a rapid increase in the number of problems solved correctly when the intervention
Figure 1. Percent of multiplication problems solved correctly for Diane, Joe, and Sam when using the FLYPen as a mathematical instructional tool.
was first introduced. Specifically, when comparing the last two sessions of at the end of the baseline phase and the first two sessions at the beginning of the intervention phase, there was an increase from 14.3% of the problems being solved correctly to 50% of the problems being solved correctly (an increase of 35.7%) indicating an immediate change of level for Joe.

Sam

During Sam’s baseline, the mean percent of problems solved correctly was 48.6%. The mean during the intervention phase was 74.3%, indicating an increase in the overall problems solved correctly. The mean for Sam’s maintenance phase was 70.0%, suggesting a slight decrease in the problems Sam solved correctly once the intervention ended. Visual analysis indicated that Sam demonstrated a high variability of performance during the baseline phase; however, less variability was observed during intervention. Additionally, the median for the baseline phase was 28.6% of the problems solved correctly and the median for the intervention phase is 100% of the problems solved correctly signifying an increase in the level during the intervention phase. There was also a rapid increase observed between the last session of baseline where the assessment score was 14.3% solved correctly and the first session of the intervention phase where the assessment score was 50.0% (increase of 35.7%), which reveals an immediate change of level.

Discussion

The purpose of this study was to examine the effectiveness of the FLY™ Pen when used as a mathematical instructional tool for students with mild intellectual disabilities. The results indicate an increase in students’ assessment scores on multiplication facts during the intervention phase; however, the extent of these results was variable among the students. The results suggest that all three participants experienced an immediate increase in the percentage of problems solved correctly when they initially began using the FLY™ Pen. These results support previous research that found technology may be beneficial when used to teach math skills to students with mild intellectual disabilities (Horton et al., 1992; Jaspers & Van Lieshout, 1994; Masteropieri et al., 1997).

Dihoff, Brosvic, Epstein, and Cook (2005) examined the improvement of mathematics abilities of students with mild disabilities. They found that students who received immediate feedback from an educator or from an Immediate Feedback Assessment Technique (IFAT) on mathematical assessments demonstrated reductions in errors and a greater retention of the material. The FLY™ Pen similarly provides students with immediate feedback through its beeps (indicating a correct number or answer was written) or prompts indicating an incorrect answer (i.e., the pen saying “not there yet, there’s more to do”). Dihoff et al. called for an instrument that can be used by students with disabilities that can not only assess correct answers but also provide feedback and correct misunderstandings of material. The audible output provided by the FLY™ Pen does this through the feedback given when a student answers a question incorrectly. The prompts assist students in identifying where errors are made and allow them to continue working on solving problems until a correct answer is obtained. A teacher who is working individually with a student typically would provide this type of one-on-one feedback. Since the pentop computer can provide this feedback instead, this may help to decrease the amount of time teachers spend working one-on-one with students.

While the FLY™ Pen does provide immediate feedback, there was variability in the students’ assessment scores and responses to the intervention. Diane, who expressed a dislike for using the technology in front of her classmates, demonstrated the most significant changes in her assessment scores during the intervention and maintenance phases. When Diane expressed discomfort in using the pentop computer in front of her classmates, she was accommodated by being allowed to use the FLY™ Pen in a separate room across the hall. Diane expressed an increase in motivation for learning her multiplication facts after using the FLY™ Pen. Although allowed to use a multiplication table (in addition to the FLY™ Pen) for her work, Diane tended to only use the FLY™ Pen. Following the inter-
vention phase, the teacher indicated that Diane received 100% on her daily timed tests. Diane tended to want to please her teachers and this motivation to demonstrate continuous improvements in her classroom assessments may have influenced her maintenance results. Diane had the longest break between the end of her intervention phase and the maintenance phase; however, of the three students, she received the highest average percent correct during the maintenance phase.

Joe’s variability in his assessments has a variety of possible explanations. Joe expressed dislike in having to rewrite the multiplication problems on the FLY™ Pen paper and experienced difficulty with his basic multiplication facts. In addition to using the FLY™ Pen, Joe also relied on using his multiplication tables when completing his mathematics worksheets in class. Joe was encouraged to only use the pentop computer and not the multiplication table; however, Joe was not always able to fully comprehend the auditory prompts provided by the FLY™ Pen resulting in him becoming frustrated with the tool. He would repeatedly tap the hint button to try to get different hints from the pen and then ultimately ask if he could use his table. Joe also had a secondary diagnosis of a communication disorder and this may have impacted his ability to accurately comprehend certain prompts provided by the pentop computer. Joe’s reliance on using the multiplication table and dislike of rewriting the problems possibly contributed to the variability of Joe’s assessment scores. The decreases in scores observed during Joe’s maintenance phase indicate a lack of retention in his ability to solve the multiplication facts. Additionally, the assessment during the maintenance phase where Joe scored 20%, although randomly drawn, included a majority of higher digit problems (problems with 7s, 8s, and 9s in them). These are the type of problems with which Joe tended to struggle and he would typically rely on his multiplication table to solve. The multiplication tables were not allowed to be used by students during the assessments conducted and this was possibly a factor in Joe’s low score.

Of the participants, Sam seemed to enjoy using the pen the most. However, like Joe, he expressed a dislike in having to rewrite every problem on the FLY™ Pen paper. During the intervention phase, there was less variability in Sam’s scores and this may be a reflection of Sam’s enjoyment in using the pentop computer. During one of the intervention assessments, Sam indicated that he was having a difficult time and even said, “I wish I had my FLY™ Pen, this is hard.” One notable finding was that Sam indicated he felt that sometimes the FLY™ Pen did not help him learn multiplication because, on occasion, it would just give him the answer. This made him not have to think about solving the problem because the pen would just say the answer without requiring the student to attempt to solve the problem. This would occur at times if a student continued to use the hint button before writing what they believed to be the answer down.

The results of this study have important implications for the use of smart toys in special education classrooms. The increased requirements for schools to demonstrate mathematical proficiency for all students, including those with disabilities, will continue to be an important topic in the field of special education (NCLB, 2002). One way to assist teachers and schools with this mandate may be through the use of assistive technology such as smart toys. This study found that there were gains made by all of the students in this study; however, these variable results may warrant teacher discretion when considering using a pentop computer as an assistive technology intervention, particularly if they have limited funds to spend on classroom supplies. Many smart toys can be rather expensive; the cost of the FLY™ Pen itself tends to be around $80 per pentop computer with an additional cost of $15–30 per software.

Limitations and Future Directions

One of the limitations in this study is that only three of the students in the classroom served as participants. If all of the students in the class were able to participate, the students who participated may have reported different perceptions of the FLY™ Pen. Specifically, Diane may not have felt like she stood out as much if all of the students in the class had been using the tool. Also, if all of the students were required to use the FLY™ Pen, Joe and Sam may not have felt like they were being slowed down
because all of the students would be required to rewrite the multiplication problems on the FLY™ Pen paper. Additionally, the teacher indicated that one dislike she had with using the technology was that she always had to remind the students to use their pentop computer. If all of the students in the class were able to use a FLY™ Pen then it was easier for the teacher to remind all of the students at once, instead of individual students. For this study, only three students in the classroom were selected as participants due to these students having the same disability classification and a similar math level; however, future studies may seek to examine the effects of using the FLY™ Pens in a classroom where all of the students have access to using the pens. Another limitation was the student’s access to using multiplication tables during the intervention phase. Future studies may want to examine the effect of the FLY™ Pens for learning multiplication with students who do not use multiplication tables as part of the class.

Future replication studies should be conducted to better assess the effects of the FLY™ Pen as an instructional tool in the area of mathematics for students with mild intellectual disabilities as well as for students with other types of disabilities. Only one student in the current study had a secondary disability (communication disorder), and it would be of interest to examine the effectiveness of FLY™ Pens between groups of students with different types of disabilities. Furthermore, LeapFrog developed a variety of software that can also be used as instructional tools with the FLY™ Pens. Future studies may want to examine how the FLY™ Pen can provide assistance in other academic areas or mathematical content areas for students with disabilities (i.e., spelling, writing, algebra, Spanish). In addition to future studies that focus on students with disabilities, it would be of interest to examine how this type of technology might be useful for students without disabilities in general education settings.

References


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Effectiveness of Parent and Therapist Collaboration Program (PTCP) for Teaching Self-Care and Domestic Skills to Individuals with Autism

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Abstract: The purpose of this study was to develop and determine the effectiveness of a Parent and Therapist Collaboration Program for teaching self care and domestic skills to individuals with autism with varying educational needs, age, and severity of disability. Three individuals with autism, one habilitation provider, and three parents participated in the study. A multiple probe design with probe conditions across skills was used in order to examine the effectiveness of independent variables on the dependent variable. The independent variable of the study was Parent and Therapist Collaboration Program (PTCP) for teaching self care and domestic skills for individuals with autism. Training is completed when the parents and therapists determine that they are proficient in the tasks explained during the meetings and home visits, including how to complete various recording forms for target skills and how to apply teaching methods. Result show that the PTCP was effective for teaching self-care and domestic skills to children with autism.

According to The Revised Fourth Edition of Diagnostic and Statistical Manual, (DSM-IV-TR), autism is characterized as having: Qualitative impairments in social interactions and communication skills, and repetitive and stereotyped patterns of behavior (American Psychiatric Association, 2000). In addition, people with autism often acquire self-care and daily living skills, but require additional supports in the form of supervision and prompting to ensure independent performance (Hibbert, Kostinas, & Luiselli, 2002). Many individuals with autism have deficits in their ability to function independently and need multiple forms of instruction to master daily living skills (Carothers & Taylor, 2004). An individual who has essential self-care skills such as dressing, eating, and toileting skills is considered as one who has taken important steps toward gaining an independent life. As a main aspect of American Association on Intellectual and Developmental Disabilities (AAIDD-formerly AAMR—American Association on Mental Retardation) definition, helping an individual with a developmental disability gain practical skills including self-care skills are important for increasing his independence and participation in society (AAMR, 2002).

Matthews and Hudson (2001) pointed out that the parent training methods by which parents are taught parenting strategies should follow sound instructional principles based on established theories of learning. There is a great deal of evidence that applied behavioral analysis (ABA) is a highly effective form of intervention for children with autism (Dillenburger, Keenan, Gallagher, & McElhinney,
2004; Feldman & Werner, 2002). Cooper, Heron and Heward, (2007) stated that “ABA is the science in which tactics derived from the principles of behavior are applied systematically to improve socially significant behavior and experimentation is used to identify the variables for behavior change.” (p. 20). This method utilizes behavioral principles such as positive reinforcement to teach individuals with special needs skills in a planned, systematic manner, and offers repeated opportunities across the day, settings, people, and materials to practice their new skills.

As in many parts of the world, the United States provides educational supports for people with developmental disabilities in two forms: educational assistance within public and private schools, and home and center based therapy services. Educational assistance within public and private schools is funded through the Department of Education and consists of special education and inclusive regular education classrooms with special education support that includes but is not limited to: speech, occupational, and physical therapies; counseling services and; Individualized Education Plan (IDEA, 2004). These supports are offered from the time a student enters preschool until they have graduated high school if the team finds the need to be ongoing, and can be provided in a public school setting or within private settings that specialize in their specific disability. Home and center-based therapy services are funded through the Department of Economic Security and provide one on one treatment that may include: speech, occupational, physical, and music therapy; behavioral interventions; respite care; attendant care; habilitation therapies (Arizona Department of Economic Security, 1996). These services are provided from the time a child is diagnosed with a developmental disability until such time as the services are not necessary or they show enough progression that they no longer meet the criteria for the diagnosis.

The use of paraprofessionals in public schools has become one of the primary mechanisms by which students with disabilities are being supported in general education classes (Giangreco, Edelman, Broer, & Doyle, 2001; Giangreco, Smith, & Pinckney, 2006). Paraprofessionals can be used to support the education of student with, or without, disabilities. According to Giangreco, et al. paraprofessionals need orientation and support. Just as educators in the school settings rely on the assistance of these paraprofessionals to work one on one with the child with a disability, so do settings that provide home and center-based behavioral therapies. Some states have a specific system in place that provides state and federally funded therapy and other forms of assistance to children and adults with developmental disabilities. Many of these services provide assistance by trained personnel that work one on one in the client’s home, or at therapy centers that cater to each person’s individual needs. These personnel, called “habilitation therapists” in the state of Arizona, carry out behavioral interventions that a team of professionals have designated in order for the client to meet their specific goals. As defined by the Arizona Department of Economic Security habilitation services: “provide a variety of interventions such as applied behavior analysis, social skill training, sensory integration therapy and are designed to maximize the functioning of the person with developmental disabilities” (Arizona Department of Economic Security, 1996).

Due to the amount of services that are needed to care for a person with developmental disabilities, often states can only provide low hourly wages for personnel working one on one. This does not afford highly educated professionals to carry out the individual’s service plan on a daily basis. Therefore it is crucial to train highly motivated personnel that work under the supervision of the team of professionals in order to carry out the behavioral intervention plan. Although the well-trained personnel are a very important addition to the education of an individual with autism, parents and families are the most vital part of the team. Symon (2001) pointed out a large body of research which shows the importance of parent and family participation in the education of children with autism. Brookman-Frazee, Vismara, Drahota, Stahmer, and Openden (in press) also highlight multiple parent training models and the efficacy of delivering intervention through the primary caregiver. Parent education is found to be effective on reducing problem behaviors and also teaching various skills to these children.
is well known that when parents learn the principles of ABA regarding skill instruction, they implement the system successfully (Batu, 2008; Cavkaytar, 2007; Weiss & Rutgers, 2006). Although there are some research studies showing the effectiveness of parent implementing ABA, there is still a need to see the effects of parent-therapist collaborations and partnership (Hanna & Rodger, 2002). Some of the research showed that home-based parent training programs, based on ABA were effective for teaching independent life skills. For example, Batu examined the effectiveness of caregiver delivered home-based instruction on teaching chained home skills. Results of the study showed that the care givers were successful at providing the training to their children and the children acquired, maintained and generalized the target behaviors. When the literature was reviewed some studies showing effectiveness of parent-therapist collaboration or parent-teacher partnership were found. For example Hanna and Roger suggest that parent-therapist partnership helped to acquire better therapy outcomes for the children and their families. The authors also concluded that the partnership had assisted children and families to reach meaningful, functional goals in their daily lives. Also Ruble and Dalrymple (2002) mentioned that children with autism would benefit more if they attend more to the instructional context. Therefore it is said that having parents participate in the educational process and deliver therapeutic methods in the home environment is crucial in the lives of children with autism.

The present study was designed in accordance with past research findings regarding the importance of parent involvement in therapy implementation. It is the hypothesis of this study that individuals with autism would maintain and generalize mastered skills, if parents and habilitation therapists teaching techniques based on ABA work in collaboration with one another, rather than therapists teaching the skills alone. In order to examine the hypothesis, Cavkaytar’s (1999) parent training program about teaching self-care and domestic skills (PTP-TSEDOS) was chosen. The program was shown to be effective with mothers on teaching self-care and domestic skills to their children in Turkey (Cavkaytar, 1999, 2007). Parents with various educational backgrounds took part in the program. In both studies, the mothers who completed the program have managed to teach the targeted self-care and domestic skills to their children at home. At the end of the program, children acquired the skills that were taught by their mothers. The program was replicated for teaching self-care and domestic skills by teacher aides. Teacher aides who were working in a private rehabilitation center participated in the study. At the end of the program the implementations of the teacher aides were found to be effective as well (Sabanova & Cavkaytar, 2007). Also, the program was applied in order to teach toilet skills to children with autism and mental retardation and was found to be effective for mothers in teaching these skills to their children (Ozcan & Cavkaytar, 2009). At the end of the study, the program was seen as effective and mothers who participated in the study managed to teach toilet skills to their children. Therefore; this study intends to expand evidence-based practices on specifically teaching practical adaptive skills (e.g., self care and domestic skills). The purpose of the current study was to determine the effectiveness of a Parent and Therapist Collaboration Program (PTCP) for teaching self care and domestic skills to individuals with autism. The researchers were also interested to see if the program was most effective when taught by a parent alone, a therapist alone, or a parent and therapist team. The following research questions were addressed for each individual child participating to investigate the effectiveness of the PTCP: (1) Was child Aa able to perform targeted skills that were “sweep under the table”, “tooth brushing”, and “using remote control” taught by her mother A who was working as a therapist in center? (2) Was child Bb able to perform targeted skills that were “washing hands”, “putting shoes on”, and “tooth brushing” taught by both mother B and his therapist BT? (3) Was child Cc able to perform targeted skills that were “tooth brushing”, “put toys away”, and “talking on the phone” taught by his mother? (4) What were the mothers’ opinions about PTCP?
Method

Participants

Participants included three children with autism, their mothers, and one habilitation therapist that worked with children with autism. All participant children were receiving state funded therapy services through the Division of Developmental Disabilities in Arizona. In order to receive these services they must have a documented diagnosis of autism given by a child psychologist or developmental pediatrician. No records of their individual IQ scores were available. Children were attending the G.R.E.A.T. Kids center (Guthrie Recreation Education and Therapy), a private center for children with developmental disabilities in Chandler, Arizona. The first mother A was 33 years old and attained an associate degree. She was married and had two children, one of which was diagnosed with autism. She was a working mother who was a former habilitation therapist that was promoted to a supervisory role. She conducted the intervention both at the center and at home with her daughter in parallel sessions. Mother A was placed as “parent as therapist” in this study. Her daughter Aa was five years old and could follow two-step instructions, and was learning to read and write at that time.

The second mother B was 41 years old and has a Master’s degree. She was married and had three children, two with developmental disabilities, one of which was diagnosed with autism. Her four year old son Bb was mostly nonverbal with a few single words, and had difficulty in following more than one-step directions. His therapist BT was a high school graduate. The therapist BT worked with him for three-hour sessions per week for several months. The intervention with Bb would be conducted by the mother B and the therapist BT at the same time both at home and at the center. The third mother C was working, married, and had two children, one of which was diagnosed with autism. Her seven year old son Cc was able to follow all single-step and some two-step directions, had limited verbal language, and could recognize letters, numbers and read single words. This mother worked alone. She did not have a therapist working in the study with her. The participation criteria for parents were as follows in the study: (a) they should read and write; (b) they should voluntarily attend training sessions and be capable of carrying out training procedures at home. The following criteria was also considered for children to be participants: (a) they should be between ages of 3 to 7, (b) diagnosed with autism, and (c) could follow simple one-step directions such as “come, go, sit down, stand up, open, and close.” The following criteria for the habilitation therapists were taken into account for be the participating in the study: (a) to have at least two months of experience on teaching skills to people with developmental disabilities, (b) to have completed 10 hours of training given by the State of Arizona’s Division of Developmental Disabilities, that outlines how to effectively teach skills to people with developmental disabilities using methods of Applied Behavioral Analysis, and (c) to voluntarily attend training sessions and be capable of carrying out training procedures at the therapy centers and provide training to parents in their home.

Settings and Materials

Three different settings were used in this study: Meeting room for parent and therapist instructional meetings at the center, therapy room for therapist working on skills, and children’s home for home supervision. The parent training sessions were conducted in the meeting room at the center. The other setting was the children’s own home. All the house settings were as designed by the parents. No additional accommodation was planned. All teaching sessions and the home visits were conducted in the natural environment of children’s daily lives. There were no selected specific materials such as toys, daily furniture or items on data collection and teaching periods. All materials were natural materials used in daily routines.

Design

As one of the methods of single subject designs, a multiple probe research design across behaviors was used in order to find out the effects of independent variables on the dependent variables. The independent variable of the study was Parent and Therapist Collabora-
tion Program (PTCP) for teaching self care and domestic skills for individuals with autism. The dependent variable was performance level of children with autism on self care and domestic skills taught by their mothers and therapist.

**Data Collection**

In the study, according to the multiple probe design across behaviors, the children’s baseline phase, training phase, probe phase and follow up phase data concerning performance level of acquisition of children on the target skills were collected. Baseline, probes and follow up phase data were collected by the researchers in accordance with the research model. The single opportunity method was used in data collection procedures. According to that method, firstly the materials to be used were prepared and the setting was organized. Secondly, the recording procedures were initiated by giving the child or adult discriminative stimuli. The skill steps carried out correctly were marked as correct (+). When the child had no response within 10 skill steps, application would be stopped and the rest of the items would be marked as wrong (−). When the child had a correct response for one item and an incorrect response for the next item, the correct ones were marked as (+), the incorrect or skipped ones were marked as (−). The training phase data for each skill were collected by the participant parent and therapist using the Data Recording Form for Training Procedure (DRFTP) provided by the program. During the initial training program, how to fill in the forms was explained in detail. Social validity data were collected from mothers by “PTCP Exiting Questionnaire.” The questionnaire included nine questions about satisfaction of the mothers regarding the study. The questionnaire was sent to the mothers by e-mail when the study was completed, and the mothers were asked to send the answers of the questionnaire through e-mail as well.

**Independent Variable**

Parent and Therapist Collaboration Program (PTCP) for teaching self-care and domestic skills. The purpose of the PTCP was to enable parents and therapists of individuals with autism to teach self-care and domestic skills to their children/student. PTCP has been adapted from the parent training program for teaching self-care and domestic skills to children with mental retardation developed by Cavkaytar (1999, 2007).

PTCP consisted of group and individual (one-to-one) teaching activities with parents and habilitation therapists. During the application of these procedures, the “Teaching Self-Care and Domestic Skills Manual” (TSCDSM), which was replicated by Cavkaytar (1999) in accordance with the program objectives, was used. The purpose of the TSCDSM was to make the parents and habilitation therapists knowledgeable and skillful about the program’s objectives and content. TSCDSM had three parts: introduction, preparing before skill instruction, and skill instruction. An appendices section was also included in the manual. The manual consisted of lists and forms for parents to prepare during the study.

As part of the program, group and individual meetings with parents and habilitation therapists were planned and conducted. First, as group training part of the program, group meetings were conducted. The purpose was to give training to parents about the topics in TSCDSM. Second, the individual (one-to-one) training part of the program, home visits with parents, and center visits with habilitation therapists were planned and conducted with parents and habilitation therapists. The purpose of the training, one-to-one teaching aspect of the program, was three-fold; (1) to enable the parents and habilitation therapists transform the knowledge they gained in group meetings into practice, (2) to see the parents, habilitation therapists and the child in a one-to-one practice under the supervision of an expert and, (3) to give training to the parent and habilitation therapists while applying the program.

**Procedure**

Intervention started with the first group meeting. Three group meetings, each of which lasted 1.5 hours, and a home visit to the parents’ home of each parent lasted 1.5 hours were conducted. Also visits to the center of therapist BT lasting 1.5 hours were con-
ducted. Group meetings were held in a meeting room in the school of participant students. Each group meeting and each home and center visit lasted until the mothers were competent in terms of the objectives identified. In the first parent meeting, extensive information was provided to participants regarding (a) how the program works, (b) how to use the introduction section of the TSCDSM, and (c) how to identify the child’s performance and the rewards as indicated in the second part of the manual. Second, participants were asked to identify the skills, which their children/student were or were not able to perform. They were also asked to put the skills they identified in order of priority and to identify rewards they would like to use in their home activities. In the second meeting, the following activities took place. First, extra activities given to the mother and habilitation therapist in the first meeting were examined. Second, some explanation was made about planning instructional activities as indicated in the second part of the manual. Finally, the first skill in the list prepared by the participants during home/center activities was chosen as the sample skill and DRFTP was prepared. All mothers chose cutting nails as the sample skill. In the third meeting, some explanation was made about important points that the participants should be careful before starting, and during applying the skill training activities as indicated in the third part of the manual. In addition some cues concerning the skill training were provided to participants. Participants were trained on creating visual aids for each skill by way of photo books. For each skill a photo of someone performing each step was taken, and a typed label with step number was adhered to the specific step. The photos were placed in the book from front to back, in the order that each step was performed. The books were to be used in training as another form of prompt when a child was stuck on a particular skill step. Participants also used the photo book to discuss the skill with the child outside of training sessions, by turning the pages and labeling the steps together.

After completing three group meetings, one visit to each mother’s home was made by the researchers. During the home/center visit, the participants, under the supervision of the researcher, carried out the instructional activity of the sample skill. At the end of the visit, three independent skills, which each participant would like to work with her own child/student, were identified together with the participations. All these steps were carried out by the participants themselves under the supervision of the researcher. Following the visit, participants continued instruction of the sample skill they started with the researcher during home visit until there was consistency in the data after three consecutive sessions. At the same time, they prepared DRFTP for each of the three skills identified. When there was consistency in the data, participants called the researchers. The researcher visited each parent in order to get follow up data of the sample skill and the probe and baseline data of the other skills. In the first part of the visit, the researchers carefully examined the DRFTP prepared by the participants for three skills. Then, they obtained the probe data once for these three skills.

Reliability

In order to provide reliability across observers, habilitation therapists of participant children at the private center were chosen as the independent observers. They were first trained for “recording procedure”. Following this, reliability across observers was determined for each skill using the “agreement/agreement + disagreement × 100” formula (Tawney & Gast, 1984) for at least 20% of the data. Reliability was 100% for the first participant child, 75% for the second and the third participant child. Across all skills for all participant children, overall inter-rater reliability was found as 94%.

Social Validation

Social validity data were gathered via a nine items questionnaire from participant mothers. Seven of the items were Likert type scale; two of the questions were open ended. The questionnaire had five rating scales: strongly disagree, disagree, neutral, agree, and strongly agree. The questions were as follow: (a) Prior to beginning this study, I felt comfortable with teaching self care skills to my child with autism, (b) Prior to this study, I understood the basic principles of Applied Behavioral Analysis.
(reinforcers, prompt levels, breaking skills into steps, etc.) and how to implement them in teaching my child with autism, (c) I felt that the photo books I made were helpful when teaching the skills to my child, (d) I felt that the trainings given prior to the study were easy to understand, even for someone who has little experience with teaching skills to children with autism, (e) I would recommend the trainings to other parents of children with autism, (f) Upon completion of this study, I feel comfortable with teaching self care skills to my child, (g) Upon completion of this study, I understand the basic principles of Applied Behavioral Analysis (reinforcers, prompt levels, breaking skills into steps, etc.) and how to implement them in teaching my child with autism. The open ended questions were: (h) What I liked most about this training program and, (i) What I liked least about this training program. The questionnaire was e-mailed to the parents. The data from the questionnaires were analyzed by the first author by gathering similar answers from the participants.

Results

Results for “Aa”

Data obtained from the study were analyzed graphically. Figure 1 illustrates mother A’s training activities with her child Aa about “sweep under table”, then “tooth brushing”, and lastly “using remote control” at home and also at the center.

Aa was able to perform very few of the skill steps at baseline for all skills, as illustrated by the first data points on each graph. Probe data obtained from all skills seems to be consistent with the baseline data. A noticeable and sometimes fluctuating process can be seen for each of the three skills throughout the training process. All skills were performed above 80% at completion. Moreover, follow up data were consistent with those of teaching phase. According to these results, the PTCP provided to the mother A in addition to her training as a therapist was considered as effective.

Results for “Bb”

Figure 2 illustrates skills taught to Bb, by his therapist BT at center and also mother at home. The skills are shown in the order they were taught, beginning with “washing hands”, then “putting shoes on”, and lastly “tooth brushing.”

Participant Bb was unable to perform any of the skill steps at baseline for the skills “washing hands”, “putting shoes on” and “tooth brushing”, as illustrated by the first data point on each graph. Probe data obtained from all skills seems to be consistent with the baseline data. Child Bb’s noticeable process can be seen for first and second skills throughout the training process. First and second skills were performed above 94-100% respectively. His mother stated that she did not take much data on the third skill however did work on the teaching methods with him. She mentioned that she was able to take data for two trials to show his progress, and he was at 80% independence. This data is consistent with the final probe data taken. According to these results, parent training provided to mother in conjunction with her therapist BT can be considered effective for “washing hands” and “putting shoes on”. The skill of “tooth brushing” was taught successfully using the teaching methods, although the data to support this claim is limited. Figure 3 illustrates habilitation therapist BT’s data for same skills as “washing hands”, then “putting shoes on”, and lastly “tooth brushing.”

According to habilitation therapist BT’s data, child Bb was unable to perform any of the skill steps at baseline for the skills “washing hands”, “putting shoes on” and “tooth brushing”. Probe data obtained from all skills seems to be consistent with the baseline data. An acceptable process can be seen for first and second skills throughout the training process. First and second skills were performed above 80%. During the third skill child Bb experienced a change in his habilitation therapist BT three times, and the teaching methods and data collection did not remain consistent. There was a small amount of data taken in the beginning of the sessions with the therapist BT. According to these results, parent training provided to mother in conjunction with the therapist BT can be considered as effective in “washing hands” and “putting shoes on”. Child Bb also completed third skill, “tooth brushing” as shown on Figure 3.
Results Regarding Targeted Child “Cc”

Figure 4 illustrates skills taught to Participant Cc, by his mother C at home. The skills are shown in the order they were taught, beginning with “tooth brushing”, “put toys away”, and, “talking on the phone”.

Child Cc was unable to perform any of the skill steps at baseline. Probe data obtained from all skills seem to be consistent with the baseline data. First skill was performed above 75%, although the final probe indicated it was mastered above 80%. Mother C misplaced the last data sheet showing independence. Second skills were performed above 80%. It was determined by his mother that the third skill, “Talking on the phone” was not appropriate for him at this time. Child Cc has noted auditory sensitivities and adverse reactions to the voice coming through the phone. He refused the skill after multiple trials and reinforcement, and no data was taken. According to these results, parent training provided to mother can
be considered as effective in “Tooth brushing” and, “Putting toys away”, but not effective in determining target behaviors for this child.

Social Validity of the PTCP
According to the social validity data, all parents agreed that they were comfortable with...
teaching self-care and domestic skills using the method of ABA with their children after the study was completed. They agreed that training in meetings and home visits were easy to understand. Photo book was helpful in training sessions with the children. All parents agreed that they would recommend this training to other parents of children with autism. What they liked most about this training program was that it was easy to apply with their child. First mother A said “it was easy for my child to comprehend due to the visual

Figure 3. Percentage of correct responses for Bb during baseline, teaching and follow up sessions according to the therapist BT’s data.
aids and repetitiveness”. Second mother B said “what I like most about the program was the picture books showing the skill steps.” The third mother C mentioned that “learning to break skills into parts, teach using correct prompt levels, and having pictures of the steps” were the parts she liked most about the program. Participants stated the parts they liked least about this program were data collection, time line and busy family’s schedule. The first mother A said “I have no time-line given for how long to teach the skill”. She

Figure 4. Percentage of correct responses for Cc during baseline, teaching and follow up sessions.
had difficulty taking videotape of her child, which was needed due to his refusal to complete the skills in front of the raters. The second mother B said “I felt like it was often difficult to teach skills due to my family's busy schedule and felt that it would be easier having a habilitation therapist to help her with implementation. I was teaching the skills twice per day for some skills”. The third mother C said “It was difficult taking the data. I felt that having the habilitation therapist involved was helpful and feels confident teaching future workers how to teach skills to her child.”

In conclusion, data obtained from the study showed that the children were unable to perform the skill steps at the baseline for most of these skills and probe data were consistent with baseline data. First of all, training started a quick progress for most of the skills, fluctuating progress for some other skills throughout the training process was observed. At the end of the teaching process, all children were able to reach the criteria for all three skills, except Bb’s tooth brushing skill. Follow up data were collected at the end of the each teaching stage. But most of the children couldn’t reach the independence level. Follow up data were observed to be consistent with teaching phase. Mothers said they were happy to apply skill teaching to their children.

**Discussion**

The purpose of this study was to determine the effectiveness of a PTCP for teaching self-care and domestic skills to individuals with autism. Results revealed that PTCP was effective in teaching self-care and domestic skills to individual with autism. Results were that the mother who was previously a therapist, and mother-therapist dyad that completed PTCP were effective in teaching self-care and domestic skills to their children and student with autism by the training activities provided by the program. These results were parallel with the results of the previous research on the program focused in this study. For example, Cavkaytar (1999, 2007) applied the program to mothers who have children with mental retardation. After the training phase, mothers taught self-care and domestic skills to their children at their home. All mothers completed the program were working alone with their children.

In another study, Sabanova and Cavkaytar (2007), worked with teacher aides who are working in a private special education center for teaching self-care and domestic skills at school. Results of the study showed that the program was effective in teaching self-care and domestic skill. Ozcan and Cavkaytar (2009) replicated the program in teaching toilet skills to children with autism and mental retardation. The program was again found to be effective in teaching toilet skills.

The first mother A was previously trained as a therapist and had received additional training in ABA prior to the study, and worked with her child at home. She felt very comfortable teaching the skills to her child and felt comfortable taking data and fading prompt levels. She did feel overwhelmed at times and stated that it was very difficult to teach the skills consistently by herself without the help of her habilitation therapist. Like most working mothers, her work, home, and family responsibilities consumed such a large portion of her time that she felt the support of an additional therapist would have been very helpful and that the skills would have progressed at a faster rate.

The second mother B worked at home; her therapist worked at the center on the same skills simultaneously. The mother’s and therapist’s data indicated that they taught the targeted skills in conjunction with one another. This mother had two children at home with a disability and discussed how invaluable it was to have additional help and support implementing her child’s intervention. She also felt that having the skills taught across multiple environments was part of the success of his mastering so quickly. Although ideally children would benefit most from receiving intervention in their natural environments by their primary caregiver, it is not always an easy feat to achieve. Therefore having parents trained to the best of their ability to implement interventions at home, in conjunction with collaborating with other professionals in the child’s environment would provide continuity of care. This also allows parents’ access to a trained professional that can offer suggestions and adaptations to skill teaching when a child...
is not progressing or refusing to complete skill steps.

The third mother C participated in the PTCP, but she could not complete the third skill teaching after the first and second skill. The result may be related to the absence of support from her therapist and school. She discussed her satisfaction with the program and the new empowerment that she felt after being able to successfully teach her child skills. She stated that different her son with autism was from his typical siblings, and how teaching methods were also quite different for each. She explained that if no one spent the time teaching parents how to use methods such as ABA, and visually supported instruction then they would continue reinforcing the wrong behaviors and become just as frustrated as the child. So many parents feel so helpless when they have a child with autism, because their interactions are often unsuccessful. This mother stated that giving her the power and confidence to teach her child even basic skills made her feel successful and more comfortable teaching him. Special educators and the paraprofessionals or therapists with whom they work need to establish and maintain a collaborative relationship to better serve the children assigned to them (Hauge & Babkie, 2006). Werts, Harris, Tillery, and Roark (2004) have reported that most parents in their sample reported paraeducators working with their children were doing a good job. The result of their study indicates that paraeducators are perceived by parents as professionals, highly valued service providers, and they should be treated as such. Communication and collaboration are required of paraeducators; therefore, training in these areas is vital. Eyberg and Matarazzo (1980), pointed that parents can act as their own therapist by developing mother child interaction if they train on individual parent-child interaction training programs. The first mother who was working at the education center as a therapist completed teaching for three skills during a total of 85 sessions alone with her child. The second mother completed teaching for three skills during a total of 55 sessions in collaboration with her child’s therapist. The third mother did not complete the teaching period for all three of the skills. According to these results, the first mother effectively completed the teaching period for all skills. The second mother who worked with her therapist completed the skills more efficiently than first mother working alone. These results indicate that the mother who trained and applied the PTCP program with her child’s therapist, can teach her child self-care and domestic skills most effective and efficiently. In addition the mother who also had previous training and completed the PTCP program taught her child the skills over a longer duration. This may point to the need for children to learn skills across several contexts in order to generalize and master the skills independently.

The child working with his mother and therapist received training in both the therapy center and at home.

Limitations and Suggestions

Results of the current study should be considered with the following limitations. Data on the teaching phase of the study was gathered by participants who are mother or therapist. Although the researchers were present to take baseline and all probe data, it was not feasible to be present in the homes or at the center each time a participant took data on the skills. Therefore the study had some limitations about the correct implementation reliability. We cannot be certain that data was taken correctly and consistently, although at each visit data collection methods were reviewed with the participants. The researchers also did not anticipate that child Cc would not perform any of the skills in front of anyone but his mother. His mother was gracious enough to take video of him performing the skills, and baseline and probe data was taken from the videos. Parent who was working alone also complained about not having enough time to work on skills consistently. This illustrates further the importance of a supportive collaboration between parents and the professionals working with the child with autism so that they are constantly receiving training on these much needed skills. Social validity data showed that mothers found it easy to learn and apply the PTCP to their children with autism at home.

Some suggestions to be presented can be as follows: First of all, this program can easily apply to children with autism for teaching
self-care and domestic skills by parent as a therapist or parent-therapist collaboration. Future research is needed to verify the results of this study, including replication for children with other developmental disabilities and their family members such as peers and grandparents. A larger sample size with varying levels of severity would provide more insight into the coexisting variables that may influence the speed at efficiency of how the skills are taught and mastered. Follow up data after mastery at varying intervals would also give us information about the continuing independence on the skills taught.

References


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Effects of Instructional Rubrics on Class Engagement Behaviors and the Achievement of Lesson Objectives by Students with Mild Mental Retardation and Their Typical Peers

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Abstract: Aligning standards and individual needs of students with disabilities has been emphasized as a prerequisite for the students’ access to, and meaningful progress in, the general curriculum. As inclusive assessment tools, instructional rubrics are believed to have potential in effectively linking standards and the Individualized Education Program (IEP) goals of students with disabilities and in enhancing self-directed learning of all students involved with the in-depth application during class. This study examined the effects of instructional rubrics on class engagement behaviors and the achievement of lesson objectives by students with mild mental retardation and their same-age peers. The results demonstrated that class engagement behaviors of the students with mild mental retardation drastically improved. The achievement of lesson objectives by all the participants evaluated through rubrics was statistically significant. Implications for practitioners and for future researchers were also discussed.

Inclusive education already has been a solid option for the education of students with special needs. Similar with the statistics in the U.S. that almost half of all students with disabilities ages 6 through 21 served under the Individuals with Disabilities Education Act (IDEA) are educated for most of their school day in the regular classroom (U.S. Department of Education, 2007), the counterpart in Korea constitutes up to 63% in 2007 (Korea National Institute of Special Education, 2007). With the current registration of the No Child Left Behind Act of 2001 (NCLB), the population has been challenged to make meaningful progress through access to general education beyond simply engaging in it (Kleiner & Thurlow, 2001; Wehmeyer, Lattin, Lapp-Rincker, & Agran, 2003). The mandate of having students with disabilities in inclusive assessment for the evidence of academic achievement has become a challenge with respect to addressing their individual needs in the general curriculum while keeping the content of the curriculum intact.

For students with disabilities to be successful in inclusive assessment, individualized education program (IEP) goals of the students should be reasonably aligned with standards of the general curriculum, followed by consistent progress monitoring through formative assessments that are carefully developed with consideration of goals and daily instruction (Fisher & Frey, 2001; Klinger & Vaughn, 1999). For example, performance of students with disabilities could be accurately evaluated with the validity of the assessment maintained only when the same adaptation methods were available during the assessment as were in instruction (e.g., Edgemon, Jablonski, & Lloyd, 2006; Ysseldyke et al., 2001). However, there is a strict contrast when it comes to reference of assessment as typical academic assessment for students with disabilities is individual-refer-
enced based on IEP goals, whereas regular students are evaluated by criterion-referenced methods based on standards of the general curriculum (Nolet & McLaughlin, 2000). If the performance criterion for students to target during class is specified based on standards, it would make the process to set an individual but standards-based goals for students with disabilities and for them to effectively participate in inclusive assessment clearer. Instructional rubrics seem to have potential to effectively align IEP goals with standards as a criterion-specific assessment as well as to be closely related to ongoing instructional practices (Glatthorn, Braqaw, Dawkins, & Parker, 1998).

With more highlighted instructional functions in rubrics, which are evaluation tools with standards-based criterion and scales of various performance levels, instructional rubrics can be utilized as an instructional tool or used in the process of informed feedback on the progress of students and in-depth evaluation on the final work (Andrade, 2005). Instructional rubrics are suggested as an alternative way for progress monitoring of IEP goals of students with disabilities (Etscheidt, 2006); they feature distinct twofold elements as follows: First, instructional rubrics enable student-centered assessment represented by its self-assessment feature through better awareness of what are expected from instruction. For example, many research utilizing instructional rubrics have reported the positive effects on students’ increased responsibility for their own learning and cooperative relationship between teachers and students (Shepard, 2000; Skillings & Ferrell, 2000), enhanced empowerment on evaluation (Han & Lee, 2004; James, Abbot, & Greenwood, 2001), and active self-/colleague-assessment on both learning process and outcomes (Andrade & Boulay, 2003; Barry & Moore IV, 2004; Saddler & Andrade, 2004). As a support strategy for self-directed learning, instructional rubrics are combined with graphic organizers and process-composition model (James et al.), and are utilized along with self-directed organizational strategy instruction for writing competency tests (Barry & Moore IV). It requires attention that exact awareness of learning goals and performance criterion, alongside with self-assessment, is essential to lead to self-regulation of students while engaging in learning activities (Andrade & Boulay).

Second, instructional rubrics can be flexibly applied to a wide range of students with diverse needs (Smith, Brewer, Heffner, & Algozzine, 2003; Whittaker et al., 2001). It might be because it is easier to establish an objective performance criterion, which enables every student involved to target if the goals of instruction to be accomplished through certain tasks are explicit with the possible differentiation or accommodations for individual students with disabilities. Actually, not only typical students but students with disabilities could effectively learn various subjects and learning skills using rubrics (eg. Finson & Ormsbee, 1998; Loeffler, 2005; Schirmer & Bailey, 2000), and their applicability has been extended from young children (Byan & Hyam, 2005) to college students (Pindiprolu, Lignugaris/Kraft, Rule, Peterson, & Slocun, 2005). For example, Loeffler implemented instructional rubrics for spelling instruction for students with learning disabilities and found that they were useful as a tool to enhance intended lesson objectives through self-assessment and discussion about their ongoing progress. A group of students with hearing impairments also improved their writing skills using a rubric (Schirmer, Bailey, & Fitzgerald, 1999). According to James and colleagues (2001), instructional rubrics can be applied as an instructional strategy for students with disabilities in inclusive classrooms with the use of guidance towards developing needed accommodations for individual students, and make the IEP process including the indicators of the student’s progress in the general curriculum run more efficiently (Stanford & Siders, 2001).

In South Korea, as many as 80% of the students with disabilities in inclusive settings, who are mainly working on general curriculum-irrelevant-IEP goals, are excluded from both formal and informal assessment in the regular classroom (Kim, Kwon, Kim, & Park, 2003). Moreover, the results of performance tests based on IEPs typically done by special education teachers either in a resource room or in a self-contained class are rarely reported to the principal or administrators in charge (Shin, 2005); thus there is no accountability check of the related personnel for the stu-
students’ adequate academic progress in inclusive settings. With more than 50% of general education teachers who currently have students with disabilities in their class never having seen IEPs developed for the students (Kim et al.), even in the case where IEPs are standards-related, it cannot be guaranteed that the students could proceed towards a meaningful academic achievement through accessing the general curriculum and getting proper support. Meanwhile, the research on assessment for students with disabilities focuses on either diagnosis-related issues (e.g., Han & Park, 2004) or tests for students in special schools (e.g., Kim & Kim, 2004), leaving few empirical studies for those students to successfully participate in inclusive assessments.

In practice, regarding the assessment for regular elementary school students, apart from the guidelines written in the state-level curriculum, a specific criterion on targeted ‘concepts’ or ‘generalization’ of each subject standard is much needed across contents (M. Lee, 2004). Therefore, it might benefit all students involved if instructional rubrics with a specific criterion are carefully developed in the light of universal design for learning (UDL; Rose & Meyer, 2006) and applied for daily instruction in inclusive classrooms with diverse learners. Based on such needs in the field, this study examined the effects of instructional rubrics on class engagement behaviors and the achievement of lesson objectives by students with mild mental retardation and their typical peers.

**Method**

**Participants**

Three students with mild mental retardation in grades five and six participated in the study. The range of IQ score of the participants was from 57 to 59 on the *Korean-Wechsler Intelligence Scales for Children-III* (Kwak, Park, & Kim, 2001). All participants were reportedly in need of improving basic class engagement behaviors to make progress in the general curriculum.

Student 1 was a twelve-year-old male student in the sixth grade with a full scale IQ of 57. Based on the curriculum-based measurement, he could read and write short sentences with three to four simple words, but demonstrated difficulties in comprehension of complicated words and paragraphs. During the pre-baseline observation, he barely showed interest in class, spending most of the time scribbling on or folding the paper, with no textbook or material prepared on the desk.

Student 2 was an eleven-year-old male student in the fifth grade with a full scale IQ of 59. Though producing some errors, he could read and write sentences with four to five words in various formats based on the curriculum-based measurement, and demonstrated relative strengths in reading comprehension. During the pre-baseline observation, he prepared the textbook and looked at the teacher or other students from time to time; however, when asked to participate in the activity, he became extremely shy lowering his head and not even moving a finger.

Student 3 was an eleven-year-old male student in the fifth grade with a full scale IQ of 58. Based on the curriculum-based measurement, he could read and write short sentences with three to four simple words, but demonstrated difficulties in comprehension of complicated words and paragraphs. During the pre-baseline observation, he scarcely showed interest in class, laying down his head on the desk most of the time, with no textbook or material prepared.

The typical peers of the inclusive classes in which these three participants with mild mental retardation were studying and three teachers of the classes also participated in the study. Class 1 in which Student 1 was enrolled had 30 students without disabilities, 29 in Class 2 of Student 2, and 29 in Class 3 of Student 3. All of the teachers were female and their teaching experience in the field ranged from 6 to 18 years.

**Setting**

Both training and intervention took place in the regular classroom of each group of participants. In addition, the setting for extra training given to the students with mild mental retardation was a resource room where they were educated partly during the day.
TABLE 1
Definition of Target Behaviors by Four Subcategories

<table>
<thead>
<tr>
<th>Categories</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listen to a lecture</td>
<td>Look at a teacher who is speaking with attention or behaviors that are related with the ongoing lecture (e.g., answer a teacher’s question, look at other students who are answering a teacher’s question, or ask a question)</td>
</tr>
<tr>
<td>Take down notes</td>
<td>Write down what a teacher wrote on the board or delivered to students verbally</td>
</tr>
<tr>
<td>Work with peers</td>
<td>Work on a task or an activity together with one or more peers (Peers provide physical, verbal, or material support)</td>
</tr>
<tr>
<td>Work independently</td>
<td>Work on a task or an activity which is related (same or similar) with the ongoing class (e.g., reading, writing, speaking, manipulating, or presenting)</td>
</tr>
</tbody>
</table>

Instrument

Instructional rubric. Based on related studies (Hall & Salmon, 2003; Whittaker et al., 2001), the instructional rubric for this study was developed to target individual but standards-based lesson objectives for students with mild mental retardation, and standards-based lesson objectives on the Korean language for typical students. Specific components of the two-page-long rubric were: 1) standards-based lesson objectives for typical students and standards-related but individually accommodated lesson objectives based on IEP goals for students with mild mental retardation; 2) levels of performance criterion (four levels for typical students; three for students with mild mental retardation); 3) examples of performance indicators for each level that represent the characteristics to which the assessment task should pertain; and 4) section for self-assessment. Individual lesson objectives for students with mild mental retardation specified the levels of content and process standards of Korean language for a specific grade, which were related to the students’ IEP goals, led by analyzing the fundamental functions of targeting standard (Hoover & Patton, 2004; Wehmeyer, Lance, & Bashinski, 2002).

Students with mild mental retardation received an ‘on-task-rubric-application-form’ on a daily basis along with the rubric. The form contained specific task-related objectives based on individual lesson objectives on the rubric, questions for self-monitoring on class engagement behaviors, and a section for self-evaluation and teacher-check. A set of rubrics, including an on-task-rubric-application form, were provided to all students in the inclusive class so that typical students could be informed about individual lesson objectives and instructional support for the students with mild mental retardation.

Initially developed rubrics went through a content validity check by one general education teacher and one special education teacher, each holding a master’s degree, based on ‘guidelines for reviewing quality of instructional rubrics’ (Stiggins, 2005), and 12 rubrics, four for each class, were finally implemented for intervention.

Data Collection Procedures

Dependent variables. Two dependent variables were measured in the study. First dependent variable was class engagement behaviors of students with mild mental retardation. Class engagement behaviors consisted of four subcategories (listen to lecture, take down notes, work with peers, work independently) under the operational definitions, which are indicated in Table 1. Using the 15 min-partial-interval recording method, the target behaviors were observed for 25 min. during class after five to six min. passed from the beginning of the class. The occurrence of the behaviors was calculated by dividing the number of intervals that the behaviors occurred with the total number of the intervals and multiplying it by 100. The second dependent variable was performance level of class objectives of all participants. Until the students with mild mental retardation reached the intervention termination criterion, which was more than 80% of occurrence of the target behaviors in three consecutive sessions, four instructional
rubrics were applied to each class. All participants assessed their own performance level in the lesson objectives using the rubrics (1–4 points for typical students; 1–3 points for students with mild mental retardation) before and after the intervention of each rubric was implemented. The data were analyzed with SPSS for Windows 12.0 program using paired-samples t-test.

Interobserver agreement. Before the actual agreement check, the second observer who has a master’s degree in special education and the first author practiced to reach an agreement of over 90% on the observation of the target behaviors by watching the videotaped data. The interobserver agreement counted for 25% of data randomly chosen across the intervention conditions ranging from 94.3% to 95.2%.

Social validity data. Teachers of the three classes and six typical students, two from each class, were asked for the social validity data. Using a questionnaire with a five-point Likert scale, the mean scores of the answers of teachers are as follows: significance of the target behaviors (5), participation in the intervention (4.3), outcomes from the intervention (4.6), standout of disability (1.6), usability of the intervention (4.3), and efforts needed for the intervention (3.6). The typical students who participated in a 10- to 15-min. long semi-organized interview perceived a positive change on both students with mild mental retardation and themselves, such as exact awareness of class objectives and their performance level and increased participation in class of students with mild retardation.

Treatment fidelity. For 25% of the intervention sessions, treatment fidelity of participating teachers and typical students was assessed on six items organized into three sections: 1) reminding the class of the objective written on a rubric or a rubric-application-form; 2) giving prompts for participation in class to the student with mild mental retardation; and 3) monitoring self-assessment of performance using the rubric. The mean scores ranged from 5.2 to 5.75 out of 6 points.

Experimental Design and Procedure

Class engagement behaviors of students with mild mental retardation. In order to examine the effects of instructional rubrics on class engagement behaviors of students with mild mental retardation, a single-subject multiple probe across participants design was employed (Tawney & Gast, 1984).

Baseline. During baseline, the class engagement behaviors of the participants were observed for 25 min. during Korean language class, while the students were given no special support or prompts for participation and the teachers led the class in the usual way. The probes were administered after the baseline was stable for at least three sessions before intervention was implemented.

Intervention

Training for teachers. The teachers of inclusive classes received two instructional sessions, each lasting approximately 40 min. During the first session, the purpose of the study and important elements of the intervention, such as instructional rubrics, IEP goals, and curricular accommodations for students with disabilities, were explained. During the second session, they were informed about the process of developing the instructional rubric with individual lesson objectives for students with disabilities along with general lesson objectives for typical learners (though the researchers developed the instructional rubrics used for the intervention). The practices they need to perform during class implementing the rubrics were then taught as follows: 1) remind both general lesson objectives and individual ones for students with mild mental retardation; 2) provide the students with mild mental retardation prompts to participate in class, if needed; and 3) ask all the students to evaluate their performance using the rubric.

Training for all students. The typical students of inclusive classes and three students with mild mental retardation received four instructional sessions together, each lasting approximately 20 to 40 min. During the first session for 40 min. before the intervention began, the instruction started with the introduction of instructional rubrics and the need for individual lesson objectives for the students with mild mental retardation. Based on the suggestions of related studies (Hall & Salmon, 2003; Whittaker et al., 2001), the participants had exercises on evaluating their own performance or current status according
to the criteria in the rubric by comparing them with examples of each level of performance. At the designated section on the rubric, they were asked to write down the result and the specific performance indicator to focus on during the next class. Additionally, the peers who sat next to or were in the same group with the student who has mild mental retardation were taught to check the individual lesson objectives from the on-task-rubric-application form together with the student in need; they then monitored whether the student did the self-evaluation of performance on the rubric.

After finishing a unit using each rubric, the students received another instructional session for approximately 15 min. each. They shared a couple of good examples among the student rubrics that specified things to improve on in detail based on the self-evaluation of performance, which were mutually picked by the researchers and the teacher of the class; they also discussed how the students with mild mental retardation had performed so far.

Extra training for students with mild mental retardation. In addition to the training for all student participants, students with mild mental retardation received six extra instructional sessions, lasting approximately 20–30 min. each. Based on King-Sears and Carpenter (1997), the instruction consisted of three stages: 1) understanding target behaviors; 2) understanding a self-monitoring/assessment tool; and 3) practicing and evaluating mastery of the usage. During the first session, the students were taught to differentiate target behaviors from non-target behaviors by watching video clips of the students and their peers in class or using work samples. Target behaviors were examples of excellent performance indicators on the rubric that represented lesson objectives as well as basic class engagement behaviors, which will enable the students to achieve the lesson objectives.

During the second session, the students were taught how to use the rubric and the on-task-rubric-application form for self-assessment of performance. The first author modeled the steps of self-assessment as follows: 1) check the lesson objective and on-task objective; 2) participate in class as informed by the objective; 3) check the lesson objective and on-task objective again; 4) monitor their own performance according to the questions on the application form; and 5) evaluate performance with the level on the rubric and choose a performance indicator to improve on for the next class. The students then practiced those steps with the researcher’s guidance and feedback. The third instructional session consisted of independent practice of the self-assessment steps taught in the previous session and the evaluation of mastery of their usage. Based on the evaluation results, the students received corrective feedback and practiced specific steps repeatedly. Three additional instructional sessions consisting of the differentiation of new target behaviors and the practice of self-assessment steps using rubric were provided one by one just before a new rubric was applied.

Additional support for students with mild mental retardation during class. During Korean language class, the students with mild mental retardation received additional support such as the on-task-rubric-application form where a task-related objective and behavior monitoring questions were specified alongside with needed instructional accommodations (e.g., a material with easier level of difficulty). The class teacher then checked the application form right after the class and gave feedback to the student based on the result. The students received guidance from the researcher and the teacher on the process of picking a performance indicator to improve on for the next class. With the chosen indicator considered, the task-related objective and instructional accommodations for the next class were decided accordingly.

Generalization. For generalization of target behaviors, data on those behaviors were collected three times during social studies class under the same condition as the baseline, right after the intervention condition was terminated.

Maintenance. During maintenance condition, data on target behaviors were collected during Korean language class under the same condition as the baseline, a month after the intervention condition was terminated.

Performance Level of Class Objectives of All Participants

In order to examine the effects of instructional rubrics on the achievement of class ob-
jectives by all participants, a pre-/post-test design on the performance level of lesson objectives through self-assessment by the participants was employed. Before and after each rubric was applied to Korean language class, the students assessed their own performance level of lesson objectives using the rubric, resulting in four pre-/post-test scores. Students with mild mental retardation reviewed the assessment result with the researcher and the teacher before they put their final scores on the rubric.

**Results**

*Class Engagement Behaviors of Students with Mild Mental Retardation*

Results indicated that the intervention of implementing instructional rubrics in Korean language class was effective in improving class engagement behaviors of all participants with mild mental retardation (See Figure 1). As demonstrated in Figure 2, the overall occurrence of the three subcategories of target be-

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Figure 1. Percentage of occurrence of class engagement behaviors.

Figure 2. Percentage of occurrence of class engagement behaviors for individual students.
behaviors, except ‘take down notes’ category, substantially improved, especially ‘work independently’ category, which dramatically increased across all conditions. The occurrence of class engagement behaviors of Student 1 increased to an average of 71.6% (range...
49.0% to 92.0%) during intervention phase from an average of 5.3% (range 4.0% to 6.0%) during baseline. Among the subcategories of behaviors, ‘work independently’ category took the highest stage with an average of 37.1% during intervention from 0% during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%). Starting with the 70% of sudden hype during the first session of intervention, Student 2 demonstrated an increase on the target behaviors from an average of 25.8% (range 19.0-31.0) during baseline, followed by ‘work with peers’ category (1.0% to 17.9%) and ‘listen to a lecture’ category (4.3% to 18.9%).

**Performance Level of Lesson Objectives of All Participants**

As indicated in Table 2, the mean score of all three classes increased from 1.60(SD = 0.29) for Class 1, 1.48(SD = 0.28) for Class 2, and 1.78(SD = 0.22) for Class 3 in the pre-tests to 2.95(SD = 0.45), 3.25(SD = 0.35), and 3.47(SD = 0.31), respectively, in the post-tests, and the differences were statistically significant (p <.001). With the consideration that the performance level of lesson objectives for all participants significantly increased, the intervention of applying instructional rubrics to the Korean language class was effective on the achievement of targeted lesson objectives by the participants.

**Discussion**

This study intended to examine the effects of instructional rubrics on class engagement behaviors and the achievement of lesson objectives in the Korean language class by students with mild mental retardation and their typical peers. The results demonstrated that class engagement behaviors of all participants with mild mental retardation drastically improved, and the improved behaviors were generalized and maintained after the intervention was terminated. The difference in performance levels on lesson objectives for Korean language class for all participants before and after the intervention phase was statistically significant (p <.001). Interestingly, Student 1 and Student 2 demonstrated a high occurrence rate in ‘work with peers’ category with an average of 20.3% and 24%, respectively, across all conditions.

### TABLE 2

<table>
<thead>
<tr>
<th>Class</th>
<th>Before M</th>
<th>After M</th>
<th>Before SD</th>
<th>After SD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 (N = 31)</td>
<td>1.60</td>
<td>2.95</td>
<td>0.29</td>
<td>0.45</td>
<td>18.214*</td>
</tr>
<tr>
<td>Class 2 (N = 30)</td>
<td>1.48</td>
<td>3.25</td>
<td>0.28</td>
<td>0.35</td>
<td>23.515*</td>
</tr>
<tr>
<td>Class 3 (N = 30)</td>
<td>1.78</td>
<td>3.47</td>
<td>0.22</td>
<td>0.31</td>
<td>33.561*</td>
</tr>
</tbody>
</table>

* p <.001
Intervention was shown to be statistically significant in all three classes.

Impact on Class Engagement Behaviors of Students with Mild Mental Retardation

The improvement on class engagement behaviors of the participants with mild mental retardation can be considered as a meaningful progress because ‘engagement’ in a regular class has been emphasized as a prerequisite for students to achieve individual academic goals through access to the general curriculum (Cushing, Clark, Carter, & Kennedy, 2005; Wehmeyer et al., 2003). The result indicates that the rubrics functioned as an instructional guide on learning for the students as suggested by previous studies (e.g. Andrade & Boulay, 2003; Lee & Lee, 2006; Loeffler, 2005). Specifically, by utilizing instructional rubrics, the participants could be better aware of lesson objectives they were targeting and could systematically manage self-monitoring of their own performance during class. Although it demands, as the first step for students with disabilities, to successfully learn in inclusive settings (Prater, 2003), the participants were either explicitly informed about individual lesson objectives they were expected to target or provided accommodated tasks or materials in line with the objectives. The positive result of implementing instructional rubrics, especially on ‘independent work’ category, is not only supported by the related research that suggest the effectiveness of instructional rubrics as a strategy for self-directed learning (Andrade & Boulay; Hall & Salmon, 2003; James et al., 2001), but also underscores the significance of exact awareness of lesson objectives and self-monitoring/evaluation of performance for students with disabilities to learn successfully in an inclusive class (Copeland & Hughes, 2002; Grossi & Heward, 1998).

Furthermore, more specific and goal-oriented support provided by typical peers to the participants with mild mental retardation under the awareness of the participants’ individual lesson objectives might contribute to the positive result. All three participants improved in ‘work with peers’ category at least more than 10% during intervention, and the increased behavior was maintained with a higher occurrence rate than the one during the intervention for Student 1 and Student 2. As related studies reported that cooperation among students was enhanced through specific colleague evaluation and informed feedback on performance using rubrics (Schirmer et al., 1999; Smith et al., 2003), having individual objectives and performance monitoring questions for the participants with mild mental retardation specified in the inclusive assessment tool might lead to efficient and consistent peer support for the participants during class rather than spontaneous or unsystematic ones. For instance, as the intervention progressed, it was observed that the peers of Student 2 and Student 3 actively recognized the two students’ participation in class activities and voluntarily involved them in a cooperative task. It can be analyzed that the peers’ overall expectation for the participants with mild mental retardation went higher as they noticed the improvement on class engagement behaviors of the participants working on tasks for individual but standards-based lesson objectives (Cha, 2002; McDonnell, McLaughlin, & Morrison, 1997). Exposure to specific ways to support the participants with mild mental retardation, such as instructional adaptations and self-monitoring questions, might also contribute to the natural empowerment of peers in terms of cooperative work with students with disabilities.

Impact on the Achievement of Lesson Objectives by All Participants

The positive result on the achievement of lesson objectives by all participants, including students with mild mental retardation, by implementing instructional rubrics extends the findings of previous studies that reported the effects of instructional rubrics on performance in various subjects (Andrade & Boulay, 2003; Barry & Moore IV, 2004; Goodrich, 1996; James et al., 2001; Loeffler, 2005; Shirmer et al., 1999). Moreover, it highlights its implication as an ultimate outcome for students with disabilities in inclusive settings beyond just ‘engaging’ in the general curriculum (Clayton, Buridge, Denham, Kleinert, & Kearns, 2006; Cushing et al., 2005). The positive influence on achievement for all participants, not only for the participants with mild
mental retardation, also points out that carefully designed and executed instructions for students with disabilities can be beneficial for all the students involved (S. Lee, 2004; McDonnell et al., 1997; O’Connor & Jenkins, 1996).

Specifically, exact awareness of lesson objectives and regular self-evaluation through the rubric might make a positive impact on the achievement of lesson objectives by all participants. This result demonstrates that appropriate progress monitoring by students based on their awareness of learning goals is closely related with enhancing academic achievement (Deno, 2003; Fuchs & Fuchs, 1986), and extends the suggestion that instructional rubrics, especially with self-evaluation of performance, can function as a stepping stone that assists students to self-regulate over learning activities (Andrade & Boulay, 2003; Saddler & Andrade, 2004; Shepard, 2000). In addition, individual support for students with disabilities to successfully participate in an inclusive assessment was specified in this study. For example, the participants received extra training for self-monitoring/evaluation to utilize instructional rubrics before the intervention in addition to the regular training for all participants. During the intervention, instructional accommodations in objectives, materials/activities, and scoring system were provided along with an aid for performance monitoring and feedback on the result using an application form. Considering the need for ‘special support’ for students with disabilities to achieve meaningful progress in the general curriculum even in cases when a universal design of learning is employed (McGuire, Scott, & Shaw, 2006; Wehmeyer et al., 2005), these additional training and support employed for the participants can be suggested as necessary elements to consider in utilizing instructional rubrics as an inclusive assessment for diverse learners.

There are some limitations to be noted in the study. First, the participants were students with mild mental retardation and their typical peers in elementary grades. Thus, the results of the study might not be generalized to other students with different disabilities and their peers or those from different age groups. Second, this study employed the participants’ self-evaluation on their own performance level and it may not exclude the possibility that the result of self-evaluation might not be the same as the real performance level of the participants.

Despite the limitations, this study presents several implications for future research and practice. It suggests the utility of instructional rubrics not only as an inclusive class-wide assessment tool, but also as an instructional strategy that systematically assists students with disabilities to make meaningful progress in the general curriculum. Specific considerations to address individual needs of students with disabilities demonstrated in the study will guide practitioners to design and implement an inclusive assessment for diverse learners to successfully participate in with appropriate support. In the future, research is needed to implement an instructional rubric on students with various disabilities and from different age groups. Additionally, employing a control group for comparison would make an elaborate analysis of the effects of an instructional rubric on the achievement of certain objectives possible.

References


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Nolet, V., & McLaughlin, M. J. (2000). *Accessing the


Increasing Comprehension of Students with Significant Intellectual Disabilities and Visual Impairments during Shared Stories

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Abstract: Shared stories have been shown to help increase emerging literacy skills in students with significant intellectual disabilities. One important literacy skill is the development of listening comprehension. In this study, least-to-most prompt system was used to promote listening comprehension during shared stories for two students with significant intellectual disabilities and visual impairments. The procedure was evaluated via a multiple probe design across materials (i.e., books). Outcomes indicate that both students improved on the correct number of comprehension questions answered during all three books. In addition, Student 1 was able to generalize responses across people and settings as well as maintain results. Future research and implications for practical team implementation of the least-to-most prompt system to teach listening comprehension are discussed.

Literacy is one of the most important educational goals for all students because of the opportunities it provides to gain strategies for further learning and access to information about the world. For students with significant and complex disabilities, strategies for promoting literacy are difficult to identify. For example, in a comprehensive review of reading for students with significant disabilities, Browder, Wakeman, Spooner, Ahlgrim-Delzell, and Algozzine (2006) found most studies focused on students with moderate intellectual disabilities and sight word reading. When students have visual impairments, as well as severe intellectual disabilities, finding a model for literacy can be especially challenging.

This challenge may be the reason that 92% of teachers of students with visual impairments and multiple disabilities surveyed by Durando (2008) were interested in receiving additional training on literacy for this population. Fewer than half viewed reading as appropriate for all students and most relied on variables such as cognitive ability, communication skills, and functional vision to determine whether or not to teach literacy. While these variables have sometimes been used to determine eligibility for literacy instruction, an alternative perspective would be to give all students the opportunity for literacy learning even if all do not become fully literate. What is needed is a strategy for introducing this literacy instruction. Unfortunately, the research on how to teach literacy tends to focus on students who only have intellectual disabilities or visual impairments, not both (Browder et al., 2006; Corn & Koenig, 2002; Park 2004; van Kleeck, 2006).

Erickson and Hatton (2007) propose a conceptual framework specifically for students with visual impairments who are working on emerging literacy skills. Their framework focuses on three areas for learning: (a) oral language (i.e., narrative knowledge, vocabulary, and knowledge of the world), (b) metalinguistic skills (i.e., phonological awareness...
and syntactic awareness), and (c) literacy knowledge (i.e., conceptual knowledge, functions of print, perceptions of self as learner, emergent reading in context, procedural knowledge, phonetic spelling, alphabetic knowledge, and letter-sound knowledge). By focusing on all three areas, students with visual impairments gain skills for beginning reading. Similarly, Browder, Gibbs, et al. (in press) proposed a conceptual model of literacy that emphasizes beginning reading skills for young students. This model also promotes the use of shared literature for all ages with the use of read alouds or other means to access text for students who are not independent readers.

Read alouds, also called “shared stories”, are often used with young children to promote early literacy (Coyne, Simmons, Kame ’enui, & Stoolmiller, 2004; van Kleeck, 2006). Shared story experiences can foster literacy concepts such as: (a) print awareness; (b) phonological awareness; (c) alphabet knowledge; and (d) metalinguistic awareness (Justice & Kaderavek, 2002). For example, Coyne et al. found benefits for using shared stories on literacy skills of students at risk for reading failure. Shared stories have also been shown to be effective in promoting increases in communication and literacy development for students with disabilities, (Al Otaiba, 2004; Crowe, Norris, & Hoffman, 2004; Justice & Kaderavek, 2002, 2003; Justice, Kaderavek, Bowles, & Grimm, 2005; Justice & Pullen, 2003) visual impairments, and blindness (Corn & Koenig, 2002; Park 2004; van Kleeck, 2006).

In a study specific to students with severe intellectual disabilities, Skotko, Koppenhaver, and Erickson (2004) used shared story activities with four girls diagnosed with Rett Syndrome at the pre-symbolic communication level (i.e., primarily used objects and vocalizations). The intervention consisted of the use of augmentative communication devices and opportunities to communicate (e.g., asking prediction questions). One important aspect of this study is that the interventionist did not wait for the participants to acquire “prerequisite” communication skills, but assumed and promoted understanding and expression in the context of the lessons. For example, the students gained meaning of AAC symbols by using them in the context of the story, rather than in isolation. Results indicated that an increase in communication and engagement with literacy materials was shown with all four participants.

To extend the research of Skotko et al. (2004), to students with visual impairments and severe intellectual disabilities it may be necessary to make two changes—adding objects and using systematic prompting. First, experts have recommended using real objects to add concrete information that will allow the learner to relate to the text and interact more with the story (Erickson & Hatton, 2007; Park, 2004). Second, students with severe intellectual disabilities may need systematic instruction including repeated opportunities to respond with prompting and feedback to use the objects in meaningful ways. Systematic instruction is a method for teaching discrete and chained skills to students with significant disabilities that has a strong research base (Westling & Fox, 2004). For example, in the literature review by Browder et al. (2006), systematic instruction was the most used evidence-based practice to teach vocabulary sight words (88 studies), vocabulary pictures (17 studies), comprehension (16 studies), and fluency (12 studies).

A specific form of systematic instruction that may be especially useful in teaching the exploration and use of objects to build meaning in stories is the least-to-most prompt system, also known as the system of least prompts (SLP). The system of least prompts is used after the target stimulus is presented and the student is provided with a chance to respond independently; if an error or no response occurs, the least intrusive prompt is delivered as well as another opportunity to respond. This is continued until the student responds correctly or the most intrusive prompt in the prompt hierarchy is delivered (Doyle, Wolery, Ault, & Gast, 1988). In a literature review of SLP, researchers found that 11% of the studies used this strategy with students that had visual impairments (Doyle et al.). The SLP has often been used in combination with a task analysis. A task analysis is the process of breaking down a chained behavior into smaller components and teaching each small component one at a time (Collins, 2007).

Browder, Trela, and Jimenez (2007) ap-
plied systematic prompting and the use of a task analysis to teach shared stories to students with moderate and severe intellectual disabilities. In this study, they examined the effects of training teachers to engage students in a shared story using a book adapted from middle school literature. Results indicated an increase in participation in the reading activities. Although, this study implemented systematic instruction, adaptations would need to be made for students with visual impairments in both the adaptation of the book and mode for student responding (e.g., salient objects, touch response).

Browder, Mims, Spooner, Ahlgrim-Delzell, and Lee (in press) also applied systematic prompting and the use of a task analysis to increase participation and communication of students with significant multiple disabilities. In this study, they examined the effects of individualizing a task analysis to help increase student engagement in a shared story. In addition, books were adapted with salient objects as all participating students required the use of salient objects. Results indicated an increase in participation and communication in the shared story with all three participating students. Once again, this study demonstrates the importance of systematic instruction, but adaptations would still need to be made for students with visual impairments.

Although studies like those by Skotko et al. (2004) and Browder, Mims, et al. (in press) offer guidance for planning shared stories, there currently are no studies demonstrating their applicability to students with visual impairments and significant intellectual disabilities. An extension to this population is especially important because students who have both visual impairments and severe intellectual disabilities present multiple challenges to literacy learning. Due to the complex combination of disabilities and earlier views about “eligibility” for literacy, they may have had little to no prior literacy instruction. Because of this, they may not understand the most basic conventions of a read aloud like interacting with a book and responding to questions about text. These students may also need to build language concepts concurrently with literacy exposure and knowledge. For example, students may not understand even literal concepts presented in the book like “tree” or “box.” Finally, students may need many repetitions with a book to understand the story and be able to produce comprehension responses.

The purpose of this study was to evaluate a strategy for engaging students with visual impairments and severe intellectual disabilities in literacy instruction through the use of a shared story. Specifically, the study evaluated whether a least-to-most prompting system would increase the number of independent comprehension responses during a story-based lesson.

**Method**

**Participants and Setting**

Participants for this study included two students with significant intellectual disabilities who were visually impaired. Participating students were required to meet the following criteria: (a) classified by the school system as having a “severe or profound” intellectual disabilities (IQ and adaptive behaviors <55), (b) developmental levels below 1 year as measured by an adapted behavior scale, and (c) receiving services for visual impairments. Teachers in a large urban school system in the Southeast were asked to identify students who met these eligibility criteria. Student eligibility was then verified by reviewing information provided from the student’s psychological evaluations.

Three students were initially identified who met the criteria to participate. Only two students completed the study as the third had competing self stimulatory behavior that interfered with making the literacy responses. Although this student began to show some interest in the stories, the competing behavior was not adequately reduced in the timeframe of the study to be able to prompt the comprehension responses.

Demographic information for the two participating students is shown in Table 1. The two students attended two different public schools and received their instruction in self-contained special education classrooms for students with severe disabilities. For Student 1, most assessments and interventions were conducted in a separate tutorial room for individualized literacy instruction; although, general-
ization data were collected in the special education classroom and the cafeteria. For Student 2, all assessments and interventions were conducted in the student’s elementary special education classroom. The first author, a doctoral student in special education and former licensed special education teacher with seven years of experience with students with multiple disabilities, served as the interventionist. In addition, all data collection, including procedural fidelity and inter-rater reliability, were conducted by the other members of the research team.

Materials

Three popular elementary picture books were used for the intervention. Each book was adapted to contain 5 specific concrete objects mentioned in the book. These objects were tactile representations of nouns embedded throughout the story (e.g., “flower”). Each object was attached to the page on which the noun would be read and could be removed (attached with Velcro). The same objects detached from the page, and distractor objects, were used for students to express comprehension responses. Five objects appeared twice in each book. Objects were selected and adapted for the maximum sensory distinctiveness possible (e.g., soft cloth, textured surface, distinct smell like an orange). The books were also adapted to abbreviate text and add a repeated story line to promote understanding. Table 2 gives examples of the adaptations used for each book and a list of the objects used as noun referents.

Data Collection Procedures

Dependent variable. The dependent variable was the number of correct independent selection of one of two objects to answer comprehension questions asked throughout the read aloud of the story. The interventionist recorded the student’s response to each of 10 preplanned comprehension trials during the read aloud (each object occurred twice). Although for purposes of instruction, the interventionist recorded the level of prompt the student required (e.g., verbal, model, physical), only responses scored as unprompted correct (+) were graphed.

Inter-rater reliability. Inter-rater reliability was measured by using an item-by-item formula. A second observer viewed videotapes of the sessions and independently scored each of the 10 comprehension trials. If item-by-item agreement was not 90% (9/10 trials), the two observers met to discuss the responses to be observed prior to the coding of the next video. Inter-rater reliability was calculated by taking the number of agreements and dividing it by

<table>
<thead>
<tr>
<th>Student</th>
<th>Age</th>
<th>Gender</th>
<th>Diagnoses According to School Records</th>
<th>Aids and Services</th>
<th>Communication And Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1</td>
<td>6</td>
<td>Male</td>
<td>Developmentally Delayed; Multihandicapped; Cortical Visual Impairment; Cerebral Palsy; Bronchopulmonary Dysplasia</td>
<td>Wheel chair; single switch; OT, PT, Speech, Vision Services</td>
<td>Inconsistent communication attempts; inconsistent response to objects; inconsistent responding during read alouds</td>
</tr>
<tr>
<td>Student 2</td>
<td>9</td>
<td>Female</td>
<td>Developmentally Delayed; Multihandicapped; Severe visual impairment/severe nearsightedness in each eye; Cerebral Palsy; Microcephaly; Seizures</td>
<td>Wheelchair; single switch; OT, PT, Speech, Vision Impairment Services</td>
<td>Laughs or screams to communicate mood; inconsistent response to object or pictures; inconsistent responding during read alouds</td>
</tr>
</tbody>
</table>
the number of agreements plus disagreements and multiplying by 100.

Procedural fidelity. Another member of the research team scored procedural fidelity during all checks of inter-rater reliability. Data was collected on the number of steps the instructor followed while implementing the story-based lesson. The steps included reading the story aloud until the text that was associated with the predetermined comprehension questions were reached. At this point the instructor would request for the student to “read with me” while placing the students hands on the correlating object. After reading the targeted line of text, the instructor would then ask the comprehension questions and progress through the least-to-most prompt system as necessary. The team member checked to see if each segment was present (+) or not present (−). The number of present items was divided by the total number of items and multiplied by 100 to obtain a procedural reliability score. In addition, procedural fidelity was collected on the implementation of the least-to-most prompt system and included a check of the delivery of the appropriate prompt hierarchy as well as the predetermined wait time of 5 seconds between prompt levels.

Social validity. Social validity was collected to measure procedures and outcomes by having each student’s special education teacher take a survey. This was designed to recognize the teachers perspective of the effect of the least-to-most prompting system on the number of correct comprehension questions answered throughout the story-based lesson.

Research Design

A multiple probe across materials (i.e., books) design with concurrent replications for two students was used to examine the number of correct comprehension questions answered (Tawney & Gast, 1984). Baseline data were collected on the two students to identify their current level of responses to the comprehension questions during story-based lessons with three different books. During baseline, the interventionist read the book aloud and provided objects to answer the comprehension questions, but did not prompt responding. Once a stable or decreasing baseline was seen, instruction was initiated with the first book. Once the students demonstrated a change in trend and/or level in their graphed data with the first book the second book was introduced. This continued until both students had been introduced to all three books with the intervention. Maintenance probes were conducted on Student 1 approximately 2 weeks after a functional relationship was determined, but could not be obtained for Student 2 due to the end of the school year.
TABLE 3

Comprehension Questions

<table>
<thead>
<tr>
<th>Comprehension Questions</th>
<th>Dirty Bertie</th>
<th>Alexander and the Terrible, Horrible, No Good, Very Bad Day</th>
<th>I Missed You Everyday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1</td>
<td>What did Bertie pick up off the ground and eat?</td>
<td>What did Alexander go to sleep with that got stuck in his hair?</td>
<td>What did she wrap herself with?</td>
</tr>
<tr>
<td>Answer: Sucker</td>
<td>Answer: Gum</td>
<td></td>
<td>Answer: Wrapping Paper</td>
</tr>
<tr>
<td>Question 2</td>
<td>What did Bertie put up his nose and then try to eat?</td>
<td>What didn’t Alexander find a toy in?</td>
<td>What did she tie herself with?</td>
</tr>
<tr>
<td>Answer: Orange</td>
<td>Answer: Cereal Box</td>
<td></td>
<td>Answer: Ribbon</td>
</tr>
<tr>
<td>Question 3</td>
<td>What did Bertie go hunting in the garden for?</td>
<td>What didn’t Alexander get in his lunch box?</td>
<td>What did she jump inside?</td>
</tr>
<tr>
<td>Answer: Worms</td>
<td>Answer: Chocolate Bar</td>
<td></td>
<td>Answer: A Box</td>
</tr>
<tr>
<td>Question 4</td>
<td>Who would Bertie lick in the face?</td>
<td>What didn’t Alexander get with his shoes?</td>
<td>What did she use to write your address with?</td>
</tr>
<tr>
<td>Answer: The dog</td>
<td>Answer: Blue Shoelaces</td>
<td></td>
<td>Answer: A Pen</td>
</tr>
<tr>
<td>Question 5</td>
<td>What did Bertie try and eat after watching his cat?</td>
<td>What did Alexander’s Brother take from him?</td>
<td>What was in the mailbag she jumped into?</td>
</tr>
<tr>
<td>Answer: Flowers</td>
<td>Answer: Pillow</td>
<td></td>
<td>Answer: Envelopes</td>
</tr>
<tr>
<td>Question 6</td>
<td>What did Bertie learn not to eat because he got all wet?</td>
<td>What did Alexander eat that didn’t get stuck in his hair?</td>
<td>What can you find her wrapped in?</td>
</tr>
<tr>
<td>Answer: Worms</td>
<td>Answer: Gum</td>
<td></td>
<td>Answer: A Box</td>
</tr>
<tr>
<td>Question 7</td>
<td>What did Bertie learn not to play with when his sister dumped them on his head?</td>
<td>What did Alexander find a toy in?</td>
<td>After paying the postman, what will be on their way?</td>
</tr>
<tr>
<td>Answer: Worms</td>
<td>Answer: Cereal Box</td>
<td></td>
<td>Answer: The Envelopes</td>
</tr>
<tr>
<td>Question 8</td>
<td>What did Bertie learn not to eat off the ground?</td>
<td>What did Alexander get in his lunch box?</td>
<td>What does she need to be unwrapped from?</td>
</tr>
<tr>
<td>Answer: Suckers</td>
<td>Answer: Chocolate Bar</td>
<td></td>
<td>Answer: Wrapping Paper</td>
</tr>
<tr>
<td>Question 9</td>
<td>After getting hair in his mouth, who did Bertie learn not to lick?</td>
<td>What did Alexander find with his shoes at the shoe store?</td>
<td>What should you not forget to untie?</td>
</tr>
<tr>
<td>Answer: The dog</td>
<td>Answer: The Blue Shoe Strings</td>
<td></td>
<td>Answer: The Ribbon</td>
</tr>
<tr>
<td>Question 10</td>
<td>What does Bertie still put up his nose and then eat?</td>
<td>What did Nick give to Alexander?</td>
<td>What did she use to write the thank you letter?</td>
</tr>
<tr>
<td>Answer: Oranges</td>
<td>Answer: Pillow</td>
<td></td>
<td>Answer: A Pen</td>
</tr>
</tbody>
</table>

Procedure

Baseline phase. During baseline, the instructor (first author) progressed through each story, provided objects affixed to the book pages, and asked the preplanned comprehension questions, as shown in Table 3, giving the student the object and a distractor to respond. The instructor did not prompt or provide feedback during baseline conditions. At the appropriate place in the story, the instructor asked the comprehension question, placed the objects by the student’s hands on the table, and waited 5 s for a response. Because of physical challenges, both students selected responses by sliding their arm across the table to touch one object. The instructor waited until all movement stopped to be sure that the student had made the selection and was not scanning the objects. At the end of 5 s, the instructor scored the response and continued reading the story up to the next comprehension question and so on until all 10 questions were asked. This was repeated for all three books across days until a stable or decelerating trend in the baseline data was observed.
**Intervention.** Like baseline, each intervention session began with the instructor reading the book aloud and asking comprehension questions after each page. In addition, the instructor would ask the student to "read with me" when reading a page with an embedded object. To help the student "read with me," the instructor would place the student's hand on the object that was attached to the page and then read the text that contained the noun the object depicted (e.g., "Alexander woke up with gum stuck in his hair." The book page had a pack of gum attached). The instructor then placed the same object as in the book (e.g., pack of gum) beside a distractor object (e.g., one from another book) in front of the student's hands on the table. After asking the comprehension question, the teacher waited for an independent response or that is, for the student to slide an arm across the table to select one of the objects. If no response occurred, the instructor began to use the least-to-most prompt system. If the student made no response after 5 s, the instructor gave the first level prompt. For the first level prompt, the instructor said “Find the one that is like this” and placed students hand on page with tactile object). Again the instructor waited 5 s for a response. If a correct response occurred after the first level prompt, the student was praised. If the student once again made no response after 5 seconds, the instructor used a second level prompt. The instructor said, “Find the one that is like this” and placed students hand on page with tactile object, then placed students hand on the correct object, and then removed the student’s hand while saying “You find it.” The instructor then waited another 5 seconds for a response, a correct response resulted in praise. If no response, the instructor used a third level, fully physical prompt. The instructor said, “Find the one that is like this” and placed students hand on page with tactile object and then placed students hand on the correct object and said “This is the ‘gum’ (or whatever the object was)!" If at any time during the prompt hierarchy the student went for an incorrect response, the attempt was blocked and the student was physically redirected to the correct answer.

**Maintenance and generalization.** Maintenance probes were collected on Student 1 on all three books, approximately two weeks after the intervention ended. Generalization data were collected with Student 1 in two additional settings to demonstrate generalization across settings (i.e., the student’s classroom and the empty cafeteria). In addition, a peer from the student’s school who was non-disabled was recruited to conduct the intervention with Book 3 to demonstrate generalization across people.

**Results**

**Agreement.** Procedural fidelity for delivery of all steps of the intervention was 100% across all three books for both Student 1 and 2. Inter-rater agreement for scoring student 1 responding was 98% for Book 1, 100% for Book 2, and 93% for Book 3. For student 1, both procedural fidelity and inter-rater agreement data were collected for 29% of the sessions for Book 1, 47% of the sessions for Book 2, and 29% of the sessions for Book 3. Inter-rater agreement for scoring student 2 responding was 100% for Book 1, 100% for Book 2, and 100% for Book 3. For student 2, both procedural fidelity and inter-rater agreement data were collected for 36% of the sessions for Book 1, 27% of the sessions for Book 2, and 40% of the sessions for Book 3.

**Student 1 data.** Student 1 performance data are displayed in Figure 1. During baseline, Student 1 correctly answered a mean of less than one question (.75) of the 10 comprehension questions asked in Book 1, with a range from 0 to 3 questions. After intervention, the responses increased ($M = 5$, range from 1–9). During baseline for book 2, Student 1 also correctly answered a mean of less than one (.6) of the 10 comprehension questions asked, with a range from 1 to 3 questions. After intervention, the responses increased ($M = 6.5$, range from 3–8). For Book 3 during baseline, Student 1 correctly answered a mean of 1.3 of the 10 comprehension questions asked, with a range from 0 to 2 steps. After intervention, the responses increased ($M = 5.6$, range from 1 to 9).

**Student 2 data.** Student 2 performance data are displayed in Figure 2. During baseline, Student 2 correctly answered a mean of 1.75 questions of the 10 comprehension ques-
tions asked in Book 1, with a range from 0 to 4 questions. After intervention, the responses increased ($M=5.14$, range from 2–7). During baseline for book 2, Student 2 correctly answered a mean of 2 of the 10 comprehension questions asked, with a range from 1 to 4 questions. After intervention, the responses increased ($M = 6.5$, range from 4–9). For Book 3 during baseline, Student 2 correctly answered a mean of 2.8 of the 10 comprehen-

Figure 1. Number of correct responses across three books for participant 1.
tion questions asked, with a range from 1 to 6 steps. After intervention, the responses increased ($M = 6.25$, range from 4 to 8).

Social validity. Both classroom teachers participated in a follow-up survey that measured both the procedures and the outcomes. Both teachers reported strongly agreeing that the comprehension items selected were appropriate, important, and cost effective. In addition, the teachers strongly agreed that the system of least prompts, the prompt hierarchy used, as well as the wait time between prompts were appropriate for this student. The teachers reported that they strongly agreed to use this prompt procedure again in the future for

Figure 2. Number of correct responses across three books for participant 2.
additional skills as well as in future comprehension skills with additional students. Finally, the teachers reported strongly agreeing that the students overall comprehension increased as a result of the intervention and that overall the student had increases in meaningful participation in literacy activities as well as other academic and functional activities.

**Maintenance and Generalization.** Student 1 was able to maintain all skills by maintaining comprehension of all three books. Maintenance data were collected about two weeks to a month after the end of intervention for each book. Maintenance data were not collected for student 2. Student 1 generalized the comprehension responses across settings (i.e., separate literacy room, classroom). Student 1 was not able to generalize the skill to a third setting (i.e., cafeteria), as he became extremely distracted by this environment. In addition to generalization across settings, student 1 was able to correctly answer 7 out of 10 questions asked during story 3 (i.e., *I Missed You Every Day* by Simms Tabak) read by a peer. Generalization data across settings and people as well as maintenance were not collected for Student 2 due to time constraints with the school year ending.

**Discussion**

Student 1 was able to show increases in comprehension across all three books. In addition, the intervention was replicated with another student and maintained across time. Student 2 was also able to show increases in comprehension across all three books. These outcomes add to the literature that shared stories promote comprehension skills for young children (Bus, van Ijzendoorn, & Pellegrini, 1995; Coyne et al., 2004; Justice & Kaderavek, 2003; Senechal, Thomas, & Monker, 1995; Vacca et al., 2006), including those with visual impairments (Erickson & Hatton, 2007). Shared stories also have been used in a few studies with students with severe intellectual disabilities (Browder et al., 2007; Browder, Mims, et al., in press; Skotko et al., 2004). The unique contribution of the current study was to demonstrate how using objects that were noun referents could be used to promote comprehension responses during shared stories. By attaching the object to the page, the student gained understanding that the page of the book itself contained the information. The student then used the same object as a means to communicate understanding of a comprehension question.

The focus on listening comprehension also makes an important contribution to the growing research on using shared stories with students with intellectual disabilities. For example, in Browder et al. (2007) and Browder, Mims, et al. (in press) comprehension was only one component of a series of responses to engage with the text. In these prior studies, the dependent variable was a task analysis of participating in a read aloud (e.g., turning pages, repeating a story line). In contrast, the current study focused only on the comprehension responses and thus provided a stronger demonstration that students were gaining meaning from the read aloud. The instruction also included more opportunities (10) to make comprehension responses. In fact, the student answered a comprehension question after the reading of each page.

Besides using objects as referents and providing multiple opportunities to make comprehension responses, a third feature of the intervention was the use of least-to-most prompting. Although prior studies used prompting (e.g., Browder et al., 2007), the current intervention was uniquely designed for students with visual impairments and for gaining meaning from the object in the story. Each level of the prompt hierarchy helped the student return to the page to find the object of reference similar to the way a sighted student might review the text on the page to find the answer. By the end of the first book, the students were beginning to grasp how to locate the answer. For example, Student 1 was much more likely initiate a response in the second and third books because of the familiarity of the structured routine of objects embedded in the book and the same object being used in the response options for the comprehension question.

Another consideration is the context for instruction. Student 1 responded well to a peer read aloud after becoming familiar with the third book. What is unknown is whether the student would have acquired the responses with peer tutoring. What was deter-
mined is that this student needed a quiet room to focus on the book in early instruction. In the quiet room, the student was able to build the auditory discrimination needed to hear the text read and select the correct object. Once the student became familiar with the book, he was able to generalize the responses to his classroom context. In contrast, it is unknown whether this generalization would have occurred for a new book. For Student 2 all instruction occurred in the student’s self-contained classroom, but all sessions were conducted during a time that the other students had “quiet time.” In planning replications of this research, consideration should be given to whether students have the level of quiet needed to focus on the read aloud of the text during initial instruction and how to fade this back into typical classroom contexts.

Although results of this study were encouraging, some limitations should be noted. First, the intervention was conducted by a member of the research team rather than the classroom teacher due to some of the logistics of the context (e.g., time to implement three 1:1 read alouds). Future research should consider having the special or general education teacher serve the role of the interventionist which might be feasible with small group instruction. A second limitation is that instruction was provided in a one-to-one format. Whether in a general education or self-contained class, students often receive literacy in a group format. In contrast, students with both intellectual and visual impairments may need some 1:1 instruction during early acquisition of skills for listening comprehension. A question for future research is whether the students would be able to acquire these responses in a small group format if the context were quiet. For example, the student might participate in a mixed ability group in a general education class. Prior research (Kliwer & Landis, 1999; Ryndak, Morrison, & Sommerstein, 1999) suggests that including students who are nondisabled in small group literacy experiences can be beneficial. In a mixed ability group, the students would use response options appropriate for them (e.g., objects to represent the answers, saying answers aloud, writing responses, etc.).

In applying this intervention to practice, the first step would be to identify literature appropriate to the student’s age, grade, and interests. Consultation with a media specialist, general education teachers or same age peers may help identify books that have the appeal needed for early literacy instruction. As needed, these books can be modified as described in Table 2, or the team may be able to use computer software with digitalized text for ease of access. Next, the instructor determines the comprehension questions to ask during the shared story. In the beginning, these may be simple recall questions. Future applications should target higher level comprehension questions (e.g., sequencing, cause and effect). Third, the instructor determines the prompt hierarchy and wait time to use during instruction. Each level of prompt should return the student to the page of the book to locate the correct answer. In addition, an error correction procedure and reinforcement procedures should be determined before instruction begins. Finally, independent correct responses should be the targeted outcome, but it may be helpful to monitor progress on the prompt needed during instruction. This will allow the teacher to monitor that students are using less prompting over time.

In conclusion, this study adds to the growing research on using shared stories to promote literacy skills for students with significant intellectual disabilities. Students with significant intellectual disabilities and visual impairments are underrepresented in the research on literacy instruction. This is one of the first demonstrations of the use of shared stories and comprehension with this population. While more research is needed to build an evidence base for the use of shared stories with this population, this may be viewed as a promising practice for increasing comprehension for students with limited communication in the literature of their age group.

References
Literacy for students with severe developmental disabilities—what should we teach and what should we hope to achieve? Remedial and Special Education.


Evaluating the Acceptability and Effectiveness of Family Assessment Portfolios

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Illinois State University

Abstract: The Family Assessment Portfolio (FAP) is a new tool that includes scrapbooks, web-based profiles, and movies that families create to introduce their children to educators. FAP was developed to promote good home/school communication and collaboration. Although FAPs appear to be a promising practice for the field of special education, there is limited information about its social validity; the social importance of FAPs’ goals, procedures, and outcomes. To evaluate the acceptability and effectiveness of the FAPs, data were collected, through interviews and questionnaires, from three groups of stakeholders: parents, FAP facilitators, and educators. Participants reported that the goals of the FAPs are important for both families and educators. The procedures for developing the FAP were considered to be appropriate and acceptable, and the final product was evaluated as very useful and meaningful. Participants also shared their perceived challenges related to the FAPs and had suggestions for improvement. Implications for future research and practice are discussed.

In the field of special education there is widespread consensus regarding the merits of a family-centered approach to providing services and supports. Decades of research have documented positive outcomes from family participation in a child’s schooling, and federal special education legislation strongly encourages parental involvement in educational planning (Turnbull, Turnbull, Erwin, & Soodak, 2006). However, barriers to effective family/school partnerships persist (Lake & Billingsly, 2000).

A new tool, the Family Assessment Portfolio (FAP), was developed to promote successful home/school collaboration. FAPs include scrapbooks, web-based profiles, and movies that families create to introduce their children to educators. “Although FAPs are not a panacea for all of the challenges associated with home/school communication and collaboration, FAPs can be used to (a) empower families by involving them in the assessment process; (b) enhance opportunities for families to communicate the information they most want schools to know; (c) familiarize future educators with students (e.g., likes, dislikes, strengths, needs, and communication skills); and (d) increase the likelihood that special education services and interventions will truly address a child’s most important needs” (Thompson, Meadan, Fansler, Alber, & Balogh, 2007, p. 19).

The idea for developing FAPs originally came from parents in central Illinois who wanted to encourage local schools to include their children in general education classrooms. They began creating materials (e.g., scrapbooks, student profiles) that provided information about their children to future teachers and administrators prior to the start of the school year. Although some of the information in scrapbooks and student profiles paralleled what one would expect to find in typical assessment reports (e.g., information about words known and how the child communicates, functional descriptions of motor abilities and challenges, and descriptions of specialized equipment used), such information was presented in an accessible, personal, and “user friendly” format. Parents, teachers,
and administrators reported that these materials promoted greater understanding of children with disabilities and increased the school’s commitment to include the children in general education classrooms. With the involvement of faculty and students from local universities, FAPs were further developed to include a DVD/movie and a webpage. Guidelines for what information to include and how to create multimedia materials were published (Thompson et al., 2007). Since the portfolios were making an important contribution to the assessment and decision making efforts of IFSP/IEP teams, the term Family Assessment Portfolio (FAP) was coined.

Although FAPs appear to be a promising practice for the field of special education, to date, only a few FAPs have been developed and used, and only anecdotal reports support their effectiveness and acceptability by parents and teachers. Systematically evaluating FAPs is needed. Such an evaluation will not only provide more objective evidence regarding their usefulness, but also could help improve their effectiveness and contribute to wider dissemination.

Traditionally, researchers and practitioners have evaluated practices in terms of outcomes. They were primarily interested in assessing whether the practice produced significant effects. However, these evaluations did not necessarily afford insights about the social importance of the practices. Wolf (1978) argued that society needs to validate the practices used and he referred to it as “judgment of social validity” (p. 207). Wolf suggested three levels of social validity: (a) the social significance of the goals, the importance of the goals for society; (b) the social appropriateness of the procedure, the acceptability of the practice by the consumers; and (c) the social importance of the effects and satisfaction with the results of the practice.

The purpose of this study was to evaluate the acceptability and effectiveness of the FAPs. The research questions that guided the investigation addressed the three levels of social validity of the FAPs: (a) are FAPs important and needed in the field of special education; (b) is the process of developing the FAPs acceptable and appropriate; and (c) are the effects of the FAPs important and meaningful. Assessment of social validity is important because if practices are judged to be acceptable, they are more likely to be initiated. Practices that show good outcomes and have positive social validity measures are more likely be disseminated and adopted by others (Winett, Moore, & Anderson, 1991).

**Method**

**Participants and Data Collection**

To evaluate the acceptability and effectiveness of the FAPs, data were collected from three groups of stakeholders: (a) parents who participated in the project and created FAPs for their children; (b) FAP facilitators, the practicing professionals (teachers and social workers) and university students who provided technical assistance and support to parents as they were developing the FAPs; and (c) pre-service teachers and experienced educators who served as a proxy for educators who receive FAPs from parents. Consents for participation were obtained prior to data collection from all participants.

**Parents.** Nine families who created FAPs for their children participated in this study. In total, there were 10 parents (9 mothers and 1 father) that provided information to the researchers. Overall, data from parents include information related to eleven FAPs that were developed, as two of the families had two children with disabilities and therefore developed two FAPs (one for each child). Data were collected from the mother of each child, with the exception of one case where both mother and father provided information. All of the families spoke English as the primary language at home. However, for one family the parent’s native language was Hindi. Additional information about the parents participating in this study and their children is provided in Table 1.

Parents were asked to complete a questionnaire and participate in a face to face or a phone interview with the first author. The items on the questionnaire are shown in Table 2, and included 26 statements. Parents identified their level of agreement with each statement on a Likert scale from 1 (disagree) to 5 (agree). Twenty statements were worded positively and 6 statements were worded negatively. It is important to include both positively
and negatively worded items on a questionnaire to control for response sets in respondents. If every item on a questionnaire is worded either positively or negatively, there is a greater chance that respondents will not thoughtfully read and answer each item (Yamaguchi, 1997).

Parent interviews lasted between 30–40 minutes and were conducted at a convenient time for the parents. The parents were asked about their perceptions related to the importance/acceptability of FAP goals, procedures, and outcomes. All interviews were recorded and transcribed. Eight of the 10 families that participated had parents who completed both the questionnaire and an interview. There was one family where the parent only completed the questionnaire and another family where only the interview was completed.

FAP facilitators. FAP facilitators were four professionals (teachers and case managers) and four university students (one graduate student and 3 undergraduate students), who worked with the parents to develop FAPs. The professionals worked in either early childhood special education (3-5) or early intervention (0-2) programs and were certified special education teachers or licensed social workers. Their professional work experience ranged from 3 years to 12 years. The undergraduate university students were preparing to be special education teachers while the graduate student had already completed a special education teacher preparation program and was pursuing a master’s degree in special education. All of the facilitators were female and received training from a university professor (the second author) on how to support parents to create FAPs. The facilitators provided “hands-on” assistance to help the parents create the three components of the FAP (i.e., scrapbook, movie, and web page). Although some parents were more involved than others in the technical aspects of creating the materials, in all the cases the facilitators provided significant technical assistance to the parents.

FAP facilitators participated in this study by completing an online anonymous questionnaire. Similar to the parents, the FAP facilitators were asked about their perceptions related to FAPs (i.e., goals, procedures, and outcomes). Questionnaire items required Likert scale responses to five statements as well as short answer responses to 11 open-ended questions.

Pre-service and experienced teachers. Because it was not feasible to recruit educators who had actually received FAPs from parents, 43 pre-service teachers (38 females and 5 males) and 23 experienced teachers were recruited to participate in the study. The pre-service teachers were students attending a large university in the midwestern region of the United States. Twenty-eight of them were enrolled in a special education teacher preparation program and 15 were enrolled in an early childhood teacher preparation program. These pre-service teachers were predominately “traditional” college age students, with only 4% older than 25 years of age. Eighty five percent of the pre-service teachers identified themselves as European-American, 8% as African-American, and the rest as Other.

The pre-service teachers were enrolled in two undergraduate education courses focusing on teaching methods for children with disabilities. The second author, who was not the course instructor, provided a 5-minute overview of FAPs and the purpose of the study.
and assured potential participants that it was their choice on whether or not to participate (all chose to participate). A movie from a FAP was shown to each class section and the same child’s web page was presented through an LCD projector (i.e., information from the web page was highlighted and hyperlinks were demonstrated). Scrapbooks from multiple children were distributed among the participants for their review. After the movie was shown, the web page demonstrated, and participants had sufficient time to look over 3 to 4 scrapbooks and ask questions about FAPs, each participant was asked to complete an anonymous questionnaire that included a demographic section as well as 21 statements about FAPs. The pre-service teachers identified their level of agreement with each statement on a Likert scale (1-disagree to 5-agree).

Data were collected from 23 experienced

<table>
<thead>
<tr>
<th>Item</th>
<th>Parents</th>
<th>Pre-service Teachers</th>
<th>Practicing Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>The FAP is an important tool for families of children with disabilities.</td>
<td>5.00</td>
<td>4.33</td>
<td>4.61</td>
</tr>
<tr>
<td>The FAP is needed in the field of special education.</td>
<td>4.88</td>
<td>4.60</td>
<td>4.65</td>
</tr>
<tr>
<td>The FAP empowers family members by involving them in the assessment process of their child.</td>
<td>4.75</td>
<td>4.50</td>
<td>4.83</td>
</tr>
<tr>
<td>The FAP helps families to communicate information they want schools to know about their child.</td>
<td>5.00</td>
<td>4.91</td>
<td>4.78</td>
</tr>
<tr>
<td>The FAP helps a child’s future teachers to understand the child better.</td>
<td>5.00</td>
<td>4.93</td>
<td>4.95</td>
</tr>
<tr>
<td>The FAP enhances positive home-school communication.</td>
<td>4.38</td>
<td>4.86</td>
<td>4.87</td>
</tr>
<tr>
<td>The process of creating the FAP is time consuming and requires a lot of effort.</td>
<td>2.75</td>
<td>3.53</td>
<td>3.91</td>
</tr>
<tr>
<td>It is important that parents participate in developing FAPs with school or agency professionals.</td>
<td>4.00</td>
<td>4.42</td>
<td>4.83</td>
</tr>
<tr>
<td>To develop a good FAP, parents need assistance from someone who has good technology skills</td>
<td>4.25</td>
<td>3.77</td>
<td>3.91</td>
</tr>
<tr>
<td>To develop a good FAP, parents need assistance from someone who understands the types of information that should be included in FAPs.</td>
<td>4.25</td>
<td>4.28</td>
<td>4.43</td>
</tr>
<tr>
<td>The scrapbook is an important part of the FAP.</td>
<td>4.88</td>
<td>4.61</td>
<td>4.30</td>
</tr>
<tr>
<td>The movie (DVD) is an important part of the FAP.</td>
<td>5.00</td>
<td>4.42</td>
<td>4.22</td>
</tr>
<tr>
<td>The Webpage is an important part of the FAP.</td>
<td>3.62</td>
<td>3.72</td>
<td>3.78</td>
</tr>
<tr>
<td>I am satisfied with the final product of the FAP.</td>
<td>5.00</td>
<td>4.84</td>
<td>4.39</td>
</tr>
<tr>
<td>The FAP enhanced the teacher’s understanding of the family’s values, beliefs, and educational priorities.</td>
<td>4.13</td>
<td>4.58</td>
<td>4.57</td>
</tr>
<tr>
<td>The FAP is an effective tool that will influence the services and intervention a child will receive.</td>
<td>4.75</td>
<td>4.51</td>
<td>4.00</td>
</tr>
<tr>
<td>The FAP should be used by other families of children with disabilities.</td>
<td>5.00</td>
<td>4.77</td>
<td>4.52</td>
</tr>
<tr>
<td>Parents can develop a good FAP with minimal support from professionals.*</td>
<td>2.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am satisfied with the outcomes (reactions and responses) of teachers and others who have seen my child’s FAP.*</td>
<td>4.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I was satisfied with the process of how the FAP was developed on my child.*</td>
<td>4.63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* item only on parent questionnaire
educators. These educators were enrolled in a master’s level course focusing on teaching methods for children with Autism Spectrum Disorder. All had teaching or related service experience in K-12 schools with the years of experience ranging from 1 to 31 (M = 6.36 years). There were 19 females and 4 males in this group with 82% reporting an ethnic background of European American. Fourteen were currently employed as special education teachers, 2 were early childhood teachers, and the remaining 4 worked in different educational roles (e.g., SLP, school psychologist). Once again, the second author collected data and was not the course instructor. The same data collection procedures were used with the experienced teachers as had been used with the pre-service teachers. The only difference was that the movie and web page that the experienced teachers viewed was on a child who was five years old (i.e., a different child than the pre-service teachers viewed). Similar to the pre-service teachers, the practicing teachers reviewed several scrapbooks and had the opportunity to ask questions before anonymously completing Likert scale ratings of extent of agreement with the 21 statements related to the social validity of FAPs.

Data Analysis

Interviews. Parents’ interviews were audio taped and transcribed. Two faculty members (first and second authors) and two undergraduate students independently analyzed the transcripts of the eight interviews. The four researchers met to discuss their analyses, and came to consensus regarding themes in each interview. After discussing and summarizing each individual transcript, the researchers came to consensus on a summary of themes across the participants. These findings were organized into three categories: (a) perceptions related to the importance of the goals of the FAPs, (b) perceptions related to the acceptability of the procedures used to develop the FAPs, and (c) perceptions related to the outcomes and effectiveness of the FAPs.

Questionnaires. Data from questionnaires were entered into the Statistical Package for the Social Sciences (SPSS 16.0 for Mac, 2007) and descriptive statistics were generated for each variable.

Results

Results from the data collection and data analysis are presented according to the three groups of stakeholders (i.e., parents, FAP facilitators, pre-service teachers, and experienced educators) that participated in the study.

Parents’ Perceptions

Parent interviews. The parents who participated in the project indicated in their interviews that the FAP was an important tool for families of children with disabilities (i.e., social validity of the goals). Parents mentioned that FAPs provided essential information about their child (“what you see in the FAP is what you get with my daughter”) and believed FAPs could help educators to get to know their child and guide them in their teaching. Parents believed the FAPs were useful especially when the child transitions from one educational setting to another (e.g., early intervention to school based services, one grade to the next) or from working with one teacher/therapist to a different one.

The parents felt that the FAPs were an important tool for improving communication and collaboration with school personnel, increasing parents’ feeling of empowerment and providing information about their child that could guide teaching and intervention plans. Beyond the use of FAPs in an educational setting, parents noted that FAPs were useful in establishing communication with other professionals who provide services (e.g., therapists and physicians), family members, and friends.

When asked about the social validity of the procedures used to develop FAPs, parents indicated that creating FAPs required an investment of time, but they felt that this time was well spent and worthwhile because FAPs provided them a means to make their voice heard. It empowered them to communicate comprehensive information about their child that may have been difficult to accurately articulate during traditional information sharing opportunities such as IEP conferences. Parents also indicated that the process of creating the FAPs was enjoyable.

Parents felt that support from professionals
was very important to completing the FAP. The parents indicated the FAPs would be difficult (if not impossible) to create without technical assistance and support. Although parents were not overwhelmed by the technology, only one parent reported that she had created an edited movie prior to the project. Therefore, parents were in agreement that having someone who knew how to work with the technology was critically important to creating quality multimedia products.

Parents enjoyed the personal freedom to make decisions about the content of the FAP. Overall, they were satisfied and positive about the procedures used to develop FAPs. However, they did provide some constructive suggestions for changes in the procedures. Suggestions included giving parents more specific guidelines and written instructions on what type of information to include when recording video. Also, written instructions on specific technical aspects of the process (e.g., how to record the voice input for the DVD) would have been helpful. In addition, parents mentioned the need for support when updating information in the FAP in the future, as the child grows and changes. With young children, certain information in the FAP becomes outdated in a relatively short period of time.

When asked about the social validity of the outcome, parents were very positive and satisfied with the three components of the FAP (i.e., scrapbook, DVD, and webpage). The book was portable and included essential information, the movie was novel and showed children as they were in their natural environments, and the webpage was something that could be updated most easily and therefore has the potential to provide the most current information. According to the parents, FAPs provide different types of information than the standardized assessments typically used in special education. When FAPs are used in conjunction with traditional assessment information, a more holistic view of the child is presented. Parents reported using the FAP with IEP teams and meetings with new therapists or care providers (e.g., respite workers). Parents reported that reactions from people who viewed FAPs have been overwhelming positive. In addition, after sharing FAPs parents felt empowered and respected by educators because the FAP revealed how knowledgeable they were about their child and how invested they were in their child’s education. Parents also mentioned that they have shared the FAPs with many others outside the educational system to communicate information about their child, including siblings, extended family members, babysitters, respite workers, friends, other families who have children with similar disabilities, and members of their religious communities.

A few parents had concerns related to the use of the FAPs. One parent mentioned that there was not enough time to view the DVD during a meeting with teachers and FAPs were better shared before a meeting as opposed to at a meeting. In addition, a few parents mentioned that they are not sure if/how the teachers utilized the information from the FAP to guide their teaching (“if the teachers don’t use it, there is no point for us to do it.” “They might use it, but I don’t know about it”). Parents suggested having a follow-up meeting with teachers/therapists to answer any questions they have about their child and FAP and to find out how the teachers/therapist use the information.

Parent questionnaires. Findings from parent questionnaires (Tables 2 and 3) corroborate the findings from the interviews. All parents indicated in the questionnaires that they agree that the FAP is an important tool for families of children with disabilities and that the FAP is needed in the field of special education. Parents also agreed that the FAPs enhance positive home-school communication and help communicate information about their child. When asked about the procedures used to develop the FAP, all parents indicated that they were satisfied with the process of developing the FAPs, but two parents felt that developing the FAP was time consuming and required a lot of effort. Seven of the parents felt that to develop a good FAP, parents needed access to technical assistance.

Similar to the interview data, all parents indicated in the questionnaires that they were satisfied with the final product of the FAP and felt that the FAP is an effective tool that will influence the services and intervention a child will receive. The only outlier to this finding was in regard to the following negatively worded item: “It is unlikely that the FAP will influence special education services and inter-
ventions that address a child’s most important needs.” Parents overwhelmingly agreed with this statement, even though this finding contradicts data from several other items that are concerned with the influence a FAP might have on educators and services to the child.

In summary, in both interviews and questionnaires, parents indicated that the goals of the FAP are important for their family and for the field of special education. The procedures for developing the FAP were considered to be appropriate and acceptable, and the final product (i.e., the three components of the FAP) was determined very useful and meaningful. Parents had suggestions for improving the procedures used for developing FAPs and for using FAPs with future educators.

**FAP Facilitator Perceptions**

Four professionals (i.e., teachers/case managers) and four university students who created FAPs with parents shared their perceptions of the FAP through an internet-based questionnaire. All eight respondents felt that creating the FAP was an important and beneficial part of a professional’s work. The respondents mentioned that the FAP is an important tool and could help future teachers to learn about a new student, enhance positive communication between school and home, and also help parents share important information with educators, therapists, family members, and friends.

When asked about the procedures used to develop FAPs, the responders mentioned that the development of all components, especially the DVD movie required considerable time and effort. Much of the time and effort that was initially required was spent on learning how to create the materials (e.g., prepare scrapbooks for publication by an online publisher, edit the movies using consumer level movie making software, create web pages). Neither the university students nor the professionals came to the project with advanced knowledge on how to create multimedia materials. Because of the learning curve involved in creating the products, the respondents reported the creation of the first FAP took much more time than subsequent FAPs. As one respondent said, “making movies was time-consuming and required a lot of effort and multimedia skills. The first time is always challenging, but by the second time I got used to it.”

The FAP facilitators provided a few suggestions for improving the process of developing

<table>
<thead>
<tr>
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<th>Parents</th>
<th>Pre-service Teachers</th>
<th>Practicing Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>The FAP does not help teachers and professionals to know more about the child’s family.</td>
<td>1.00</td>
<td>1.23</td>
<td>1.39</td>
</tr>
<tr>
<td>The FAP is not a needed tool for the field of special education.</td>
<td>1.00</td>
<td>1.81</td>
<td>1.87</td>
</tr>
<tr>
<td>It is unlikely that the FAP will influence special education services and interventions that address a child’s most important needs.</td>
<td>4.38</td>
<td>1.88</td>
<td>1.87</td>
</tr>
<tr>
<td>The FAP does not help teachers and professionals to know more about the child’s likes, dislikes, strengths, and needs.</td>
<td>1.00</td>
<td>1.05</td>
<td>1.35</td>
</tr>
<tr>
<td>The FAP did not contribute to communication and relationships between the family and the school.*</td>
<td>1.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The FAP was not worth the time and trouble it took our family to create it.*</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* item only on parent questionnaire
FAPs. They suggested developing clearer guidelines for the parents related to what information to include. In addition, they suggested that giving parents specific timelines for completion of certain sections was needed, as the “open timeline” encouraged procrastination. One respondent mentioned that the parents’ role was limited to providing the information, capturing video footage, and providing reactions and critiques of drafts of different FAP components, and it would be better if parents were more involved in the technical aspects of preparing FAPs.

All of the professionals and university students who completed the facilitators’ questionnaire reported that they gained new knowledge and skills about creating multimedia products. They also stated that they could not have created the FAPs if they were only provided equipment and written instructions at the start of the project. The assistance and guidance provided by a university faculty member (second author) and a university technology director were helpful and essential for developing FAPs. When asked if they will be able to create new FAPs in the future without any additional technical assistance, all but one person said yes.

The FAP facilitators were very satisfied with the final product of the FAP. Although a few mentioned that the web-page is the least utilized component in the FAP, they felt that all components were important. When asked about ideas for changing the final product, the respondents reported the need to able to update the information in the FAP. One person suggested giving parents working copies (Word and iMovie files) of all the products so they could update them when needed.

In summary, the FAP facilitators felt that FAPs were essential for families and educators. They reported that the process definitely required an investment of time and effort (especially initially). They also indicated acquiring useful knowledge and skills while developing the FAPs, both in terms of technology and in terms of understanding a child. They felt that the experience of developing at least one FAP with technical assistance and guidance prepared them to independently develop new FAPs in the future.

To gain a perspective on how “receiving teachers” might view FAPs, 43 pre-service teachers were surveyed along with 23 experienced educators. Although it would have been ideal to collect data from educators who actually received FAPs from parents, there is no reason to believe that the pre-service and experienced educators who provided completed questionnaires for this project are significantly different than educators who are currently working in K-12 schools.

It is important to mention that the pre-service and experienced educators completed the same questionnaire as parents, except for 5 items that were only on the parent survey. However, several items were worded slightly different on the two surveys to assure that parents were providing their impressions as “FAP senders” who had actually experienced sharing a FAP and educators were providing their impressions as “FAP receivers” who were being asked to envision receiving a FAP on a new student. For example, on the parent questionnaire an item read “The FAP enhances positive home-school communication”. The parallel item on the educator questionnaire read, “The FAP could enhance home-school communication”. The findings from the pre-service and experienced educator questionnaires are shown in Tables 2 and 3. However, for ease of comparison and to conserve print space, only the wording from the parent questionnaire was shown.

Data on Tables 2 and 3 reveal that educators had the same positive impressions toward FAPs as parents. After reviewing the three components of the FAP, the majority of the educators agreed that the FAP is an important tool for families that could enhance positive home-school communication and is needed in the field of special education. Although the number of parents responding to the survey was small, it is interesting that educators were just as likely as the parents to believe that FAPs
could help a teacher better understand a child and were slightly more likely than parents to believe that FAPs could help teachers better understand a family’s values, beliefs, and educational priorities. Although the sample size of the parent group does not enable using inferential statistics to compare mean scores between educators and parents, a cursory examination of the findings in Tables 2 and 3 show that parents and educators were quite similar in their Likert scale ratings. In summary, the two groups of educators felt that FAPs were a viable tool.

There were sections on the survey that allowed educators to ask questions and provide additional comments. It is noteworthy that many educators felt that FAPs could be beneficial for families with whom they currently work or may someday work, and they requested additional information about FAPs so they could consider using FAPs in the future. Although the responses from the participants were very positive overall, a few had constructive suggestions for improving the development of and the use of FAPs in the future. For example, one respondent felt that relatively too much information was provided on current skill level (i.e., things the child could do) and relatively too little information was provided on educational priorities of the family. Also, educators were a bit wary of the time commitment required to create the materials.

Discussion

Data from this evaluation study supported the social validity of FAPs. The goals, procedures and outcomes of FAPs were reported by different stakeholders (i.e., parents, facilitators, and educators) to be socially important. FAPs can be considered to be a promising, innovative “best practice” in the fields of special education and developmental disabilities that early intervention, early childhood special education, and inclusive education programs should be encouraged to try to implement.

There are two limitations to this research study that are important to acknowledge. First, only a limited number of FAPs have been created and therefore the population of parents and FAP facilitators was small. It will be important to document the experiences and impressions of additional family members and FAP facilitators to determine the robustness of findings reported in this study.

A second potential limitation is the possibility that because the project originated in a university setting, involved working with relatively novel multimedia software and materials, and provided parents as well as FAP facilitators some special opportunities, the parents and FAP facilitators may have been predisposed to evaluate the project positively. The university researchers invested a considerable amount of time and effort with those involved in the project, and despite requests for honest opinions, people may have had reservations about providing anything other than positive appraisals. Although providing socially desirable responses could be an alternative explanation for the findings from the FAP facilitators and the parents, it is less likely that the pre-service and experienced educators would have been inclined to provide anything less than their frank opinions. However, it is not inconceivable that even some of these respondents would be predisposed to be supportive of a project that faculty members from their university had initiated. To offset these potential confounding influences, individuals who have no connection to those involved in creating the materials should conduct future studies.

There are important implications for both research and practice from this study. Further research on the potential benefits as well as implementation challenges is needed. One important finding from this study is how capable the FAP facilitators became with the technological applications in a relatively short time. Although they reported investing considerable time and effort into making the materials, when asked if they will be able to create new FAPs in the future without any additional technical assistance all but one person said yes. Based on the experiences of this project, it appears that educators can acquire competencies needed to develop high quality multimedia products if provided access to equipment and “hands-on” training.

One FAP facilitator’s comment was especially important in terms of the feasibility of implementing FAPs on a large-scale basis. Although this respondent was pleased that she had learned useful new technology skills, felt that “it was wonderful how the staff and fam-
ilies worked together”, and commented that “the end result was fabulous,” she also believed that it “would be very difficult for teachers to complete [FAPs] with numerous children.” All of the FAPs in this project were created on an individual basis with professionals working directly with families. Future implementation should explore creating FAPs in a group setting, with facilitators working with several parents at the same time in a systematic manner. Perhaps parents could be recruited to attend 3 to 4 workshop sessions in a computer lab over the course of a semester, with specific instructions to come to each session with certain materials (e.g., photos, video footage) already gathered. FAP components could be created during these sessions in a sequential manner, with the goal of creating numerous FAPs with families without overwhelming facilitators in terms of time and effort.

The findings from this study clearly reveal that parents and educators perceived FAPs to be very useful for the purpose of communicating information about a child. As Berry and Hardman (1998) point out, “the parents’ role is to provide information about their son or daughter, and the first role of the professional is to solicit this information and to listen carefully and empathetically when it is presented” (p. 125). Based on findings from this study, it is evident that FAPs can assist with this important first step of information exchange.

References


