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The Role of Teacher Preparation in Promoting Evidence-Based Practice in Schools

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It is paramount that teacher preparation programs continually strive toward the mission of preparing effective special educators. Through coursework and fieldwork, graduates must be well-informed professionals capable of improving student outcomes by understanding, selecting, and engaging in evidence-based practice (EBP). Evidence suggesting special educators are not implementing EBP with fidelity underscores the necessity for teacher educators to reexamine our role in promoting EBP in schools. Following an analysis of current challenges, ranging from lack of reinforcement provided to teachers who use EBP to the breadth of expertise needed as contemporary special educators, we offer a path forward. Starting within our own college classrooms, we explore traditional and innovative methods of enhancing knowledge and skills that rely on EBP. Next, we highlight the transition from coursework to fieldwork and the importance of building teacher preparation programs around clinically-rich teaching experiences. We then unpack issues related to fidelity and generalization of EBP by preservice teachers and provide a model for its promotion. We conclude with the critical role teacher educators have in elevating the status of teacher preparation by ensuring our preservice teachers know and use EBP in their own classrooms.

Keywords: **Teacher preparation, evidence-based practice, special education. Preservice teachers.**

Introduction

Preparing effective preservice teachers who enter the field ready to meet the unique needs of their students is the ultimate goal of teacher education, influenced by a combination of coursework - including methods grounded in research - and fieldwork where students have the opportunity to gain experience using evidence-based practice (EBP). As teacher educators, we must prepare preservice teachers to impact student outcomes by providing them with the most effective tools and experiences available. This preparation is not as simple as handing over a list of techniques, a library of practices, or an inventory from which preservice teachers can choose. Rather, it involves educating them to be well-informed professionals, aware of their own strengths and the impact of the environment on their instructional decisions. It also includes an awareness that not only *what* they teach matters, but also, *how* they

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teach makes a difference (Cook, Tankersley, & Harjusola-Webb, 2008). Teacher education programs therefore must prepare teachers who can (a) understand and select practices with empirical support, and implement them as intended (Detrich & Lewis, 2013), and (b) view EBP as a broader, decision-making process that combines professional wisdom with the best available evidence to meet individual student needs (Maheady, Smith, & Jabot, 2013).

One can turn to our professional organization, the Council for Exceptional Children (CEC), to gain clarity on the idea that EBP is a process. For example, CEC recently published a report emphasizing *Standards for Evidence-Based Practices in Special Education* (CEC, 2014). Although this may be interpreted as a list of interventions from which to choose, when combined with CEC's *Special Education Standards for Professional Practice for Teaching and Assessment* (CEC, 2011), the balance of EBP as both a noun and a verb becomes clear; thus we view EBP as an empirically validated practice combined with a teacher's professional wisdom to select, use, and analyze such practice.

Although there are legal mandates for the use of EBP (i.e., Individuals with Disabilities Improvement Act, IDEIA, 2004) and much is known about the effectiveness and efficiency of EBP with struggling students (e.g., Baker, Chard, Ketterlin-Geller, Apichatabutra, & Doabler, 2009; Hughes, Witzel, Riccomini, Fries, & Kanyongo, 2014; Knight & Sartini, 2015; Roberts, Torgesen, Boardman, & Scammacca, 2008), many special and general educators are not implementing EBP in the classroom, or not using them with fidelity (Maheady et al., 2013). Preservice teachers may receive little instruction in the area of EBP and have few opportunities to practice and apply such interventions (Begeny & Martens, 2006). In many cases, preservice teachers are taught *about* EBP in their preparation programs, but not how to *use* and *generalize* newly acquired skills to PK-12 classrooms (Scheeler, Bruno, Grubb, & Seavey, 2009). Indeed, once in the field, many teachers report using instructional practices and strategies with minimal empirical support or effect (Kretlow & Helf, 2013) and without an awareness of a practice's level of effectiveness, evidence base, or knowledge as to how it should be implemented (Guckert, Mastropieri, & Scruggs, 2016). Even when teachers use EBP, there is often a disconnect between use and impact on students, likely due to issues related to implementation fidelity (Kretlow & Helf) which may negatively impact student learning (Guckert et al., 2016; Klingner, Ahwee, Pilonieta, & Menendez, 2003).

It is essential to prepare teachers to use EBP in our teacher preparation programs because research suggests they will continue to practice the same techniques throughout their teaching career that get them through their first year of teaching (Griffin & Kilgore, 1995). Of all the vast content and pedagogical knowledge that must be taught in a teacher preparation program, an emphasis on EBP should top the list. How can we, as teacher educators, then better prepare preservice teachers so that they are not merely exposed to EBP but are well prepared to use them with fidelity in the classroom, maintain them post-graduation, and generalize them to the next setting? Teacher educators can affect change in the college classroom in at least two overarching ways: 1) by improving our personal knowledge and skills related to EBP, and 2) by utilizing instructional tools and practices that are effective, as well as efficient to deliver content, provide feedback, and facilitate learning for preservice

teachers (Kretlow & Helf, 2013). Ensuring preservice teachers understand content knowledge related to teaching is vital, but does not guarantee they will be effective in delivering that instruction with fidelity. Therefore, we must also recognize our influence in the clinical arena. By facilitating clinically-rich field experiences, teacher educators can make the transition between college classrooms and PK-12 classrooms more purposeful and explicit to preservice teachers. Combining instructional tools, practices, and routines that facilitate a deep understanding of content is necessary because a clear relationship exists between content knowledge and the application of knowledge through pedagogy (Kennedy, Alves, & Rodgers, 2015).

Kretlow and Helf (2013) discuss the need for more innovative methods when preparing preservice teachers to select and implement EBP. They suggest reframing institutions of higher education's traditional role in the research and dissemination process by focusing more on the needs, attitudes, and beliefs of those who select and use the practices (i.e., teachers). Teacher education programs can offer innovative preparation methods in college classrooms via their teaching practices and routines, while using clinical settings for preservice teachers to practice and refine their use of EBP. The idea of innovation in teacher education and its relationship to teacher quality and impact on student outcomes is not new (e.g., Sindelar, Bishop, & Brownell, 2005), but is worthy of reexamination.

This paper examines the potential benefits and inherent challenges in preparing teachers to use EBP. This is a complex topic with unresolved questions, incomplete methodologies, and multiple stakeholders that will require time and the systematic application of implementation science to resolve. Our goal is to continue the discussion by highlighting issues related to our role as teacher educators. The paper is organized around four basic questions: (a) why prepare teachers to use EBP in our teacher preparation programs, (b) what are the primary challenges to doing this, (c) which preparation practices (and clinical experiences) are most likely to improve teacher use of EBP, and (d) how will increasing use of EBP by our teacher candidates elevate the field of teacher preparation in special education?

Preparing Preservice Teachers to Use EBP

At the risk of oversimplifying this issue, the "why" of teaching preservice teachers to use EBP can be summed up this way - student outcomes will be better (Kretlow & Helf, 2013). There is increasing evidence that teachers contribute significantly to student learning (see Maheady et al., 2013). Much more work is needed in this area, particularly in examining the impact of EBP in teacher education, as there is not enough valid, methodologically-rigorous research linking the content of teacher preparation programs to student outcomes at this time (Maheady et al.). However, we do know that teachers make a difference on student learning and emerging fidelity research (Azano et al., 2011; Benner, Nelson, Stage, & Ralston, 2011) shows that adhering to EBP curricula improves student outcomes (Kretlow & Helf).

An additional reason for teaching preservice teachers to use EBP is that well prepared special education teachers remain in the field longer than those who are not well trained (Boe, 2014; Boe, Shinn, & Cook, 2007). Boe reports beginning teachers who leave the field are twice as likely to lack full certification and report being less prepared in pedagogy and behavior management than beginning teachers who re-

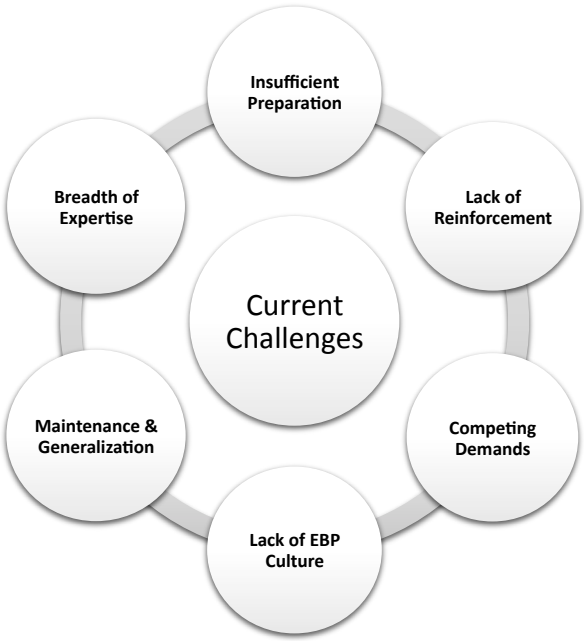
mained. Teacher turnover, driven in part by a lack of effective preparation, can negatively impact educational outcomes for all students, including those receiving special education services. This can result in an unstable teaching force, inflict high financial losses for school districts, and in special education in particular, disrupt collaborative relationships that are the foundation of successful inclusion programs (Billingsley, Crockett, & Kamman, 2014; Darling-Hammond & Sykes, 2003). This problem looms large with almost one million students with special needs receiving services annually from either unprepared or underprepared teachers, or receiving no services whatsoever (Tyler & Brunner, 2014).

A third reason for preparing preservice teachers to use EBP is that it is the law (Spencer, Detrich, & Slocum, 2012). As noted, federal and state mandates require teachers to use EBP in schools, particularly when working with students with disabilities. However, legal mandates have not mitigated the inherent challenges in translating research into routine practice.

Challenges to Increasing Preservice Teacher Use of EBP

There are at least six challenges to increasing teacher use of EBP to consider and address in teacher preparation programs (see Figure 1). These include but are not limited to insufficient preparation in using EBP, lack of reinforcement, competing demands, lack of generalization, absence of an EBP culture, and lack of expertise.

Figure 1. **Current challenges to preparing preservice teachers to use EBP.**



Insufficient Preparation

An obvious barrier to EBP implementation is that novice teachers may not be introduced to or sufficiently trained in its utilization. Hemmeter, Santos, and Ostrosky (2008) surveyed faculty members from institutions of higher education with teacher preparation programs and found that they reported graduates had not mastered skills related to managing students' challenging behaviors, such as conducting functional behavior assessments and implementing positive behavior support plans. The researchers cited the lack of opportunities to implement practices in field placements and not enough room in the curriculum as potential contributors to lack of skill mastery. Without adequate practice implementing EBP during field experiences, preservice teachers may not develop the level of fluency needed to generalize newly acquired skills into classrooms as novice teachers.

Begeny and Martens (2006) conducted a survey with a sample of 110 preservice general and special education teachers on their use of classroom-based interventions with strong empirical support. Results were troubling in that preservice teachers reported receiving little preparation in explicitly teaching EBP. In a related study, Burns and Ysseldyke (2009) surveyed a national sample of special education teachers and school psychologists on selection of EBP and found teachers did use interventions with a strong evidence base, although not frequently. More troubling results were that teachers used practices with little to no empirical evidence on a weekly basis. So the problem of receiving insufficient preparation in using EBP in teacher preparation programs is compounded by evidence that even if preservice teachers do get training, they are failing to use them consistently. Other studies (e.g., Jones, 2009) and systematic reviews (e.g., Maheady et al., 2013) add support to beginning teachers' lack of preparation and use of EBP.

Lack of Reinforcement

One of the basic behavioral principles to increase or maintain a behavior is reinforcement. A possible barrier to EBP implementation may be lack of reinforcement for doing so. Reinforcement contingencies for teachers are either not in place in schools or not used as frequently as they could be. As a result, even if teachers start out using EBP, they may use them with less frequency as time goes on due to a sparse reinforcement history. All too often, novice teachers are observed only once or twice a year for performance evaluations and the observation and feedback is summative rather than formative. Without reinforcement contingencies in place through feedback or self-monitoring, a novice teacher is more susceptible to the next barrier related to cognitive overload.

Competing Demands

Cognitive overload occurs when an individual is inundated by excessive demands involving his/her internal cognitions and processing of external stimuli (Sweller, 1989). Feldon (2007) contends that cognitive overload prohibits novice teachers from adapting more effectively to unusual situations. Basic pedagogical skills, classroom management issues, and curricular content may impose nearly all of the cognitive load novice teachers can process successfully (Borko & Livingston, 1989). In the midst of teaching a new curriculum, learning school norms and pro-

cedures, meeting students and colleagues, and everything else required during the first weeks and months of a school year, novice teachers may become cognitively overloaded and fail to implement EBP.

Lack of Generalization

An obvious and persistent need to prepare teachers to sustain and generalize newly acquired skills across time and settings is well established in the literature (see Scheeler, 2008). Two examples of research studies that illustrate the scope of the problem include one by Englemann (1988) who found that less than 30% of preservice teacher skills transferred to actual teaching settings, and another by Noell, Witt, Gilbertson, Ranier, and Freeland (1997) who found deterioration of a specific reinforcement strategy just four days after implementing it. Rutherford and Nelson (1988) reported that there is often simultaneous decay in both teacher and student behaviors because once the student behavior is changed, teacher behaviors that led to the change do not continue. Baer, Wolf, and Risley (1968) stated that generality is not automatic when behavior is changed; instead, it needs to be programmed rather than expected. Could a reason that preservice teachers are not maintaining newly acquired EBP and generalizing them to their own classrooms be that they are not taught to do this?

Absence of an EBP Culture

Detrich, Keyworth, and States (2007) suggested that our public schools lack an evidence based culture and presented a roadmap for its development. Teachers have few incentives to read and use research once in the field and in fact, often encounter barriers and other distractors within existing school culture that preclude them from reading research. Detrich et al. identify two necessary components in building an EBP culture - adoption and implementation with sustainability. What does this mean to teacher educators and what is our role in the process? In the next section, we focus on sustainability of EBP in classroom settings. Assuming we teach EBP content effectively in our universities and provide preservice teachers with sufficient opportunities to implement them in clinical experiences, how do we get them to actually use these practice in PK-12 settings, while facing a barrage of distractors? First, a discussion of one additional challenge is warranted - i.e., the state's role in licensure.

Lack of Expertise

An additional challenge in training preservice special educators is preparing them for the breadth of knowledge and expertise needed to be successful within the time constraints of the teacher preparation program (Brownell, Sindelar, Kiely, & Danielson, 2010). For example, a preservice teacher may student teach in a third grade, inclusive, learning support classroom in a suburban district with many resources. As a novice in-service teacher, however, he may begin his career in a ninth grade, self-contained, emotional support classroom in an urban district with limited resources. Not to imply that this new teacher will be unsuccessful, but the situation highlights the unpredictability of job specificity once in the field.

States have acknowledged that the range of required professional expertise is a problem and have narrowed licensure for special education teachers (Geiger et al.,

2014). Some states have restructured certification pathways according to disability severity levels. Arizona, for example, has recently aligned special education certification to include P-12 mild/moderate disability certification or P-12 severe and profound disability certification (Arizona Department of Education, 2016). Other states have limited certification through age range. Pennsylvania discontinued its encompassing Special Education P-12 certification in 2013 and replaced it with PK-8 plus content area and Grades 7-12 plus content area (Pennsylvania Department of Education, 2016). Most states have also recognized the unique characteristics of disabilities such as visual, hearing, and speech/language, and require specific certification in these categories.

Given this unpredictability, as well as teacher candidates' movement across state lines to assume the role of special education teacher, it is important to acknowledge that teacher preparation does not end upon graduation. New teachers must enter the profession prepared to continue their professional development through self-reflection along with skills in how to make necessary and appropriate changes as a result (Grant & Gillette, 2006). To adapt EBP to individual settings, teachers must also have sufficient professional wisdom (Whitehurst, 2002). Lastly, adaptive expertise is necessary to transfer knowledge and apply it to complex teaching roles and changing dynamics of the classroom environment (De Arment, Reed, & Wetzel, 2013).

A common theme among these various challenges is that teachers utilize experience and knowledge to address new situations efficiently and effectively. Whether it is a change in grade level, shift from resource room to co-teaching model, or one particular student with a unique set of behaviors; a day, let alone a career, of a special education teacher is highly variable. Ideally, teacher preparation programs and state agencies should collaborate to construct a continuum of professional development that includes readiness for the field, mastery of the craft, and ultimately, advanced credentials (Shepard, Fowler, McCormick, Wilson, & Morgan, 2016). Meanwhile, building on the tools provided in preservice training (e.g., knowledge and skill in using EBP), teachers must adapt and apply strategies across various settings and be willing to learn new practices as the field of special education evolves.

Role of Teacher Preparation in Leveraging Change

Given these current challenges, what preparation practices (and clinical experiences) are most likely to improve teacher use of EBP and what can teacher educators do to ensure preservice teachers leave their programs with knowledge and skill to implement EBP? The process starts with faculty knowledge and skills in EBP.

Faculty Knowledge and Use of EBP in Classrooms

Brownell and colleagues describe effective special educators as those who are independent professional learners and "knowledge seekers" (Benedict, Brownell, Yujeong, Bettini, & Lauterbach, 2014; Brownell et al., 2013). If we apply these characteristics to ourselves, as teacher educators, we should examine our own teaching practices and seek out more effective means to prepare preservice teachers to use EBP in the classroom. It is feasible that faculty who purposefully align their research efforts with EBP, engage in self-study, or become more active consumers of

research are more capable of affecting changes in their teaching behaviors (Vanassche & Kelchtermans, 2016). One promising tool to consider in the self-study process is the CEEDAR (Collaboration for Effective Educator Development, Accountability and Reform) Center's Innovation Configurations (http://ceedar.education.ufl.edu/tools/innovation-configurations/). Innovation Configurations (ICs) promote EBP implementation in teacher preparation activities (Rock et al., 2016) by offering self-evaluation tools for specific evidence-based instructional practices in areas such as behavior, reading, writing, math, and technology. The self-evaluation process may lead to improvements in a faculty member's own work by revising courses, syllabi or other key program assessments.

Mason-Williams, Frederick, and Mulcahy (2015) offer an example of this process whereby faculty purposefully redesigned a final Capstone Intervention Project that provided preservice teachers with targeted opportunities to actively research, use/apply, and evaluate empirically-based interventions. This project allowed preservice teachers to problem solve in order to meet student needs by emphasizing a combination of routine expertise (i.e., candidate content knowledge) as well as their ability to apply that knowledge flexibly and creatively in innovative ways. To build this adaptive expertise, Mason-Williams and colleagues studied Fixen's implementation science (Fixsen, Blase, Metz, & Van Dyke, 2013) using an Active Implementation Framework (i.e., A.I. Hub, n.d.) in their design.

Specifically, Mason-Williams and colleagues (2015) designed a project in which preservice teachers were required to: (a) identify student need and seek empirically-supported solutions to meet the need, (b) prepare for implementation, (c) implement the intervention at an initial pilot level, and (d) engage in full implementation of intervention, with fidelity, while evaluating student progress. Although this sequence is a fairly standard protocol for what effective teachers do when planning and implementing interventions, the nuances and phase sequencing make it a true science related to implementing an effective EBP. Fixsen and colleagues' ideas have the potential to reduce the research-to-practice gap and assist in producing better-prepared teachers.

Modeling EBP in Classrooms

There are numerous effective instructional practices that impact student achievement (Hattie, 2012), many of which could be modeled by instructors in the college classroom. Modeling itself is an effective research-based strategy that all teachers should engage in (e.g., Rosenshine & Stevens, 1986), regardless of student age levels. Adult learners can benefit from seeing other empirically supported practices modeled such as active student engagement, varied instructional groupings (including peer or reciprocal teaching), and immediate corrective feedback. Active engagement strategies such as clickers, response cards, and guided notes, for example, can be used with preservice teachers. Not only do college students enjoy them (e.g., Landrum, 2013), but their use can lead to improved learning outcomes (e.g., Fallon & Forrest, 2011; Malanga & Sweeney, 2008; Marmolejo, Wilder, & Bradley, 2004; Musti-Rao, Kroeger, & Schumacher-Dyke, 2008; Zayac, Ratkos, Frieder, & Paulk, 2016). University instructors can also model varied instructional groupings in college classrooms. Reciprocal teaching, cooperative learning, or other peer mediated strategies

can be used to teach important content to preservice teachers, while practicing the use of EBP themselves (e.g., Morgan, Whorton, & Willets, 2000; Saville, Lawrence, & Jakobsen, 2012). A final modeling example might include the use of concept maps to acquire and retain important content (Miller et al., 2009). Concept maps can be an instructional method for teaching/evaluating course concepts while also acting as a model for an effective instructional tool to be used in the PK-12 classroom.

Innovative Tools

Other more innovative instructional tools should also be considered. Two technology-based alternate instructional methods that supplement and enhance traditional lectures are Content Acquisition Podcasts and simulated teaching environments. Content Acquisition Podcasts (CAPs), are short instructional vignettes that teach a specific idea, term, concept, or other singular piece of information, including EBP (Kennedy, Hart, & Kellems, 2011). This form of enhanced podcasting has many benefits that extend beyond learning new content, in that podcasts are convenient, quick, and offer repeated access and time for individual learning (Kennedy et al., 2016; Kennedy & Thomas, 2012).

Another emerging innovation is the use of virtual simulated environments in teacher preparation, such as TLE TeachLivE™ (see Dieker, Rodriguez, Lignugaris-Kraft, Hynes, & Hughes, 2014). TLE TeachLivE™ provides preservice teachers with opportunities to engage in a variety of teaching behaviors in a virtual classroom comprised of avatars who emulate typical student archetypes with academic needs and behavior concerns seen in general and special education settings. TLE TeachLivE™ affords preservice teachers multiple opportunities to use EBP to a level of fluency while receiving immediate and specific feedback from college instructors or supervisors. The feedback before, during, and after a teaching session eliminates risk to real students (who may otherwise experience ineffective or incorrect teaching) without interrupting the flow of instruction in a typical classroom setting. This combination of practice opportunities and feedback is likely to improve fidelity of implementation and facilitate generalization of EBP to actual classroom settings. This tool is also efficient given that research demonstrates 10 minutes in a simulator is roughly equivalent to experiencing 45-60 minutes in a classroom setting (Dieker et al., 2014).

Providing preservice teachers with college classroom experiences that lead to deeper understanding of effective educational practices can impact their ability to master these approaches at higher rates of use and incorporate such practices in their teaching (Bain, Lancaster, Zundans, & Parkes, 2009). Despite this litany of familiar and innovative instructional practices for teacher educators, issues of generalization and fidelity in the PK-12 setting remain. To address this, we offer suggestions on how to leverage innovative and effective methods of preparation in clinical settings.

Clinical Settings

A growing body of evidence suggests graduates from programs with well-designed clinical experiences contribute more to student learning, are rated more effective by their supervisors, and feel better prepared than those from less experiential based programs (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009; Darling-Hammond & Bransford, 2005; Nougaret, Scruggs, & Mastropieri, 2005). Darling-

Hammond (2014) refers to strong clinical preparation as the Holy Grail of teacher education. It is obvious that preservice teachers need to practice newly acquired skills to move from acquisition to mastery; however, teacher education provides fewer opportunities for novice teachers to practice teaching elements and, therefore, receive less feedback compared to other professions (Leko, Brownell, Sindelar, & Kiely, 2015). In actuality, university based teacher educators often leave the development of pedagogical skill and the interactive aspects of teaching almost entirely to field experiences, depending on PK-12 cooperating teachers who supervise preservice teachers in field experiences (Grossman & McDonald, 2008), rather than leveraging the value of school-university partnerships to design more clinically rich experiences (Darling-Hammond, 2014). In 2010, the National Council for Accreditation of Teacher Education's (NCATE) Blue Ribbon panel on educational reform argued that teacher preparation in the United States must be "turned upside down" and proposed building teacher preparation programs around clinically-rich experiences distributed throughout preparation programs that provide more opportunities to teach and receive performance-based feedback.

Recently, a movement to support a practice-based approach to special education teacher preparation has emerged (Leko et al., 2015; Maheady et al., 2013). Leko and colleagues suggest that this transformation is ambitious and will take time to build capacity; however, the field needs to begin the transformation sooner rather than later and should include maximizing technology and aligning current licensure and certification across states to promote clear expectations for teacher preparation. Teacher educators should embed technology throughout coursework and clinical experiences to build teachers' content and pedagogical knowledge and provide more opportunities for practice and feedback (Rock et al., 2016).

Importance of Fidelity of Implementation

While teacher education programs cannot prepare preservice teachers to use every instructional routine and intervention, we can make sure that those we do teach are practiced and implemented accurately. Yet, to impact student learning on a socially significant scale, evidence-based programs must be expanded to a state level (Fixsen et al., 2013). Fixsen and colleagues describe approaches for scaling up research as *letting it happen* or *helping it happen* - i.e., researchers either publish their work and leave it to other scholars to read and use, or develop programs based on the research and help the dissemination happen through workshops, trainings, and other professional development activities. Greenhalgh, MacFarlane, Bate, and Kyriakidou (2004) present a third option called *making it happen* whereby implementation teams take responsibility for supporting teachers and others as they implement EBP with students. Based on the work by Greenhalgh and colleagues, Fixsen et al. developed a formula for successful uses of evidence-based programs: (Effective Interventions) x (Effective Implementation) = Improved Student Outcomes. As Fixsen et al. describe, if interventions or implementation strategies are not effective (intervention or implementation = zero), then student outcomes will not improve. Additionally, they point out that lack of funding to support effective implementation contributes to the research to practice gap. Simply stated, if society wants a return on its research investment to develop EBP, it must also invest in implementation science. Furthermore, if

evidence-based programs are not implemented with fidelity, there is nothing to scale up; therefore, working backwards from scaling up, let us first address the issue of fidelity of implementation on a smaller scale.

One of the biggest detractors to full employment of EBP in education is related to fidelity of implementation (Detrich & Lewis, 2013). Detrich and Lewis argued that fidelity of implementation, or using interventions as intended, is critical in EBP implementation. If particular practice components are omitted or changed or a practice is not used as often as recommended, then student outcomes may not improve. This is an instance of implementation failure rather than an ineffective practice. Teachers must be well prepared therefore to deliver various interventions in the manner in which they were intended to be used. Fortunately, we have tools to help us as teacher educators to enhance fidelity of implementation such as coaching and performance feedback.

Generalization

Scheeler (2008) analyzed extant literature on promoting generalization and maintenance in preservice teacher preparation programs. Four factors emerged as important to sustaining teaching skills in classrooms, including using immediate feedback to promote acquisition of skills, training to mastery to promote maintenance of behavior, programming for generalization, and providing performance feedback. Using these four critical factors, Scheeler developed a model for promoting generalization of teaching skills with preservice teachers (see Figure 2). Scheeler et al. (2009) conducted two studies with preservice teachers transitioning to in-service teachers to assess the model's effectiveness in promoting generalization and maintenance of a specific teaching skill - completion of learning trials across time and settings.

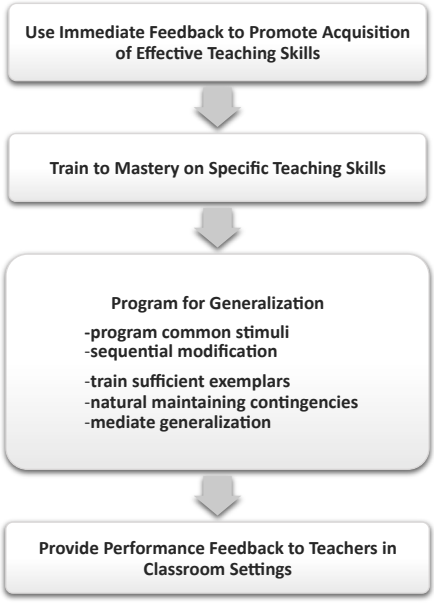
Scheeler et al. (2009) examined maintenance of behavior from practicum to field experience placements when intervention consisted of training to criteria, alone. When a generalization technique, *programming common stimuli*, was added to the intervention, teachers generalized behavior across settings (i.e., student teaching setting to own classroom as a novice teacher), and across time, and maintained it at a higher average than occurred during intervention. It bears repeating that in the final step in the model, the teacher receives in-class support in the form of performance feedback and positive reinforcement to maintain teaching skills. If we want to maintain effective teaching behavior, we should reinforce it. If we want to change teacher behavior, we need to reinforce it even more. If we want to address lack of generalization of EBP across time and settings (university to PK-12 classrooms), we need to include systematic programming for generalization in our teacher preparation programs.

Elevating the Field of Teacher Preparation through EBP

One last issue to address in promoting EBP in teacher preparation is our role in policy, advocacy, and elevating the status of our profession. Teacher educators cannot limit our roles to preparing effective teachers in content and pedagogy and making contributions to the professional literature. Our professional roles have evolved to include policy development and advocacy for the profession and those we serve. Legal and policy decisions are made by people and these decisions are vulnerable, open to scrutiny, reanalyzed, and revisited by education policy makers (West &

Shepard, 2016). Recently, the Every Student Succeeds Act of 2015 (ESSA) was voted into law to replace No Child Left Behind. West and Shepard point out that the key feature of ESSA is the return of decision making for the most part, to states and local school districts. With additional policy changes looming, West and Shepard urge us to commit/recommit to advocacy as an integral part of our job rather than an afterthought or someone else's problem or responsibility. We would be wise to view this as an opportunity to advocate for teacher preparation in special education to work on the various (and multiple) issues outlined in this paper. McLaughlin, West, and Anderson (2016) point out a fundamental disconnect between policy and higher education cultures. Educators claim that research has little influence on policy; policy makers claim that education research is not useful. We need more research in teacher education that links teacher preparation to teaching practice and student learning. This will require minimally, quantitative experimental methods that can be applied in university and PK-12 educational settings.

Figure 2. **Model for promoting generalization and maintenance of effective teaching skills.**



Reprinted from Scheeler, M. C. (2008). Generalizing effective teaching skills: The missing link in teacher preparation. *Journal of Behavioral Education, 17*, 145-159.

We have generated a solid knowledge base around EBP, and can identify, model, and implement selected practices on a limited and occasionally system-wide basis (e.g., Positive Behavioral Interventions and Supports). Yet, much work remains. Since 1971, literacy scores have barely changed despite numerous education reforms, the creation of the U.S. Department of Education and Cabinet position for the Sec-

retary of Education, and increased funding for education overall (Fixsen et al., 2013). The next step is to invest in implementation capacity (Fixsen et al.) and to do this we must affect change in policy through advocacy.

Conclusion

When it comes to expanding the use of EBP, conventional wisdom holds true - you cannot teach what you do not know. Preservice teachers must be prepared to enter the field armed with an empirically supported knowledge base, ample opportunities to practice and to master selected teaching practices, and the professional wisdom to adapt the instructional environment to meet individual student needs. In this paper, we propose suggestions for a more purposeful inclusion of evidence based practice in university coursework and clinical experiences. The future of teacher preparation hangs in the balance; we must heed the call to action by West, Shepard, and others, advocate for our field, strengthen our research and commitment to prepare teachers to implement EBP with fidelity, and use principles of implementation science to facilitate the generalization and maintenance of their practice. Failing to doing this is not an option. As Vaughn, Klingner, and Hughes (2000) reminded us, the outcomes of failing to implement and sustain evidence-based practices are borne by the students of our teachers. Teacher educators face numerous challenges, but none may be as important as expanding teacher understanding and use of evidence based practice so that all students can benefit from their educational experiences.

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