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Teacher Knowledge and Selection of Evidence-Based Practices: A survey study

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Introduction

Federal legislation and state and local policies mandate the use of evidence-based practices (EBPs) (Cook & Odom, 2013), which are defined as “treatment approaches, interventions, and services, which have been systematically researched and shown to make a positive difference in children” (Association for Children’s Mental Health, 2004, p. 4). Although the concept of EBPs emerged from the medical field (Cook & Odom, 2013; Spencer, Detrich, & Slocum, 2012), it has become a defining characteristic of education as researchers, policymakers, and practitioners continue to improve the provision of educational services for all student populations including those who have historically struggled in school (Cook & Cook, 2013; Odom, Brantlinger, Horner, Thompson, & Harris, 2005). As part of this effort, schools are mandated to use evidence-based academic and behavioral practices to improve student outcomes (Coburn & Talbert, 2006; Honig & Coburn, 2008; Individuals with Disabilities Education Improvement Act).

The passage of No Child Left Behind (No Child Left Behind (NCLB) Act of 2001) marked the first time in education that the use of scientific research to inform instructional decisions was mandated (Spencer et al., 2012). NCLB (No Child Left Behind (NCLB) Act of 2001) includes more than 100 references to ‘science’ or ‘scientifically-based evidence’ as a foundation for educational practice (Spencer et al., 2012). Furthermore, the passage of the Individuals with Disabilities Education Improvement Act (IDEIA) highlighted the use of scientifically-based

practices in education (Spencer et al., 2012). For example, IDEIA stipulates that student response to scientifically-based practices (e.g., EBPs) must be documented when determining student eligibility for special education services. Thus, if the use of scientifically-based practices cannot be indicated, students should not be identified as having a disability. Likewise, when considering the federal mandates for educating students with disabilities in the least restrictive environment, preparing general education teachers for inclusion necessitates both theoretical and practical knowledge (Forlin, 2010).

More recently, the passage of the Every Student Succeeds Act (Every Student Succeeds Act (ESSA), 2015) included at least fifty references to and clearly defined ‘evidence-based’ as:

...an activity, strategy, or intervention that—(i) demonstrates a statistically significant effect on improving student outcomes or other relevant outcomes based on—(I) strong evidence from at least 1 well designed and well-implemented experimental study; (II) moderate evidence from at least 1 well designed and well-implemented quasi-experimental study; or (III) promising evidence from at least 1 well designed and well-implemented correlational study with statistical controls for selection bias; or (ii)(I) demonstrates a rationale based on high quality research findings or positive evaluation that such activity, strategy, or intervention is likely to improve student outcomes or other relevant outcomes; and (II) includes ongoing efforts to examine the effects of such activity, strategy, or intervention. (§1177-290, 2015)

In addition to federal mandates, teacher training requirements (e.g., the National Council for Accreditation of Teacher Education) and education standards (e.g., the National Board of Professional Teaching Standards, the Council for Exceptional Children) make reference to the use of “research” to select, develop, and adapt materials and instruction to meet the needs of students. Furthermore, the Council for Exceptional Children makes explicit references to EBPs throughout its preparation standards for special educators. Despite this continued emphasis on teacher use of EBPs, the research to practice gap remains an ongoing concern (Burns & Ysseldyke, 2009; Gable, Tonelson, Manasi, Wilson, & Park, 2012) with little evidence that the gap has been narrowed (Cook & Odom, 2013; McKenna, Shin, & Ciullo, 2015).

Further compounding the issues related to the research to practice gap, is the expectation that educators sift through, identify, and select practices that are scientifically-, research-, or evidence-based. Although these terms have often been used synonymously among educators and in the literature, a clear distinction exists between each (Kretlow & Blatz, 2011). More specifically, scientifically-based research refers to the (a) methods utilized to test instructional practices and (b) the use of rigorous quality indicators for research to make determinations about the efficacy of those practices (Kratlow & Blatz, 2011). Research-based practices are those practices for which research has been conducted, though no determinations have been made regarding the rigor of the research nor the efficacy of the practices (Kretlow & Blatz, 2011). Furthermore, evidence-based practices for education have been defined as “practices that are supported by multiple, high-quality studies that utilize research designs from which causality can be inferred and that demonstrate meaningful effects on student outcomes” (Cook & Cook, 2013, p. 73). Although the aforementioned terms are often used interchangeably (Kretlow & Blatz, 2011), educators must have a clear understanding of the definition of EBPs in order to identify such practices. This is of particular importance when considering that a variety of interventions are being implemented in the general education setting for students with disabilities, with little information regarding the

efficacy of those interventions for all students (Reichrath, deWitte, & Winkens, 2010). In the absence of knowledge regarding what constitutes an EBP, teachers may continue to use less effective teaching methods with their students (Cook & Cook, 2013; Cook & Odom, 2013) and child study teams may make inaccurate decisions regarding student eligibility for special education services (Kretlow & Helf, 2013) based on use of practices that may not be evidence-based. This means that knowledge of EBPs is important for general and special education teachers, interventionists, and referral agents (Kretlow & Blatz, 2011; Stormont, Reinke, & Herman, 2011).

Federal mandates (IDEIA 2004; No Child Left Behind (NCLB) Act of 2001) coupled with teacher training requirements and the need for identifying effective practices for use with students with and without disabilities, highlight the need for teachers to not only implement EBPs but to identify such practices for implementation. In order to do so, teachers must be well versed in what constitutes an EBP. Despite this, researchers have found that pre-service teachers receive little and often generalized instruction on EBPs (Berry, 2011; Gable et al., 2012). In addition, a disconnect reportedly exists between what pre-service teachers report and implement with regard to EBPs (Jones, 2009). Therefore, teacher knowledge of what comprises an EBP must be a prerequisite for eventual selection and use of such practices. In order to identify a practice as being evidence-based, educators must first have a clear understanding of the definition of the term ‘evidence-based practice’. Therefore, the purpose of our study was to examine the current state of educator knowledge with regard to the term ‘evidence-based practice’. The current study was guided by the following research questions:

1. What is the current state of educator knowledge concerning the term ‘evidence-based practice?’
2. Were general education teachers or special education teachers more accurate in their definitions of evidence-based practice?
3. Which resources do teachers use to identify evidence-based practices?

Methods

Participants

A random stratified sampling procedure was used to select a sample of United States educators. The sampling procedure was stratified so that the percentages of educators included in the study reflected the national proportion of general education (87%) and special education (13%) teachers as reflected in the statistics given by the U.S. Department of Education, National Center for Education Statistics (2012) and the Bureau of Labor Statistics (2013). A company known as Market Data Retrieval (MDR) maintains a large database containing statistics and school information for over three million teachers in the United States. MDR emailed an Internet survey link to 8786 teachers from their database. A total of 273 recipients clicked on the Internet link contained in the email. Of those 273 individuals, six were not current or recent teachers and were thanked for their time and consideration; participants were required to have been employed as teachers in the past year. Of the 267 eligible teachers that clicked on the link to read more about the study, 163 completed the survey, which yielded a 61% response rate based on the number of eligible teachers who opened the email. Table 1 summarizes the demographic characteristics of the respondents.

Each participant had his or her own MDR given unique identifier. This unique identifier was included in the survey's URL in order to make an analysis of responders and non-responders possible. MDR also provided a list of these unique identifiers as well as the demographic characteristics associated with each participant. A chi-square analysis revealed no statistical differences between the responders ($n = 163$) and non-responders ($n = 104$) on gender ($p = .21$) and teaching assignment—general or special education ($p = .41$). Teachers who completed the survey averaged 14.8 years of teaching, 50.9% had completed master's degrees and an additional 6.7% held doctorates. The majority of respondents taught at the elementary school level. Approximately half of the sample (54%) taught in suburban schools (see Table 1).

Table 1
Participant Characteristics

Variable	N	%	<i>M</i>	<i>SD</i>
Gender				
Female	114	69.9%		
Male	49	30.1%		
Years Experience			14.80	9.18
Education Level				
Bachelor's	69	42.3%		
Master's	83	50.9%		
Doctorate	11	6.7%		
School Level				
Elementary	68	41.7%		
Middle	33	20.2%		
High	39	23.9%		
K-8	14	8.6%		
K-12	9	5.5%		
School Location				
Rural	47	28.8%		
Suburban	88	54.0%		
Urban	28	17.2%		
Position				
GenEd	116	71.2%		
SPCE	28	17.2%		
Inclusion	19 ^a	11.7%		

Note. GenEd = general education; SPCE = special education. Decimals were rounded to one decimal place for percent of sample. ^a19 teachers identified themselves as inclusion teachers. On the survey 12 of those teachers indicated their assignment as inclusion and special education. For analysis, these 12 teachers were counted as special educators. The remaining 7 inclusion teachers were counted as general education teachers.

Instrumentation

A 57-item survey was developed to obtain information about teacher knowledge and practice particularly in terms of EBP. The survey used a variety of question formats including open-ended, checklist, and matrix responses. The total time needed to complete the survey was approximately 15 minutes. The University Institutional Review Board reviewed and approved the survey as well as the research procedures.

The first section of the survey collected demographic information about the teacher, their school, and their students (e.g., what percentage with challenging behavior). Subsequent sections requested information about teacher knowledge and skill including information about EBP. Two questions focused on EBPs. The participants' responses to these EBP questions are the focus here.

Procedures

This survey study followed Dillman's (2000) tailored design methodology by using an initial deployment email and two follow-up emails. The two follow-up emails were sent one and four weeks after the initial email. The initial email resulted in 139 clicks on the Internet link in the email and 121 completed surveys. The two follow-up emails resulted in an additional 134 clicks on the Internet link and 42 additional completed surveys. Surveys were considered completed if at least 75% of the total questions were answered, though few were missing any information. Surveys were not included in the analysis if any teacher demographic information was omitted. Furthermore, only surveys in which respondents answered both questions pertaining to EBPs were included ($n = 163$).

When participants clicked on the Internet link for the survey they were directed to the survey which was written using Qualtrics and housed on a secure server at the university. As participants began answering survey questions, Qualtrics extracted each participant's unique identifier from the uniform resource locator (URL) to use as an anonymous respondent ID. This prevented individuals from accessing and entering data into the survey more than once and allowed matching to MDR's list for the chi-square analysis of responders and non-responders.

Pilot Survey

The survey questions were tested with 23 current and previous teachers. The feedback was used to revise questions and answers before MDR emailed the survey link. Also, prior to deployment of the emails, six different individuals independently tested the actual electronic survey. After each tester completed the survey, the first author examined the pilot data set to ensure that items were correctly extracted by Qualtrics and correctly saved on the server. Additionally, the author team downloaded the saved .csv file in Excel from this pilot testing to ensure correct formatting. Three of the six pilot testers who are familiar with Excel also reviewed their own pilot data in order to determine accuracy. After the initial pilot test, an error was found in how the Internet link interacted with Qualtrics to allow extraction of the unique identifier. The error was corrected. A subsequent pilot test revealed no additional errors.

Coding of Responses

As participants responded to the survey, their answers were stored on a secure server. Data were available for download as a .csv file by authorized research team members. The .csv file contained a column for each question in the survey including the unique identifier, demographic information items, and the substantive content regarding EBPs. The third author reviewed the column containing participants' responses to "What is the meaning of the term: 'evidence-based practice'?" and developed a list of initial codes based on the concepts that appeared to be included in the responses. The second author then coded all items with the initial codes and condensed the list due to overlap. The first author then reviewed all of the codes on the code list as well as those that were used to code the data and made suggestions for revision. These suggestions were discussed and resulted in a revised set of codes. The first author then used the revised set of codes to re-code the participants' responses. The second author also independently coded the responses to the EBP question using the revised set. Responses were coded with all codes that were relevant. There were four responses on which disagreement was initially

found. Those disagreements were discussed and 100% agreement was reached. Responses were also coded as correct or incorrect using a liberal definition for the term ‘evidence-based practice’; this definition is described below. The researchers also reached 100% agreement with respect to the accuracy (correct/incorrect) of the coding.

Codes

The data yielded nine different codes including: classroom data; research proof; general proof; interdisciplinary team; best serving the student; teacher knowledge/expertise; culturally and linguistically responsive practice; not sure, unfamiliar, guessing; and completely skipped the question. Definitions for each code are given in Table 2. In order to evaluate the second research question, responses were also coded as correct or incorrect using a very liberal definition: practice proven by research. Our final research question addressed the resources that teachers use to identify EBPs. Each response was dummy coded (0 or 1) for whether or not the participant utilized the indicated resource. We used Excel’s count function to determine the values for each resource: textbook, research journal, practitioner journal, Internet, other teachers, and other. Participants selected all that applied.

Table 2.

Sources of Information about Evidence-based Practices

Source of Information	General Education	Special Education
	<i>n</i>	<i>n</i>
Colleagues (<i>n</i> = 77)	63	14
Internet (<i>n</i> = 75)	51	24
Research journals (<i>n</i> = 72)	49	23
Textbooks (<i>n</i> = 57)	27	30
Practitioner journals (<i>n</i> = 51)	24	27
Professional Development (<i>n</i> = 6)	4	2
Graduate School (<i>n</i> = 1)	0	1

Note. Total numbers of general education teachers and special education teachers for this analysis were 123 and 40, respectively.

Data Analysis

Codes were tabulated using an Excel spreadsheet. First, all single codes (responses that were coded

with one code) were listed in the spreadsheet and a count was completed using the count command in Excel. Then, the multiple codes were listed in the spreadsheet and a count was completed using Excel to count the various combinations of codes. These counts are described in the following sections. In order to evaluate whether there were differences in response accuracy based on whether the participant was a general educator or special educator, we used a liberal definition to code each response as correct or incorrect. We then conducted a chi-square analysis with teaching assignment and the dichotomous variable of accurate or inaccurate EBP definition. For the purposes of this analysis, participants who identified as inclusion teachers were coded as general education teachers unless they also indicated that they were special education teachers. In the latter case, the teaching assignments for these teachers were coded as being special education teachers. To determine the resources that teachers access in order to identify EBPs, we used Excel’s count function to determine the values for each resource: textbook, research journal, practitioner journal, Internet, colleagues, and other.

Results

Of the 163 survey respondents, 145 answered the question, “What is the meaning of the term: ‘evidence-based practice?’” with a statement that could be coded with a single code. An additional 18 responded with a statement that required two codes. Fifty-one responses (31.29%) were coded as ‘research proof’: 29 general education teachers (24% of all general education respondents) and 22 special education teachers (55% of all special education respondents). Another 35 responses (21.47%) referred to proof but did not indicate the origin or ownership of the proof (general proof). This means that 86 respondents (52.76%) referred to proof of some kind; however, it also means that 77 respondents did not provide a response that referenced proof. Twenty-four responses (14.72%) suggested that an EBP was a practice determined by the classroom teacher, through teacher data that suggested effectiveness. An additional four respondents (2.45%) indicated that they did not know, 21 others (12.88%) opened the question but did not answer it, and two participants (1.23%)

Figure 1

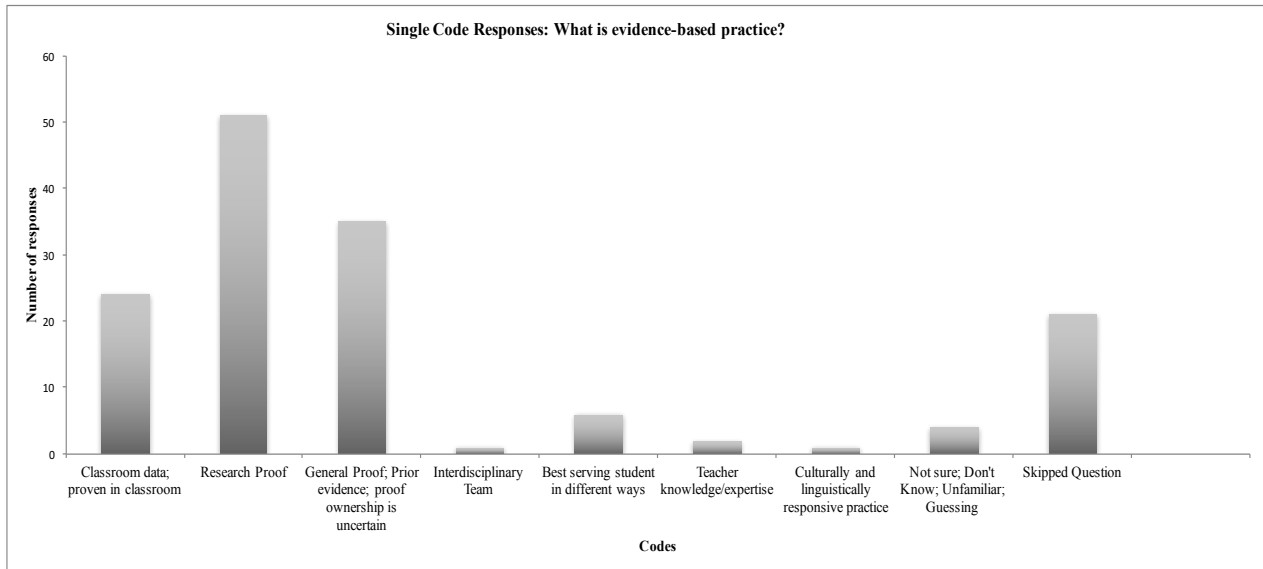


Figure 1. Responses coded with a single code.

Figure 2

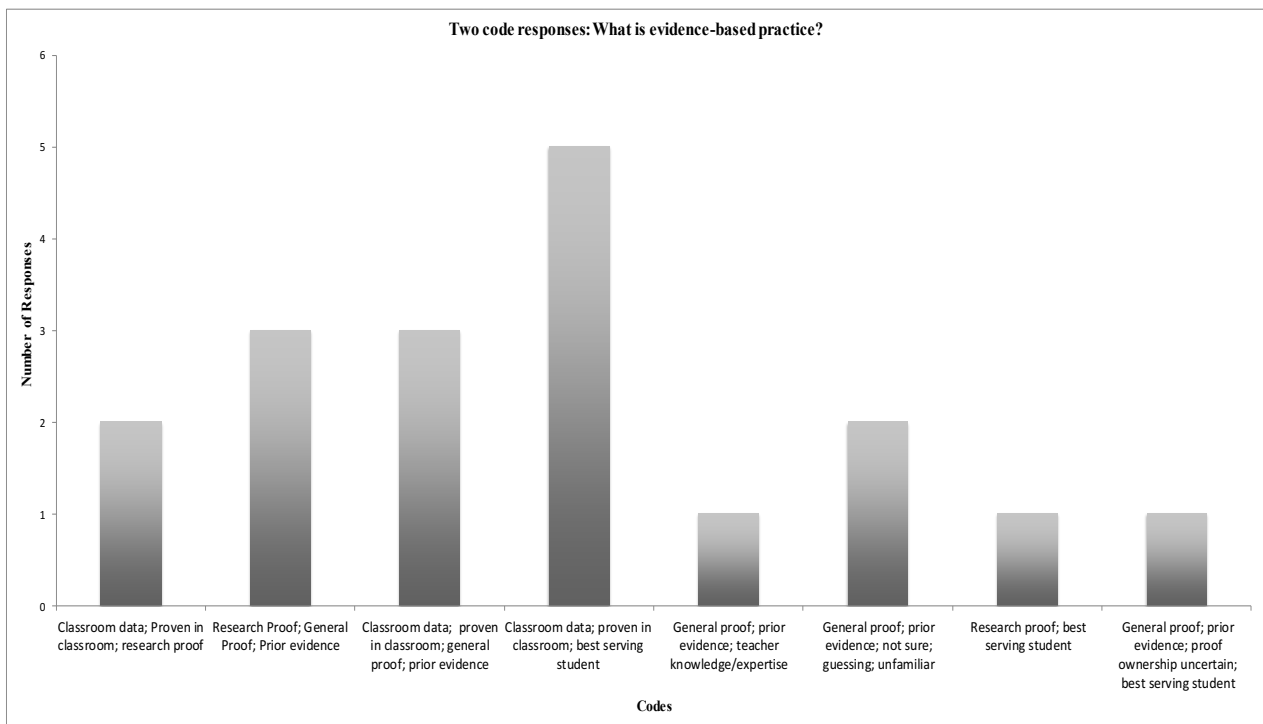


Figure 2. Responses coded with two codes

indicated that they did not know but added responses that received the code that referred to general proof. The number of participants whose

answers were coded with single codes is reflected in Figure 1. Figure 2 contains a summary of the responses that were coded with two codes. The chi-square analysis to examine the association between

teaching assignment and accuracy yielded significant results, $\chi^2(1) = 17.277$ $p = .000$. The chi-square analysis indicated that expected frequency of correct responding for general education teachers was 40.7; however, the observed frequency was 30. The expected frequency of correct responding for special education teachers was 13.3 and the observed frequency was 24.

Information Sources

Educators use a variety of methods to identify and access EBPs. It is important to note that respondents were instructed to select all resources that they use. Survey results showed that the three most commonly used sources of information concerning EBPs were colleagues ($n = 77$; 47.24%), Internet ($n = 75$; 46.01%), and research journals ($n = 72$; 44.17%). These methods were followed by use of textbooks ($n = 57$; 34.97%), practitioner-focused journals ($n = 51$; 31.29%), and staff/professional development ($n = 6$; 3.68%). One respondent (0.61%) indicated graduate school education included more access to information about EBPs. These sources are explained further according to teaching assignment in Table 2.

Discussion

As noted previously, federal legislation and state and local policies are driven by efforts to improve the quality of education for all students (Odom et al., 2005) and mandate the use of EBPs (Cook & Odom, 2013). Although the concept of EBPs has become a defining characteristic in education as researchers and stakeholders continue to strive to improve the educational outcomes of student populations who have historically struggled in school, research has not explored the current state of educator knowledge concerning EBP. In fact, it appears to be unknown as to whether teachers actually know what makes a practice evidence-based.

The purpose of our study was to examine the current state of educator knowledge with regard to the term ‘evidence-based practice’ and to understand possible differences in knowledge based on teaching assignment. We hypothesized that the

research to practice gap is due in part to teachers’ lack of awareness and knowledge about what makes a practice evidence-based. Our findings appeared to confirm this hypothesis: teachers tend to lack awareness about what constitutes an EBP, as less than a third of the sample referred to research. If ‘based on research’ were the only requirement for a practice to be considered evidence-based, one-third of the sample would have provided an accurate response. Researchers (Cook & Cook, 2013; Cook, Tankersley, & Landrum, 2009) suggest that determining whether an intervention or instructional technique constitutes an EBP requires analysis of the methodological quality and magnitude of the available research supporting specific practices. Although respondents indicated ‘research proof’ as a defining characteristic of EBPs, none of the survey participants referred to method, quantity, quality, or magnitude in their definitions of EBP. The research to practice gap is viewed as a complicated issue that continues to persist due to a number of possible factors, including (a) teachers have little access to research (Kennedy, 1997), (b) teachers lack confidence and/or trust in research (Boardman, Arguelles, Vaughn, Hughes, & Klinger, 2005), (c) researchers fail to make causal connections in studies (Kennedy, 1997), and (d) even though EBPs are consistently promoted in a variety of forums (Cook & Odom, 2013), teachers may lack awareness and knowledge about what constitutes an EBP.

Furthermore, based on our chi-square, general education teachers did not appear to be as aware of what constitutes an EBP as might be expected. Special educators, on the other hand, appeared to be comparatively more aware of the definition of EBP. These findings revealed by the chi-square analysis suggest that special educators exceeded the observed frequency for accuracy regarding the components of an EBP. One possible explanation may be due to potential differences in training requirements and professional teaching standards for general and special education teachers. For example, the National Council for Accreditation of Teacher Education (NCATE) established standards that apply to all general and special education teacher candidates completing NCATE accredited programs. Standard 1 of NCATE’s (National Council for the Accreditation of Teacher Education, 2008)

professional standards for teacher candidates addresses knowledge, skills, and professional dispositions. Although there are no direct references to “evidence-based,” “research-based,” or “scientifically-based” practices, Standard 1 (National Council for the Accreditation of Teacher Education, 2008) includes references to “research.” Additionally, Standard 1 indicates that teacher candidates must be able to (a) critique research on pedagogy and learning, (b) select and develop instructional strategies based on research, (c) analyze educational research, (d) use research to inform their practice, and (e) demonstrate an awareness of research related to teaching, learning, and best practices. Likewise, the National Board for Professional Teaching Standards (NBPTS) established standards for general education teachers at early- (National Board for Professional Teaching Standards, 2012a) and middle-childhood (National Board for Professional Teaching Standards, 2012b) levels, as well as for special educators (National Board for Professional Teaching Standards, 2010). The terms “evidence-based,” “research-based,” and “scientifically-based” practices do not appear in any of the general or special education teaching standards. There are, however, references in both the general and special education standards to the use of “research” to select, develop, and adapt materials and instruction to meet the needs of students. In addition to the NCATE and NBPTS standards, the Council for Exceptional Children (CEC) has established initial and advanced preparation standards (Council for Exceptional Children, 2015) for special educators. NCATE approved the CEC standards in 2012. CEC’s standards for special educators include explicit references to “evidence-based practices” within standards, key elements, and supporting explanations in both initial and advanced preparation standards.

From the analysis of resources that educators use to identify and access EBPs, it is quite clear that educators rely on their professional peers for information. This finding is somewhat alarming as we also found a low percentage of educators who provided an accurate definition for the term EBP. Participants also suggested that they use the Internet to identify EBPs. Although there are many

appropriate websites (e.g., What Works Clearinghouse) through which to identify these practices; there are also many websites that promote practices that are not evidence-based. Few participants indicated professional development as a source of information about EBP. This finding supports previous research indicating teachers found professional development largely inadequate (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). This is particularly disconcerting when one considers federal and district budget allotments for professional development activities. In addition, when teachers are attending in-service training, students are not in the classroom learning.

Implications

Lack of knowledge about what constitutes an EBP is not only problematic because federal legislation (Individuals with Disabilities Education Improvement Act; No Child Left Behind (NCLB) Act of 2001) requires the use of EBPs, but they have also been shown to improve student outcomes (Cook et al., 2012). Without knowledge of what constitutes an EBP, teachers might not accurately identify practices to use in their classrooms in order to achieve the best outcomes for all students. Teachers often use practices they feel comfortable implementing rather than selecting practices that they know are evidence-based. This issue may cause heightened risk for students who are already at-risk, as they may not receive evidence-based instruction in order to prevent their identification as a student with a disability. On the other hand, students with disabilities must have access to the most effective instructional techniques in order to succeed (Dammann & Vaughn, 2001). Furthermore, the degree to which educational services meet FAPE mandates is an essential consideration (Brigham, Ahn, Stride, & McKenna, 2016). By definition, students with disabilities already perform below the level of their typically developing peers. EBPs must be used with students with disabilities; failure to use EBPs with this population may result in significantly lower levels of effective instruction for and achievement of these students. This means that their teachers must have strong knowledge of EBPs in order for these students to make adequate progress. Furthermore, it is imperative that teachers are

provided professional development and ongoing coaching to support integration of EBPs into typical teaching practice (McKenna & Ciullo, 2016). It was particularly disconcerting that only one respondent identified graduate school as a source of information regarding EBPs. In order for teachers to develop their knowledge about EBPs, institutions of higher education and teacher educators share the responsibility of preparing educators to identify and ultimately implement EBPs (Jones, 2009; Paulsen, 2005). At both the undergraduate and graduate levels, teacher preparation programs must provide explicit instruction in EBPs (Berry, 2011). Since educators often rely on their professional peers for information, a concerted effort is needed to ensure that the appropriate information is disseminated widely into the field. These dissemination efforts should focus on the channels through which educators suggest that they obtain information; primarily the Internet and research-focused journals.

Future Research

The low percentage of participants who referred to research when defining the term EBP suggests a problem of significant concern. Not only do educators lack awareness about what constitutes EBP, but they may not be able to identify which practices are evidence-based and which are not. Future research should examine the criteria teachers used to evaluate the utility of a practice for implementation in their classrooms. Although participants in this study were not asked to elaborate on specific Internet resources or websites, future research might further explore where teachers are gathering information and selecting instructional methods and practices, specifically which Internet sites teachers search for resources and information.

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Future research must identify methods of disseminating information about what constitutes an EBP, but moreover, future research must identify methods of disseminating information about specific EBPs that will benefit the students whom we serve. This work may need to address how teachers are prepared in their teacher preparation programs to identify EBPs.

Limitations

Given the exploratory nature of this study, a few limitations must be addressed. First, the findings are limited to those who replied to the online survey: those with Internet and email access. However, 97% of United States teachers have Internet and email access (Gray, Thomas, & Lewis, 2010). This widespread access suggests that a lack of access probably did not have a strong effect on our survey findings. Second, although MDR maintains a large database of teachers, we had no way of determining if their information was current; that is, were all of the 8786 teachers' email addresses on file active? Since we were unable to verify the number of active email addresses that the survey link was sent to, we were forced to calculate response rates based on those we could confirm. This means that if the email was opened, we could confirm that the email was valid and the recipient constituted a potential participant. This process enabled us to calculate a response rate based on the number of teachers who opened the email. Finally, survey research requires researchers to rely on the participants' responses without opportunity for clarification, as would be the case with interviews. This means that survey responses are prone to errors that may affect the interpretation of the response. We attempted to attenuate this potential limitation as two members of our research team independently coded the data and reached high levels of agreement.

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