Current Status of Evidence-Based Practice for Students with Intellectual Disability and Autism Spectrum Disorders

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Abstract: The purpose of this paper is to provide a current look at the status of evidence-based practice (EBP) for students with intellectual disability and autism spectrum disorders. Specifically, this paper will (1) provide an introduction to the history and evolution of the use of levels of evidence, (2) discuss the importance of EBPs, (3) identify who’s doing the work and how they determine evidence, and (4) suggest a decision-making model for teachers to select and apply EBPs. This process holds the ultimate goal of improving outcomes for students with intellectual disability and autism spectrum disorders as appropriate EBPs are selected and applied with fidelity. Concerns around implementation highlight the need to examine factors related to the knowledge of and adoption of effective practices by educators, researchers and families.

In this article we seek to accomplish several things. First, we provide the history and evolution of evidence-based practice (EBP) specifically for students with intellectual disability (ID) and autism spectrum disorders (ASD). Second, we discuss the importance of EBP and highlight the need for educators to have established educational practice guidelines, just as there are in the health care system. Third, we present the work of several organizations contributing to the knowledge base around EBP. Specifically, we examine how evidence is being determined by these organizations; the quality and quantity of the research. Last, we present an evidence-based practice model that we believe should form the basis for teacher preparation in an evidence-based world and ultimately influence outcomes for students with ID and ASD.

History and Evolution of Evidence-Based Practice for Students with ASD and ID

In the 1990s, the medical field began in earnest to evaluate and determine “evidence-based practices” in the field of medicine (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Evidence-based medicine was based on five principles: (1) having a foundation in basic values; (2) scientific evidence should be considered in decision making; (3) scientific evidence is complicated, sometimes ambiguous, and often limited; (4) other factors beyond scientific evidence should also be part of decision making; and (5) clinical expertise is an important factor in decision making (Drake, Latimer, Leff, McHugo, & Burns, 2004). Throughout the 20th century, the fields of medicine (Sackett et al., 1996), psychology (Chambless & Hollon, 1998), agriculture, and technology worked to produce evidence-based practices for their respective fields, effectively “outstripping” education in establishing evidence-based practices (Slavin, 2002). In addition, the American-Speech-Language-Hearing Association (ASHA) embarked upon a project to identify and obtain clinical practice guidelines from all over the world related to audiology and/or speech-
“Evidence-based practice” is described as being different from “best practice” or “research-based practice” (Cook & Cook, 2011). That is, there is a difference between so-called “evidence-based practices” and those practices that are recommended by experts (Drake et al., 2004). Essentially, those practices that rely on research only are very limited in scope and nature. Expert opinion, however, relies on professionals combining research literature with clinical expertise. This expert opinion allows for professionals to address issues that may not have specifically been addressed by research and allows them to be more flexible (Drake et al., 2004). The Council for Exceptional Children (CEC) defines “evidence-based practice” as “a strategy or intervention designed for use by special educators and intended to support the education of individuals with exceptional learning needs” (CEC, 2008, p. 6). Others have stated that evidence-based practice is “professional wisdom supported by empirical research” (Whitehurst, 2002), and “practice that is informed by credible research” (Cook, Tankersley, Cook, & Landrum, 2008). Concerns that were raised in the field of medicine at the beginning of the evidence-based practice movement are being echoed in the field of special education, such as practitioners being told when, where, and with whom practices must be used (Sackett et al., 1996). However, it should be highlighted once again that EBPs are not intended to replace professional wisdom but, rather, to enhance outcomes for students with disabilities (Cook, Tankersley, & Harjusola-Webb, 2008).

Given the rise of accountability in education, it is clear that evidence-based practice is important throughout the field of education (Slavin, 2002). “The impetus for the current evidence-based movement in education is similar to that in medicine: A concern that effective educational practices, as proven by research, are not being used in schools” (Odom et al., 2005, p. 142). Indeed, evidence-based practice logic is that “identifying and using the most generally effective practices will increase consumer (e.g., student) outcomes” (Cook & Odom, 2013, p. 136). With educators being held accountable for student outcomes in increasingly high-stakes evaluations and strict policies (e.g., No Child Left Behind, Individuals with Disabilities Education Act), it is vital that educators be provided with effective methods for increasing student outcomes. However, educators must learn to access the research evidence, evaluate it, and use and communicate the evidence to others. Educators must use the best available research evidence in combination with professional expertise and a valuing of family priorities.

However, educational research is not without its challenges. And, possibly, even more challenging than educational research is research in special education. Odom and colleagues (2005, p. 139) described research in special education as “the hardest of the hardest-to-do science” because of its complexity in variability of individuals and educational context. The IES and Department of Education standards of randomized control trials (RCTs) for demonstrating the effectiveness of an intervention provide a challenge to those who engage in research and the evaluation of research with special populations. The complexities of this situation have several implications for research. One current concern is that researchers must clarify for whom the practice is effective and in what context those practices are effective (Guralnick, 1997). Indeed, Smith and colleagues have stated that special education researchers need to “embrace both the rigor of EBPs and the relevance of PBE [practice-based evidence]” in order to begin to address the problems of determining what practices are effective for whom and in what context (Smith, Schmidt, Edelen-Smith, & Cook, 2013).

Learners diagnosed with ID and ASD are a very heterogeneous population and do pose a significant challenge to designs such as RCTs. This heterogeneity can be a challenge as it is difficult to establish equivalent groups. In addition, RCTs require a relatively large number of participants to build the power of the analysis. Different methodologies are important for different questions. There are certainly questions that remain regarding whether RCTs are the “gold standard” of research (Biesta, 2007; Biesta, 2010; Cartwright, 2007).

For students with ASD and ID, there is a
need for researchers and practitioners to look beyond their own field for establishing and utilizing evidence-based practices. In a study of professionals across different areas of the medical field, Upton and Upton (2006) found that practitioners rarely look to other areas of the medical field for information, even for patients who may have dual diagnoses. Students with disabilities are frequently receiving services not only in education but also at home, in outpatient clinics, and in other medical facilities. Reichow and Volkmar (2011) called on autism researchers in particular to gather research from across different fields, where there may be different theoretical frameworks and research methodologies, because “it is imperative that researchers consider, acquire, and synthesize research across disciplines” (p. 9). This holds true for all disability categories and the fields that work with children and youth with disabilities—social work, psychiatry, orthopedics, speech and language pathology, hearing sciences, occupational therapy, and physical therapy. In establishing evidence-based practices for students with ASD and ID, it is essential that practices from across fields be combined to include all aspects of a student’s life in order to enhance outcomes for these students. In addition, most studies fail to consider secondary and tertiary conditions (i.e., co-morbidity) which can have a dramatic impact on how the disability is manifested and the efficacy of the treatment.

**Why is Establishing Evidence-Based Practices Important?**

Increasing pressure from legislation and high-stakes assessments has served as a catalyst for establishing effective practices that support students with ASD and ID (Mesibov & Shea, 2011). Since IDEA and NCLB require the implementation of evidence-based practices in the classroom, this suggests that school districts may rightfully refuse to provide instruction that fails to meet that level of standard. At the same time, it suggests that families may be able to assert a claim for service if it is in fact evidence-based, even at the refusal of the district to provide it. The ambiguity of not having identified EBPs prevents both parties from working in the best interests of the individuals needing EBP as services.

When considering that one in every 88 children is estimated to be diagnosed with autism (Centers for Disease Control, 2012), the need to align research and practice in the field impacts a sizable population. The National Autism Council (2009) reported that it costs 3.2 million dollars to support an individual with autism over his or her lifetime, although with effective treatment this amount may be reduced by 65%. The use of EBPs has been correlated with positive behavior and academic outcomes for children in school settings (Cox, 2005; Stichter et al., 2006) and also in the home (Buzhardt, Walker, Greenwood, & Carta, 2011). Considering these issues, relying on levels of evidence, identifying and utilizing evidence-based practices would be a priority for teachers educating students with ASD and ID.

The critical need, for the implementation of evidence-based practices in teaching, obligates teachers to identify instructional practices promoted as highly effective in meeting the diverse needs of these students. This article points to current trends that are regarded as evidence-based practices in the professional literature for teaching students with ID and ASD. The authors make no assertion as to what constitutes an evidence-based practice, since a practice identified as an evidence-based cannot meet the diverse needs of all students with disabilities or serve as a panacea (Cook et al., 2008; Cook & Odom, 2013). Nevertheless, teachers must self-reflect on their educational approaches in teaching diverse students with disabilities (Cook et al., 2008; Cook & Odom, 2013) and deliver instruction that supports the use (i.e., evidence-based).

Guidelines for types and levels of evidence can be identified, identifying a practice as evidence-based and effective. Considering the importance of evidence-based practices, amalgamating the collective efforts of various organizations involved may help to provide a common terminology and process amongst practitioners. The below process provides a model that can serve to guide practitioners in a meaningful way to select and implement effective interventions for particular students. The many organizations doing this work could support practitioners by developing educational guidelines for the education of
children with ID and ASD. Educators need to have established educational practice guidelines, just as there are in the health care system. Educators must be equipped with targeted knowledge and skills, including how to locate evidence, evaluate scientifically-based research, understand types and levels (strength) of evidence, use evidence to guide practice decisions (both current and future), and approach problems of practice from a scientific perspective (to identify problems, design interventions, collect data, and analyze data). One approach to assist educators in moving from the theory of evidence into practice is provided below.

Who is Doing the Work

Many organizations have contributed to the collective understanding of evidence-based practices within the field. Organizations involved in the determination of evidence-based practices for students with ASD and ID include CEC, National Autism Council (NAC), National Professional Development Center (NPDC), What Works Clearinghouse (WWC), and National Research Council (NRC). Currently, the WWC and the NRC only consider evidence that includes RCTs. However, the WWC has stated that standards are currently being developed for regression-discontinuity and single-subject research designs (WWC, 2012). The WWC has established protocols (though, again, evidence is based on research designs that have utilized RCTs) for early childhood education interventions for children with disabilities and for interventions for children classified as having an emotional disturbance (under which children with ASD may fall) (WWC, 2012). The WWC has established protocols (though, again, evidence is based on research designs that have utilized RCTs) for early childhood education interventions for children with disabilities and for interventions for children classified as having an emotional disturbance (under which children with ASD may fall) (WWC, 2012). Some organizations, including CEC, NAC, and NPDC, have established levels of evidence into which practices can be classified. While this work has highlighted some differences in the requirements needed for a practice to be considered evidenced-based amongst the different organizations, it has also started a dialogue around the need for a single set of universal quality indicators. The work of each of these organizations will be briefly summarized below.

Council for Exceptional Children

The CEC has defined evidence-based practices as “practices that are supported by a number of high quality studies that utilize research designs from which causality can be inferred and that demonstrate meaningful effects on student outcomes” (Cook & Cook, 2011, p. 3). The CEC (2008) classifies evidence for students with ASD on three main levels: positive evidence-base, insufficient evidence-base, and negative evidence-base. Insufficient evidence-base is further classified on three levels: potentially positive evidence-base, mixed effects evidence-base, and no discernible effects evidence-base.

In 2005, the Division for Research of the CEC commissioned a series of papers delineating quality indicators for four different research designs: group experimental (Gersten et al., 2005), single-subject (Horner et al., 2005), correlational research (Thompson, Diamond, McWilliam, Snyder, & Snyder, 2005), and qualitative research (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005). The outcomes of these papers were standards for evaluating research studies to determine what practices could be considered evidence-based. The type, quality, and quantity of research supporting a practice are considered when determining whether a practice is evidence-based.

In a continuation of this work the CEC has devoted an entire issue of their publication, Exceptional Children, towards further investigation of the implementation of evidence-based practices in special education (Cook & Odom, 2013). In this issue the CEC uses forward thinking to address concerns at the state (Fixsen, Blase, Metz, & Van Dyke, 2013), district (Odom, Cox, Brock, & National Professional Development Center on Autism Spectrum Disorders, 2013), and practitioner level (Cook, Cook, & Landrum, 2013) regarding how to support the use of evidence-based practices. Current work being done by the CEC highlights the need for organizations to not only identify and disseminate evidence-based practices in the field but also to understand the complex issues surrounding these practices and what supports are needed to encourage implementation at various levels.
In 2005, the NAC assembled a panel of experts from across the United States to collaborate on determining levels of research support for interventions being implemented with children, adolescents, and young adults with ASD. The panel's collaboration yielded a 2009 report classifying the degree to which treatments have consistently been shown to be effective. This report, known as the National Standards Project, represents one of the largest reviews conducted in the field that takes into account reported outcomes of intervention studies for students with ASD. Specifically, the relative strength and volume of published peer reviewed studies support these outcomes (for whom beneficial effects were obtained) and the skills or behaviors the treatment targeted.

The NAC panel was not only concerned with levels of research support for specific interventions, but also with the generalizability of findings across age, diagnostic criteria, and behaviors or skills being targeted by the treatment. Members reviewed over 775 studies to establish 'The Strength of Evidence Classification System', which they used to determine the effectiveness of various treatments. The system places interventions in one of four categories that represent the quality, quantity, and reliability of research outcomes associated with each treatment. The resulting product of this work is that treatments are classified according to confidence of consistency in reported outcomes and a profile of the treatment is created detailing specific populations for which it might be considered.

The NAC developed a rating system to place practices in levels of evidence. To achieve the highest rating, practices investigated through group experimental or quasi-experimental design needed to have two or more groups being compared, either a random assignment and/or no significant differences between groups at pre-treatment, an n greater than 10 per group, and no data loss (NAC, 2009). For practices investigated through single-subject design to reach the highest rating, there needed to be a minimum of three comparisons of control and treatment conditions, greater than five data points per condition, more than three participants, and no data loss.

The NAC National Standards Project (2009) has established four levels of evidence: established, emerging, unestablished, and ineffective/harmful. Emerging practices are those that have a few published research studies, meaning at least one group design or two single-subject (minimum of six participants) design research studies with no conflicting results. Unestablished practices are those with little to no evidence that would allow reviewers, or consumers, to come to a firm conclusion regarding the effectiveness of the intervention. Ineffective/harmful practices are those practices that have enough evidence to determine that an intervention is ineffective or harmful for individuals with ASD.

The NPDC began examining evidence-based practices in 2007. In addition to the original remit of identifying specific EBPs, they advocated for the implementation of EBPs that produce positive outcomes in younger children with ASD by developing online training modules. The modules were developed by the Ohio Center for Autism and Low Incidence (OCALI) together with the NPDC, the Autism Society of America, the Nebraska Autism Spectrum Disorders Network, and the Geneva Centre for Autism. The Autism Internet Modules (OCALI, 2008) currently provide a model of 41 specific evidence-based practices with 31 more in development.

The NPDC standards for EBPs require that they have been investigated by two high quality experimental or quasi-experimental group designs, or five high quality single-subject design studies conducted by at least three different researchers or research groups, or a combination of evidence including at least one high-quality experimental or quasi-experimental study and three high quality single-subject design studies conducted by three different researchers or research groups (NPDC, 2010). The NPDC maintains a listing of practices that meet their qualifications for evidence-based practices for students with ASD. The NPDC does not list any practices
other than those that have been determined to meet their standards for evidence-based.

**How Evidence is Determined: Quality and Quantity of Research**

Evaluations of practices to be considered as being "evidence-based" include evaluations of the quality of the research conducted. Consumers can have the highest confidence in the findings of research studies that are of high methodological quality; therefore, only high-quality studies are considered in determining whether a practice is evidence-based. Indicators of quality may include evaluation details such as the descriptions of participants, settings, and the intervention, and interrater reliability measures (Horner et al., 2005; NAC, 2009; NPDC, 2010). In 2008, Reichow and colleagues created the *Evaluative Method for Determining EBP in Autism* as a result of inconsistencies in defining and determining EBPs in the past and a lack of a method for aggregating group design and single-subject design. In 2009, Cook, Tankersley, and Landrum discussed the need for providing a means of combining single-subject research and group design research to provide a means of determining evidence-based practices in special education.

It is important to consider for whom, when, and where the EBP is intended. For example, a practice that is based on increasing reading comprehension for elementary students without disabilities is not necessarily an EBP for increasing reading comprehension for high school students with ASD or ID (Doehring & Winterling, 2011). The quality indicators described serve as "guidelines for (a) researchers who design and conduct research, (b) reviewers who evaluate the 'believability' of research findings, and (c) consumers who need to determine the 'usability' of research findings" (Odom et al., 2005, p. 141).

Single-subject research must have clear descriptions of participants, setting, and how participants were selected (Wolery & Ezell, 1993). Unless the participants are clearly identified it is impossible to connect an intervention with an individual who might benefit from it. This is especially important with ASD since no two individuals are alike, complicating the selection process. There must also be clear descriptions of what was measured (dependent variable) and how it was measured, what the intervention was and how it was implemented (independent variable), how experimental control (internal validity) was established, a demonstration of external validity, and measures of social validity (Horner et al., 2005). Gersten and colleagues described the essential quality indicators of group and quasi-experimental design studies to include a clear and compelling conceptualization, transparent procedures for selection of participants, clear descriptions of the intervention, validity and reliability of outcome measures, and appropriate data analysis (Gersten et al., 2005).

Indicators of quality correlational research include reliability and validity of measurements, practical and clinical significance of the study, avoidance of common analytic mistakes, and the reporting confidence intervals for score reliability coefficients, statistics, and effect sizes (Thompson et al., 2005). Brantlinger and colleagues (2005) defined qualitative research as "a systematic approach to understanding qualities, or the essential nature, of a phenomenon within a particular context," (p. 195) and provided indicators for qualitative methodology. Credibility measures for qualitative methodology include evidence of the triangulation of data sources, self-disclosure of researcher reflexivity, member checks, collaborative work, external auditors, peer debriefing, an audit trail, prolonged field engagement, thick and detailed description, generalizability, and evidence the researcher looked for disconfirming evidence (Brantlinger et al., 2005).

Currently, standards for quantity of research exist for single-subject design, and group experimental and quasi-experimental design research. Horner and colleagues (2005) suggested that single-subject design research include a minimum of five high-quality studies that (1) were conducted by at least three different researchers in at least three different geographical locations and (2) included a total of at least 20 participants be considered as evidence-based practices. Gersten and colleagues (2005) suggested that a minimum of two high-quality or four acceptable-quality group experimental or quasi-experimental design research.
design studies for a practice to be considered evidence-based.

Currently, standards for quantity of research exist for single-subject design, and group experimental and quasi-experimental design research. Correlational research, which does not prove a causal relationship between predictors and outcomes, can describe the likelihood of variable X affecting variable Y and can be used to guide single-subject research and/or group experimental and quasi-experimental research (CEC, 2008). However, standards for the quantity of correlational research to support a practice as evidence-based seem unlikely. Likewise, qualitative research alone is currently not considered sufficient to place a practice into the levels of evidence but can support other research and can add to the support of another practice to allow it to be considered with insufficient support (CEC, 2008). Qualitative research, however, can be a valuable tool for identifying individual values, one of the first steps in the evidence-based process.

Though recommendations have been made for standards in combining single-subject research designs and group experimental and quasi-experimental research designs to establish a practice as evidence-based (Cook et al., 2009; Reichow et al., 2008), no such evaluation is available in the current body of evidence-based practice literature. However, the NPDC on Autism Spectrum Disorders does include combinations of these designs in their evaluation of practices (NPDC, 2010). The NPDC will consider combinations of evidence with “one high quality randomized or quasi-experimental study and three high quality single-subject design studies conducted by at least three different investigators or research groups” (NPDC, 2010).

The Evidence-Based Practice Model

Teachers are now expected to be evidence-based practitioners, just as health professionals, but the development of the skills necessary to select and apply evidence-based interventions is largely deficient in most teacher education programs. This is not for lack of instruction on what are evidence-based interventions, but rather the absence of a model for applying them in an educational context. Drawing from the model developed at McMaster University, here is a model that should form the basis for teacher preparation in an evidence-based world.

The 2001 re-authorization of the Elementary and Secondary Education Act (No Child Left Behind Act of 2001) (P.L. 107-110), the Educational Sciences Reform Act of 2002 (P.L. 107-279, 2002), and the 2004 re-authorization of the Individual with Disabilities Education Act (P.L.108-466, 2004) all reference the term “evidence-based” when describing the preferred interventions for students with and without disabilities. At the same time, this term has found its way into the educational lexicon in a variety of different forms, including “research based”, “scientifically based”, and a variety of compounded forms. Quite often, the use of these terms blurs the distinction of what is and is truly not an “evidence-based intervention”.

Congress charged the Institute of Education Sciences (IES) with establishing the criteria for what evidence-based means. The key elements of these standards require that research:

- “apply rigorous, systematic, and objective methodology to obtain reliable and valid knowledge relevant to education activities and programs” §102 (18)(A)(i);
- “employ systematic, empirical methods that draw on observation or experiment” §102 (18)(B)(i);
- make “claims of causal relationships only in random assignment experiments or other designs” §102 (18)(B)(iv); and
- obtain “acceptance by a peer-reviewed journal or approval by a panel of independent experts through a comparably rigorous, objective, and scientific review” §102 (18)(B)(vi) (Educational Sciences Reform Act of 2002).

These criteria provide guidance on what constitutes an evidence-based intervention, but it provides very little guidance on how classroom teachers can become effective evidence-based practitioners. Providing the knowledge and skills necessary for classroom teachers to understand and incorporate these standards into classroom practice is still in its nascent stages and requires adoption of a
process for using evidence-based research. Whether practitioners accept the premise of evidence-based practices or not, it will continue to be an important component of educational planning in the coming decades. It is vital that teacher education programs provide teachers with the skills necessary to be an evidence-based practitioner.

The purpose of this section is to help educators at all levels understand the basic steps in the evidence-based educational process in order to satisfy the statutory requirements of NCLB and IDEA 2004. The basic model of the evidence-based process developed for use in medicine has been adapted (Evidence-Based Medicine Working Group, 2002) and we focus on the instructional questions teachers seek to answer, as opposed to the clinical decisions made by physicians. This model has been used over the better part of the last decade in the courses on curriculum adaptation and classroom management of students with low incidence disabilities, including autism spectrum disorders. It is hardly a definitive model, but reflects the same decision-making process used in health settings but with consideration for limitations faced by teacher educators, teacher candidates, and current classroom teachers. This includes both regular and special education, as well as related services personnel who work in educational settings.

This model addresses both the process and goals of evidence-based practices and the general practices of classroom teachers and special education decision-making process. It describes the process as “the integration of the best research evidence with professional expertise and family values to maximize instruction”. It is important to recognize that no single practice is expected to be effective for all students, and that the knowledge and skills of the individual teacher plays an important role in the selection and adoption of a particular intervention. It should also be noted that the anticipated outcome reflects the values the family ascribes to that particular intervention.

The process model for incorporating evidence-based interventions into practice consists of five basic steps that must be satisfied during the decision-making process. The five steps are:

1. Defining the Disorder—What do I need to know about the student and the disorder?
2. Searching the Literature for the Evidence—What previous research has been conducted on this topic?
3. Critical Evaluation of the Evidence—How well does the intervention actually work?
4. Choosing and Applying the Evidence—What will be done with the student?
5. Evaluating the Outcomes—Did it work, and how can I make it work better next time?

Each of these steps requires the teacher to answer a number of important questions and demonstrate a number of different competencies, many of which may not be explicit to all teacher education programs. In addition to problem solving, some teachers will be forced to learn new skills that permit them to answer each question effectively. This continual learning model is what differentiates evidence-based practices from traditional “one size fits all” approaches to classroom instruction. It also improves the likelihood that our interventions are more effective, more individualized, and more responsive to the individual goals of parents and students.

**Defining the Disorder**

The first step in the evidence-based process is to “define the disorder”, a process in which practitioners answer two specific set of questions. The first set of questions, or “background questions”, reflect general knowledge regarding the student’s learning limitation. These are questions about the disability and its effect on student learning. Most teachers learn this in their survey courses on different disability types and refine this as they develop greater knowledge of the impact of a disability on learning. The second are the “foreground” questions that focus on how the disability currently impacts the learning of a particular student. They include questions regarding the student and his/her individual problems, which interventions are currently in use, whether they are effective, what alternative interventions have previously been used, and whether student learning outcomes are being achieved.
Background questions. Teachers can find it useful to consult common reference sources to identify generic learning limitations associated with common disabilities. This is especially useful with low incidence disabilities because many of these conditions are poorly understood and often the teacher has never worked with a student with that particular condition. There are a number of credible Internet sites that can provide valuable information on less commonly seen disabilities, with the National Organization of Rare Disorders (http://www.rarediseases.org/) being one of the most comprehensive.

Foreground questions. When answering foreground questions the teacher needs to draw upon his or her individual knowledge of the student, how the disability impacts the student in the classroom and other settings, and which interventions have proven most successful in improving student outcomes. This is also an ideal time for the teacher to consider whether the educational benefits achieved by the student in the classroom are justified by the resources required for that intervention. While it is important to make sure that decisions are guided by research and not money, there are times when less expensive options are more appropriate than more expensive options, especially when the outcomes are similar or of lower priority. This will be discussed at greater length at a later time.

One of the complaints leveled by physicians regarding evidence-based practice is their belief that using this process limits their professional judgment. Actually, the foreground questions are best answered by utilizing professional judgment and professional experience to move from the generic and general to the unique and specific.

At the completion of this step, the teacher should have developed a clear picture of how the student’s disability affects his/her performance in the classroom and other settings, what limitations are unique to the expression of the student’s disability, what interventions or class of interventions have proven effective, and whether the student is achieving to his/her anticipated level of performance. These questions will form the basis for the next step in the process.

Searching the Literature for Evidence

A clear picture of the student offers the teacher an opportunity to locate information on interventions that meet the standards required of an evidence-based intervention. The Council for Exceptional Children has played an important role in identifying indicators of what is and is not an evidence-based intervention, as well as individual researchers within the various special interest divisions. At the same time, these indicators often exceed the knowledge and skills of educators since they require the educator to have (1) access to bibliographical databases to search for literature, (2) knowledge of the indexing systems for each database, and (3) the time and inclination to search the extensive literature (or lack thereof) to identify and prioritize educational research outcomes. In other professions that identify their knowledge bases as being “evidence-based”, this process is accomplished through the creation of practice guidelines and protocols, as well as educational collaboratives, such as the Cochrane Collaboration (http://us.cochrane.org) in health care and the Campbell Collaboration (http://www.campbellcollaboration.org) in the social sciences.

In the absence of a consensus on what constitutes an evidence-based practice, it is the obligation of the teacher to seek out evidence to support the interventions being planned for use with a particular student. This involves using the knowledge of student learning characteristics, identifying search terms that reflect these characteristics, and locating reputable evidence in the research literature. Systematic reviews, as well as meta-analyses, are especially helpful to the busy teacher looking for a consensus on what constitutes effective interventions supported by the research evidence.

Evaluation of the Evidence

As stated earlier in this article, a great deal of effort has been expended by the CEC as well as other organizations associated with special education, to identify the indicators of exemplary educational practices for students with ASD. This reflects the preferences of the Institute for Educational Sciences (IES) for the
use of randomized research designs in education, and the reality that educational research has long depended on other research methodologies. Ultimately, the preference for one intervention over another is not just dependent on research methodology, but also on teacher judgment and family preferences for outcomes.

Evaluating evidence requires an essential understanding of research methodologies, their strengths and limitations, and a fundamental understanding of statistical analysis. While educators receive training in these skills, their capacity to incorporate this understanding into practice can be a challenge. This speaks to the importance of special education researchers incorporating strong research designs, as appropriate, and using clear descriptions of the measured effect of the intervention. This also begs for the development of instructional guidelines based on research validated and evidence-based interventions.

Choosing and Implementing the Intervention

Once the available interventions have been identified, the educator is faced with the responsibility of selecting the intervention that is most likely to provide the outcomes desired by the family and other members of the educational team. This involves the development of appropriate goals and objectives (to accurately measure the effectiveness of the intervention), with special attention given to treatment fidelity. In education research, *fidelity* is defined as the degree to which an intervention or model of instruction is implemented as it was originally designed to be implemented (Gresham, MacMillan, Beebe-Frankenberger, & Bocian, 2000). Dane and Schneider (1998) identify five components of treatment fidelity that are essential to determining the efficacy of an intervention:

- Adherence—program components are delivered as prescribed
- Exposure—amount of program content received by participants
- Quality of the delivery—theory-based ideal in terms of processes and content
- Participant responsiveness—engagement of the participants; and
- Program differentiation—unique features of the intervention are distinguishable from other programs (including the counterfactual).

Teachers are often dismayed when the interventions they select fail to deliver on the outcomes they anticipated when they first began to use them on a particular student. It is essential that educators understand that many research studies do not assess or report fidelity (Cordray & Jacobs, 2007; Dane & Schneider, 1998; Gresham et al., 2000), or identify all five of these components with sufficient specificity so as to insure that implementation, as prescribed, will lead to the anticipated outcome. This, in turn, accounts for some of the frustration teachers experience when the best planned intervention fails to deliver on the outcomes anticipated. While this has improved over time (Dane & Schneider, 1998), it is still problematic for educators who are seeking to use evidence-based interventions and still find they are not obtaining the results identified in the literature.

Evaluation of Outcomes

The evidence-based process used in medicine depends heavily on the use of Bayesian statistics. In the simplest terms, Bayesian statistics is a method of determining the probability of an outcome based on prior experience (Spiegelhalter & Rice, 2009). In its application for evaluating educational outcomes, the question the educator is seeking to answer is whether one intervention is demonstrably more effective than another. This is where professional judgment and outcome preferences enter into the decision-making process. The teacher draws upon his/her prior knowledge of outcomes, and compares this to the results from that intervention. There are also other important considerations that can skew the true value of a particular outcome. One example is when alternative interventions are available with relatively similar outcomes. In situations like these, it is important to consider the cost and allocation of personnel and resources when determining the effectiveness of an outcome. If an educator is considering a high cost intervention there needs to be overwhelming evidence that this intervention is demonstratively more effective than the alter-
native to justify its use. This reflects the realities of education where demands for service frequently outstrip availability.

This five-step process for identifying, selecting, and implementing evidence-based practices has the ultimate goal of minimizing variability and improving outcomes for students with autism and other developmental disabilities. It reflects the importance of educational research in identifying effective interventions, the value of professional judgment when selecting and implementing instruction, and honors the importance of family and student values when it comes to outcomes. In a time when the value of experienced and well-trained educators is being questioned, this reminds us that our profession is one that requires highly trained professionals to make evidence-based practices a reality for students with ASD and other developmental disabilities.

Further work is necessary to strengthen the research to practice gap. This paper provides a context of EBP and presents a decision-making model for teachers to select and apply EBPs. This model is particularly important for teacher training programs as personnel can ensure that preservice teachers are taught how to evaluate and apply the research within their own classroom contexts. We encourage further research to examine the ways in which teachers take up and implement these practices. In particular, it may be beneficial to examine teachers’ use of communities of practice where they discuss, collaborate, and support each other to upgrade their knowledge and skills. We also encourage researchers to continue to identify those attributes of EBPs that are important for teaching learners with ID and ASD. The increased emphasis on EBP compels teachers of students with ID and ASD to use the best available research evidence in combination with professional expertise and a valuing of family priorities. Further, those who prepare personnel need to ensure that teachers learn to access the research evidence, evaluate it, and use and communicate the evidence to others. Ultimately, the goal is to improve outcomes for students with ID and ASD and we know that use of EBPs increases the probability of improved outcomes for these learners.

References


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