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Familiarity, Use and Perceived Effectiveness of Evidence Based Practices Among Teachers of Students with Visual Impairment and other Comorbid Conditions

Kristi M Probst*, Lydia Kyei-Blankson

Department of Special Education, Illinois State University, Campus Box 5910, Normal, IL 61790, USA

Abstract

Students who have comorbid conditions, diagnosis of Visual Impairment (VI) coupled with other disabilities have specific areas of need of which teachers who only have experience with the visually impaired (TVIs) are expected to identify and address. As such TVIs in a Midwestern state (N=56) completed a survey which asked them to report their level of familiarity, use, and perceived effectiveness of Evidence-Based Practices (EBPs) in their classrooms. Results show much incongruity in the familiarity, use, and perceived effectiveness of EBPs by TVIs. The data indicates that TVIs may need more resources and consistent training in practices that go beyond what they know in order to meet the needs of all students in their classrooms.

Keywords: Teachers of the Visually Impaired (TVI); Visual impairment; Autism; Autism spectrum disorder; Evidence-based practices

Introduction and Statement of the Problem

Interaction and communication are foundational skills necessary for individuals across the globe. When individuals fail to develop the skills necessary to interact with others, they also fail to learn and make progress without specialized supports [1]. Identifying and implementing appropriate supports for these students can be vexing and overwhelming for teachers. Students who exhibit delays in interaction and communication and require teachers support are students with visual impairments (VI) and comorbid conditions such as Autism Spectrum Disorder (ASD) with these groups of students, teachers provide support in the form of evidence-based practices (EBP). In order for an intervention to be recognized as an EBP, a study must operationally define the practice and the context, the fidelity of the implementation, document functional relationship, and replicate the effect over a number of studies [2].

To successfully confront the needs of learners with comorbid conditions, the educational program must be wide-ranging, deliberately designed, and integrate an expanded core curriculum (e.g., communication, play and social, adaptive, organizational, orientation and mobility, career and life education skills) [3,4]. Furthermore, Li [5] endorsed both combining and adapting interventions developed for students with a condition such as ASD and VI in order to meet the learners' unique needs. Li also promoted strategies based on Applied Behavior Analysis (ABA), as much of the literature on EBPs for learners with ASD is represented by such practices (National Professional Development Center on Autism Spectrum Disorder (NPDC) [6]. Banda et al. conducted a literature review to establish successful interventions for individuals with comorbid ASD and sensory impairments [7]. Not surprisingly, many of the identified interventions among these reviews incorporated components of EBPs (e.g., prompting, reinforcement, etc.) from the field of ASD (NPDC in 2014) [6].

Prevalence and uniqueness of population

Each year, the American Printing House for the Blind (APH) surveys each state in the United States for data regarding the number of legally blind children enrolled in school (aged 3-21). These are likely the most exact numbers available regarding blindness among students in the United States (National Federation for the Blind, 2015) [8]. The total number of students with blindness enrolled in schools in 2014 was 60,393 (American Printing House for the Blind, 2014) [9]. While there is prevalence data specific to the number of students with VI, there is no information which describes individuals who have VI together with additional disabilities. There is, however, information which could be useful from the National Child Count of Children and Youth who are Deaf-Blind. This count is the longest running registry of children who are deaf-blind in the world. The National Center on Deaf-Blindness (NCDB) conducted its census and released its most up-to-date count in October 2015. The census collects data regarding children who not only have deaf-blindness (DB) but also those who have DB together with additional disabilities, noting that nearly 90% of the children included in the count have additional disabilities (NCDB, 2015) [10]. Additionally, the census cites that only 10% of children aged 6-22 fell under the IDEA Part B category of VI and that the majority of students (35%) were reported in the primary disability category of multiple disabilities.

VI has been interconnected with delays in communication, social interaction, joint attention, as well as stereotypic behavior [11-20]. When these delays and additional disabilities exist, the barriers created are not only added, they are multiplied as one disability often intensifies the demands of another [1,21].

Additionally, ASD is one disability that when comorbid with another disability causes students' needs to be greatly intensified [1]. According to the Centers for Disease Control and Prevention's (CDC) and the Autism and Developmental Disabilities Monitoring Network,

***Corresponding author:** Kristi Probst, Department of Special Education, Illinois State University, Campus Box 5910, Normal, IL 61790, USA. Tel: 309-438-8991; E-mail: kprobst@ilstu.edu

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about 1 in 68 children has been diagnosed with ASD and is 5 times more common among boys than girls as per CDC in 2014 [22]. The pervasiveness of ASD is increasing and more people are being identified with ASD than ever before. While it is uncertain whether this upsurge is due to the increased ventures in diagnosis coupled with a more extensive definition of ASD or if there is a true rise in the disorder, there is a likelihood that the escalation is due to a combination of all three factors as per CDC in 2015. In order to receive a diagnosis of ASD, individuals must display difficulties in communication, social interaction, and insistence on sameness and routine before the age of three.

Analogous to VI, ASD has been identified across all disability areas. Irrespective of the actual numbers of students with comorbid VI and ASD, it is clear when these two disabilities come together, there is a great need for competent specialists with understanding of evidence-based practices across disability areas to ensure learning.

Teacher training in low vision and blindness

Traditionally, teachers of the visually impaired (TVIs) are trained to teach students with visual impairments, however, the training programs rarely include training in behavioral approaches. Teacher candidates receive education regarding the eye, disorders of the eye, orientation and mobility, teaching braille, even how to teach reading, math and expanded core curriculum. Because the training programs are so dense with courses specifically focusing on the education of students with VI, it is often thought that there is not enough time to also teach courses relating to other disabilities. For instance, these days with the prevalence of ASD, it is important that TVIs are also adequately prepared in this area as well. Often, the students have additional disabilities, leading to aberrant behavior for which a TVI has not received training to address. When a TVI obtains their first position, they rarely, if ever, have students who only have VI and, with the limitation in training, TVIs may be lacking in their understanding of evidence-based practices (EBPs) for educating student with additional disabilities that go beyond VI; additional disabilities such as ASD.

There is very little research which focuses on TVIs understanding and use of EBPs in providing special education services for students with a variety of impairments. Burns and Ysseldyke report that 70% of special education teachers use Applied Behavioral Analysis (ABA) on a weekly basis, however, there is no report that focuses solely on TVIs understanding and use of EBPs [23]. Parker, Grimmett and Summers conducted a literature review in an effort to increase effective communication strategies for children with comorbid VI and additional disabilities [24]. Their report identified a number of strategies used in the field of VI. Most of the literature emphasizes increasing communication because, without a trustworthy means of acquiring and imparting information, children with multiple disabilities are at jeopardy not only for developing their educational potential, but also for suffering abuse and neglect [25]. Parker et al. in 2008 identified 30 studies with a number of diverse types of interventions, noting that microswitch interventions (functional communication) have a long-standing research base, multicomponent interventions (involving the preparation and of and support from partners) and dual-communication boards (facilitated communication) were considered "probably efficacious" [23].

Justification for the study

In 2009, the produced a report that identified a number of EBPs to be used with individuals who fall on the autism spectrum. Additionally, the National Professional Development Center on Autism Spectrum Disorders works to promote the use of EBPs with individuals identified with ASD. This organization works with states as well as the University Center for Excellence in Developmental Disabilities, providing professional development to teachers and other professionals who work with individuals who have ASD [3]. With these combined efforts, there exists a robust foundation of both evidence and training opportunities which can be used to develop strong educational programs. The same issue applies to children with multiple disabilities. Unfortunately, there is very little research regarding the population including individuals with visual impairment and other disabilities more particularly ASD. Gense and Gense suggest that the best way to develop a learning environment which meets these individuals' unique needs is by addressing them in this order:

1. Sensory and biological needs

2. Providing appropriate reinforcement

3. Provide opportunities to communicate and functional communication systems

4. Provide concrete supports to assist with participation and understanding

5. Address task demands

6. Deliver systematic instruction

7. Use data-driven decision making

8. Use appropriate-level instruction

While the framework for how to deliver instruction has been provided by Gense and Gense [3], the actual interventions and EBPs have not been thoroughly researched or adequately disseminated to the professionals in the field of low vision and blindness. They go on to comment that it is imperative that the EBPs from the field of autism be used in conjunction with the knowledge of best practices in the area of visual impairment to develop well-developed, comprehensive educational programs for this population of students. Because of this, it is vital to assess TVIs preparation/familiarity, use and perceived effectiveness of ASD EBPs.

Purpose of the study

The purpose of this study is to document the familiarity, use and perceived effectiveness of EBPs in special education, focusing specifically on TVIs preparation relative to EBPs found in the area of ASD and offer an indication of their preparedness to provide educational support to students who are VI and have a comorbid diagnosis of ASD and other disabilities. It is hypothesized that TVIs will report familiarity, use and high perceived effectiveness of EBPs and these reports will be significantly linked with whether they work with students with ASD, have additional certification, and have longer years of experience.

Variables used in this study were additional certification, experience with ASD, and years of teaching experience. These variables were compared with EBPs to determine if there was a relationship between them and the TVIs familiarity, use and perceived effectiveness of EBPs from the field of ASD. Additional certification is defined as any teaching certificate that a TVI holds in addition to their teacher of the visually impaired license. The variable of experience with ASD asked teachers to report how many years of experience they had working with individuals with ASD. Lastly, the years of teaching experience variable requested TVIs to report how many years they had been employed as a TVI. Regarding EBPs, the TVIs were asked if they were familiar with an EBP intervention from a list. If they indicated familiarity with the intervention, they were asked two additional questions: (1) if they had used the intervention in the past month and (2) their perceived

effectiveness of the EBP with their students. Effectiveness ratings were based on a 6-point Likert scale where 0=irrelevant, 1=no impact, 2=low impact, 3=moderately effective, 4=effective and 5=highly effective. If the TVIs indicated no familiarity with the EBP, they were immediately presented the next EBP.

Research questions

In order to guide the study, the following questions will be addressed:

1. To what extent are TVIs familiar with, use and perceive the effectiveness of EBPs for students with disabilities that go beyond visual impairment?

2. Do TVIs who have experience working with students with ASD, have additional certification, and have more years of experience report more familiarity with EBPs?

3. Do TVIs who have experience working with students with ASD, have additional certification, and have more years of experience report more use of EBPs?

4. Do TVIs who have experience working with students with ASD, have additional certification, and have more years of experience report more perceived effectiveness of EBPs?

Review of related literature

Initial key word searches were conducted to elicit all articles with relevant content related to teacher preparation for VI, ASD, other disabilities and EBP/interventions. Boolean operators and/or were used to look for articles that included all or any of the identified key words across three databases (Academic Search Complete, PsychInfo, and PubMed).

The field of Low Vision and Blindness (LVB) experiences challenges when attempting to determine which types of instruction satisfy the federally mandated standards for EBPs, however, five categories of EBPs to improve communication skills for students with VI and additional disabilities were identified: microswitch interventions, multi-component partner training, dual communication boards, object symbol interventions, and adult-directed prompting [24]. Augmentative interventions using microswitches are considered to have a strong research base, principally with children who have VI and an orthopedic impairment [26-29]. Multi-component partner training [30-35] are considered "probably efficacious" as are dual communication boards [24,36,37]. Object Symbol Interventions [38-41] were used successfully "within meaningful context to build associations between an item and an activity or experience" [24]. Lastly, adult-directed prompting and reinforcement was defined by a study conducted by Van Hasselt, Hersen, Egan, McKelvey and Sisson in 1989 and is considered an EBP which can be used by TVIs [42].

When teacher candidates are being trained by universities, they receive preparation in methods specific to visual impairment. One key component of this training is education in braille, abacus and Nemeth Code [43]. Twenty-five universities offering teacher preparation programs for VI deliver course content relative to the three afore mentioned skills [44,45]. Additionally, university teacher training programs which prepare teachers to work with students who have VI have made Assistive Technology (AT) a significant facet of their programs, either offering an AT course or embedding AT instruction into the program [46]. However, every teacher training program is different regarding AT as they are teaching different AT and at various levels of expertise [46,47].

Upon completion of a university training program, new TVIs enter the workforce and must begin teaching students. When teachers are well prepared, often their feelings of self-efficacy are high. Self-efficacy refers to a teacher's "beliefs about their capabilities to create learning environments and foster students' development" [48]. Teacher self-efficacy has been associated with an assortment of positive student outcomes as well as inventive educational practices [48]. Overall, research implies that teachers with high self-efficacy can overcome challenging situations and will persist in their endeavors to provide high quality educational experiences [48-52]. What hinders this, however, is the strong emphasis placed on TVIs to use EBPs in their work with students. Because there is a dearth of information on EBPs found to be effective with students with VI, new TVIs must work to identify EBPs which may be useful.

Significance of the study

Gathering this information will aid both teacher preparation programs as well TVIs. Teacher preparation programs could use this information to address the possible deficit in training. TVIs could use the information in the survey and subsequent analysis to educate themselves about the EBPs that could be used with students with aberrant behavior, increasing their self-efficacy when working with students who have complex needs. It is imperative that teacher self-efficacy is high as that has been identified as a great influencer of children's cognitive achievements and may influence a student's achievement in any number of ways. Teachers with high self-efficacy are more likely than those with low self-efficacy to implement innovative educational techniques and classroom management approaches which encourage students to take responsibility for their education, find inventive ways to reach students with unique learning needs, manage classroom difficulties, keep students on task and aid in enhancing student motivation [49].

Methods

Research design

This is a cross-sectional survey, descriptive research project. A descriptive analysis of the data will address the trends, attitudes and opinions [53] expressed by teachers of the visually impaired (TVIs) through the use of the survey. The descriptive design was chosen because it can provide a plethora of information relative to what is going on in the field/existing conditions [54] regarding TVIs preparation, knowledge and use of EBPs from the field of autism and beyond. Generalizations and inferences will be drawn from the TVIs responses. A survey design was chosen because of its advantages: low monetary cost, expedited turnaround time for data collection and the ability to gather data from a large group of people throughout a large area and for its convenience.

Participants

After obtaining approval from the University's Institutional Review Board, certified TVIs (as defined by the Individuals with Disabilities Education Improvement Act; IDEIA, 2004 [55] in a Midwestern state recruited to participate in this study. Participants were not excluded on the basis of gender, race, socioeconomic level, age, or any other selection criteria. The sole inclusionary criterion was to be a certified TVI (teacher of the visually impaired) currently employed in the state. Caseload information was obtained including the age of students, the number of students on caseload, and the eligibility categories of the students served.

Ethical considerations

The survey used in this study was online and participants could

choose to participate in any location which allows web access. At no time would participants be required to personally meet with researchers. However, respondents were advised of the following: "Your school district may have software that closely monitors the computer use and activity of students and staff. You may wish to complete the survey on a non-school computer at a location other than the school if you feel that there is any risk to your employment by completing this survey." There were minimal risks to the participants in this study. A slight risk for discomfort in answering some of the questions because of the topic being explored and the connection to a participant's sense of self-efficacy existed. A loss of time did exist due to the time needed to complete the survey. There was a possibility that the school district uses software to monitor student and staff computer access and use, there was a small risk to the participant's employment should the content of their responses be monitored and examined. The time required to complete the survey was minimal and should have taken approximately 15-20 minutes.

Instrumentation, data collection and analysis

The survey was developed using an online tool, select survey and consisted of 99 questions. The online survey was password protected and the data gathered was stored on a University's secured server. Two technical options available in the select survey were used to ensure anonymity of the data: a) "Forced Anonymous"–Respondents identifying information is removed no matter how they take the survey, login, email link, or generic deploy link in a web page; using this technique, no information regarding originating computer, network, IP address, etc. is available to the researchers. b) single response, anonymous access and allowable updateable"–Respondents are allowed to respond to a survey anonymously (without logging in) and are prevented from responding to the survey more than once. Respondents that return to a completed survey can edit their original responses. Using this technique and combined with "forced anonymous," respondents do not log-in, no identifying information is retained, and respondents may only respond to the survey once.

The survey focused on recognized evidence-based practices from the field of ASD taken from the National Standards Project Report as per NAC in 2009 [56] and was based on a survey developed by Borders et al. [1]. Interventions were assembled as follows: antecedent package, behavioral package, modeling, peer training package and additional established EBPs. Furthermore, each intervention was placed under five different categories: sensory, reinforcement, structure, task demand, and skills to teach. Environmental enrichment, the use of special interests, choice, prompting/ cueing, stimulus familiarity, and errorless learning encompassed the antecedent package interventions. Contingency contracts, contingency mapping, token economies, Discrete Trial Training (DTT), shaping, task analysis, functional communication training, behavioral toilet training, and generalization training were the interventions contained within in the behavioral package. Both live and video modeling practices were included in the modeling package. The peer training intervention package included peer buddies and peer initiation training. Lastly, joint attention, incidental teaching, pivotal response training (PRT), schedules, self-management, and social stories were also included in the survey as additional established EBPs [1].

The survey consisted of two parts. Part 1 compiled information related to demographics including (a) teaching certification held, (b) years of teaching experience, (c) the number of students on caseload, (d) demographics of student caseload, and (e) disability categories with which teachers had experience. Part 2 obtained information on familiarity, use and perceived effectiveness of EBPs in the field of ASD. All TVIs were asked to communicate knowledge of the EBPs for students with ASD. If they were acquainted with an intervention, TVIs were asked two further questions: if they had used the EBPs in the past month as well as their perceived effectiveness of the EBP with their student population. Effectiveness was rated on a 6-point Likert scale where 0=Irrelevant, 1=No impact, 2=Low impact, 3=Moderately effective, 4=Effective and 5=Highly effective. If the TVIs were not familiar with the EBP, they were automatically presented with the next EBP [1].

To ensure content validity for the survey ("the systematic examination of the survey content to determine whether it covers a representative sample of the behavior domain to be measured" [57], the survey was reviewed by subject matter experts who evaluated the survey items against the study's specifications.

The survey was distributed by the state Instructional Materials Center (IIMC) via listserv. An initial email inviting TVIs to participate in the survey was sent to all 216 TVIs in the state. In addition, if there were administrators identified who worked with TVIs whose email addresses were not on the listserv, an email was sent asking them to forward the information to the TVIs.

Upon receipt of the email, any TVI interested in participating would go to the supplied web link and immediately be presented with the informed consent. If the TVI gave consent, they were directed to the survey. The teachers would answer the survey questions and, when they had reached the last question, be logged out, completing their participation.

Descriptive analysis, Chi-square test of Independence, and Analysis of Variance (ANOVA) were used to describe and compare group percentages and means to examine whether there were differences in group familiarity, use, and perceived effectiveness of evidence-based practices across the teachers. The Chi-square test was used to compare the dependent variables, TVI familiarity and use of EBPs across the independent variables, i.e., have experience working with students with ASD and additional disabilities, additional certification, and years of teaching experience.

Additionally, ANOVA was used to further compare the dependent variable, TVI perceived effectiveness of EBPs across the independent variables, have students with ASD and additional disabilities, additional certification, and years of teaching experience. ANOVA has three assumptions: assumption of independence (the components of one sample are not related to those of the other), normality assumption (the samples used are arbitrarily taken from the normally distributed populations with unidentified population means), and homogeneity of variances assumption (the population variances of the groups are equal).

Finally, correlation coefficients (Phi, Point-biserial and Pearson correlations) were calculated to examine the degree of the relationship across the independent variables (experience working with students with ASD, have additional certification, and years of teaching experience) and the dependent variables (familiarity, use, and perceived effectiveness of EBPs).

Results

Fifty-six (response rate of 26%) TVIs from a Midwestern state who were currently employed participated in the study by completing the online survey. The participants answered questions about the age of students on their caseload, the number of students on their caseload, and the eligibility categories of the students served. Finally, the

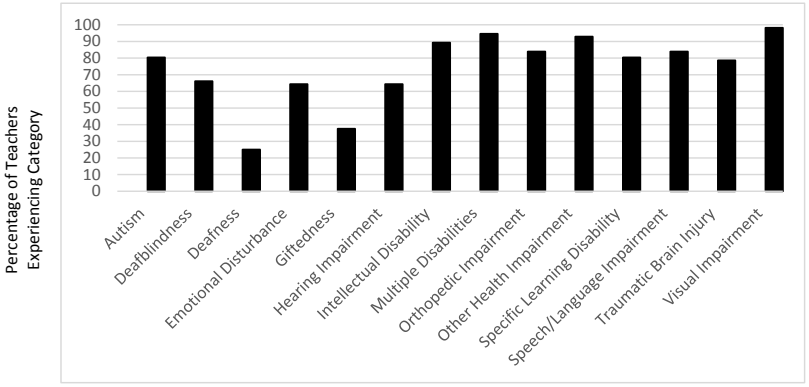

Figure 1: Reported disability categories experienced by VI teachers.

participants rated their familiarity, use and perceived effectiveness of EBPs from the field of ASD.

Descriptive statistics were used to review demographic information and participant familiarity, use and effectiveness ratings. TVIs answered yes/no questions about the familiarity and use of EBPs from the field of ASD. Data on effectiveness were assembled from the 6-point Likert scale 0=Irrelevant, 1=No impact, 2=Low impact, 3=Moderately effective, 4=Effective and 5=Highly effective into two groupings: low effectiveness and effective. Likert scale ratings of 0–2 were recoded as low effectiveness as they reflected a teacher's perception that an EBP had low to no effectiveness with the population. Ratings of 3–5 symbolized an effective rating as they indicated a teacher's perception of an EBP as effective to highly effective.

In order to discover if experience with ASD, years of teaching experience, or additional certification was a determinant of TVIs ratings of EBPs, further analyses were computed. These analyses were ANOVA and correlation; phi-coefficients (to measure the degree of the relationship of two dichotomous variables), point biserial (which measures the correlation between a dichotomous variable and a continuous variable [58] and Pearson correlations. In order to analyze the relationships between familiarity and use across experience with ASD and additional certification, phi-coefficients were used. The relationship of effectiveness ratings with experience with working with students with ASD and additional certification as well as familiarity and use across years of teaching experience was analyzed by using point biserial correlation measures. To determine the relationship between the two continuous variables of years of teaching experience and effectiveness ratings, Pearson correlation was used. By conducting correlational analyses, the level of probability that these factors are related to one another is provided, however, they do not hypothesize as to the direction or causality of the relationship. Typically, correlations of 0.2 to 0.3 are considered weak higher correlations should be as close to -1 or +1 as possible [53] nevertheless, were considered meaningful and worth mentioning when analyzing the correlational data from the survey. Outcomes were considered significant when the probability levels were less than 0.05.

Teacher reported demographics show that 20% had LBS 1 certification and only 7% had LBS II certification. Alternatively, only 2% of the teachers reported having DHH certification. When asked about having additional certification, 43% indicated they had none, 46% reported having 1, 7% said they had two and 4% reported having 3. Regarding experience, the majority (71%) of TVIs noted they had 10 or more years of experience, and most teachers (70%) had a caseload of three to four students. About 80% of the teachers has experience working with students with autism. The disability categories with which teachers had experience are presented in Figure 1.

Familiarity of EBP

The percentage of TVIs familiar with an intervention is shown in Table 1. Much incongruity was identified in TVIs familiarity with interventions, producing a range from 30% to 98%. Nearly all TVIs responded that they were familiar with the interventions of prompting/cueing, peer buddies and schedules. Other EBPs which 80% to 96% of the TVIs were familiar included the following: contingency contracts (85.7%), token economies (89.3%), task analysis (95.4%), live modeling (96.4%), incidental teaching (85.7%), self-management (85.7%), and social stories (94.6%). EBPs which the TVIs had the least familiarity (<50%) were comprised of stimulus familiarity (48.2%), errorless learning (46.4%), shaping (48.2%), behavioral toilet training (39.3%), functional communication training (50%), generalization training (41.1%), peer initiation training (30.4%), and joint attention (12.5%).

The chi-square analysis showed no significant relationship between having experience working with students with ASD and familiarity with EBPs. However, with additional certification, there was a significant relationship with only two of the EBPs, social stories (χ^2=8.72, p=0.04, Cramer's V=0.38) and discrete trial (χ^2=8.96, p=0.03, Cramer's V=0.40). Of the percentages of teachers who indicated familiarity with social stories, 41% reported having no additional certification, 45% had 1 additional certification, 7% said they had 2 additional certification, and 2% said they had 3 additional certification. Again, of the 66.1% TVIs who indicated familiarity with discrete trials, 36% reported having no certification, 21% had 1 additional certification, 5% had 2 additional certification, 4% had 3 additional certification.

An examination of the relationship between familiarity with EBPs and TVIs years of experience showed a significant relationship with peer buddies (χ^2=8.49, p=0.04, Cramer's V=0.39) and peer initiation (χ^2=9.21, p=0.03, Cramer's V=0.41). While the majority of TVIs with 10 years or more teaching experience (71.4%) reported being familiar with peer buddies, the majority of this same group (55.4%) indicated having no familiarity with peer initiation.

The correlational relationship between the familiarity of EBPs by TVIs in relation to experience with ASD, years of teaching experience and additional certification can be found in Table 1. Years of teaching experience was moderately correlated with TVI familiarity of generalization training, rpb (56)=0.45, p<0.05

Intervention	Percent familiarity	Correlations between familiarity and experience with ASD	Correlations between familiarity and additional certification	Correlations between familiarity and years of experience
Antecedent package				
Environmental enrichment	58.9	0.041	0.222	0.157
Special interests	60.7	0.225	0.312	-0.068
Choice	75	0.086	-0.031	-0.146
Prompting/cueing	98.2	0.338	0.189	-0.114
Stimulus familiarity	48.2	0.279	0.18	0.053
Errorless learning	46.4	-0.191	-0.352	-0.088
Behavioural package				
Contingency contracts	85.7	0.135	0.2	-0.112
Contingency mapping	62.5	-0.022	0.24	-0.136
Token economies	89.3	-0.143	0.184	-0.306
Discrete trial training	66.1	0.047	0.258	0.13
Shaping	48.2	-0.026	-0.162	-0.135
Task Analysis	96.4	-0.177	-0.124	0.208
Behavioural toilet training	39.3	0.127	0.307	0.114
Functional communication training	50	0.031	-0.229	-0.325
Generalization training	41.1	0.164	-0.18	0.453*
Modelling				
Live	96.4	-0.102	-0.057	0.237
Video	66.1	0.185	-0.239	-0.324
Peer training package				
Peer buddies	98.2	0.224	-0.178	-0.14
Peer initiation training	30.4	0.271	0.083	-0.185
Additional established EBP				
Joint attention	12.5	0.132	0.309	0.11
Incidental teaching	85.7	0.288	0.907	0.202
Pivotal response training	60.7	-0.266	-0.192	0.209
Schedules	98.2	0.034	0.178	-0.226
Self-management	85.7	-0.12	0.05	-0.081
Social stories	94.6	0.228	0.143	0.263
Note: ASD-Autism Spectrum Disorder; EBP- Evidence Based Practices.				

Table 1: Familiarity and correlations.

Use of EBP

TVIs reported use of the EBPs is shown in Table 2. Again, much incongruity was seen in TVIs use of EBPs, producing a range from 2% to 96% of the respondents. There were only two EBPs used by 80% or more of the TVIs: prompting/cueing (96.4%) and live modeling (90.7%). Conversely, 50% or less of the TVIs indicated that they used the following EBPs: environmental enrichment (46.5%), stimulus familiarity (48.9%), errorless learning (34.1%), contingency mapping (41.7%), token economies (38%), discrete trial training (40.4%), shaping (37.8%), behavioral toilet training (2.4%), functional communication training (34.8%), generalization (29.5%), video modeling (14.9%), peer buddies (47.2%), peer initiation training (19.5%), joint attention (7.5%), pivotal response training (51.5%) and social stories (20%).

The chi-square analysis showed a significant relationship between experience working with students with ASD and use of EBPs such as relaxation EBPs (χ^2=7.23, p=0.01, Phi Coefficient=0.37) with 79% of the TVIs who have experience working with ASD indicating they use relaxation. In addition, there was a significant relationship with the use of TEACCH (χ^2=5.48, p=0.02, Phi Coefficient=0.35), with 85% of the TVIs who have experience with ASD indicating that they did not use TEACCH. In relation to TVIs use of EBPs and additional certification, the results showed that the more likely the teachers reported having additional certification, the less likely they were to use PRT (χ^2=12.40, p=0.01, Cramer's V=0.53), discrete trial (χ^2=8.64, p=0.04, Cramer's V=0.43), errorless learning (χ^2=10.93, p=0.01, Cramer's V=0.50), and toilet training (χ^2=13.32, p=0.01, Cramer's V=0.56). For relationship with TVIs' years of teaching experience, the more years of teaching experience the TVI had, the more likely they reported using gluten (χ^2=27.72, p<0.05, Cramer's V=0.75), and sign (χ^2=10.33, p=0.02, Cramer's V=0.47).

The relationship between the use of EBPs by TVIs relative to experience with ASD, years of teaching experience and additional certification can be found in Table 2. Years of teaching token economies, rpb (56)=0.38, p<0.05, and generalization training, rpb(56)=0.300, p<0.05.

Perceived effectiveness of EBP

TVIs ratings of perceived effectiveness of EBPs are shown in Table 3. Yet again, much incongruity was identified in ratings of effectiveness by TVIs, producing a range from 11% to 97%. The EBPs which were rated by 80% or more by TVIs included choice (87%), prompting/cueing (97%), contingency contracts (80%), shaping (90%), live modeling (94%), incidental teaching (93%), and schedules (87%). EBPs which were rated effective by less than 50% of TVIs were errorless learning (46%), contingency mapping (45%), discrete trial training (46%), behavioral toilet training (14%), generalization training (50%), video modeling (30%), peer initiation training (39%), joint attention (11%), and social stories (50%).

Intervention	Percent familiarity	Correlations between familiarity and experience with ASD	Correlations between familiarity and additional certification	Correlations between familiarity and years of experience
Antecedent package				
Environmental enrichment	46.5	0.58	0.42	0.69
Special interests	50	1	0.02	0.46
Choice	65.2	0.51	0.72	0.14
Prompting/cueing	96.4	0.29	0.67	0.42
Stimulus familiarity	48.9	0.77	0.48	0.8
Errorless learning	34.1	0.47	0.05	0.34
Behavioural package				
Contingency contracts	79.6	0.05	0.61	0.09
Contingency mapping	41.7	0.41	0.1	0.27
Token economies	38	0.57	0.72	0.02
Discrete trial training	40.4	0.23	0.3	0.93
Shaping	37.8	0.65	0.24	0.31
Task Analysis	66	0.31	0.12	0.65
Behavioural toilet training	2.4	0.61	0.12	0.62
Functional communication training	34.8	0.73	0.22	0.12
Generalization training	29.5	0.7	0.18	0.02
Modelling				
Live	90.7	0.98	0.4	0.56
Video	14.9	0.73	0.1	0.12
Peer training package				
Peer buddies	47.2	0.24	0.48	0.39
Peer initiation training	19.5	0.61	0.59	0.05
Additional established EBP				
Joint attention	7.5	0.65	0.98	0.26
Incidental teaching	77.4	0.55	0.36	0.65
Pivotal response training	51.1	0.49	0.03	0.95
Schedules	74.1	0.91	0.45	0.57
Self-management	59.2	0.49	0.96	0.95
Social stories	20	0.07	0.93	1

Note: ASD-Autism Spectrum Disorder; EBP- Evidence Based Practices.

Table 2: Use and correlations.

Intervention	Percent familiarity	Correlations between familiarity and experience with ASD	Correlations between familiarity and additional certification	Correlations between familiarity and years of experience
Antecedent package				
Environmental enrichment	55	0.58	0.42	0.69
Special interests	60	1	0.02	0.46
Choice	83	0.51	0.72	0.14
Prompting/cueing	94	0.29	0.67	0.42
Stimulus familiarity	50	0.77	0.48	0.8
Errorless learning	41	0.47	0.05	0.34
Behavioural package				
Contingency contracts	70	0.05	0.61	0.09
Contingency mapping	43	0.41	0.1	0.27
Token economies	50	0.57	0.72	0.02
Discrete trial training	52	0.23	0.3	0.93
Shaping	59	0.65	0.24	0.31
Task analysis	81	0.31	0.12	0.65
Behavioural toilet training	18	0.61	0.12	0.62
Functional communication training	35	0.73	0.22	0.12
Generalization training	45	0.7	0.18	0.02
Modelling				
Live	92	0.98	0.4	0.56
Video	38	0.73	0.1	0.12
Peer training package				
Peer buddies	72	0.24	0.48	0.39

Peer initiation training	38	0.61	0.59	0.05
Additional established EBP				
Joint attention	14	0.65	0.98	0.26
Incidental teaching	80	0.55	0.36	0.65
Pivotal response training	50	0.49	0.03	0.95
Schedules	85	0.91	0.45	0.57
Self-management	72	0.49	0.96	0.95
Social stories	50	0.07	0.93	1
Note: ASD-Autism Spectrum Disorder; EBP- Evidence Based Practices.				

Table 3: Perceived effectiveness and correlations.

EBPs	No experiences with ASD (n=11)	Experience with ASD (n=45)	Total (n=56)
Sensory	1.81	2.41	2.29
Reinforcement	1.96	2.75	2.59
Structure/Visual	2.42	2.66	2.61
Task Demand	2.61	2.98	2.91
Skills to Teach	1.41	1.87	1.78
Ratings: 0=Irrelevant, 1=No impact, 2=Low impact, 3=Moderately effective, 4=Effective and 5=Highly effective			

Table 4: Means of perceived effectiveness based on TVIs experiences working with ASD.

EBPs	0 (n=24)	1 (n=26)	2 (n=4)	3 (n=2)	Total (N=56)
Sensory	2.43	1.97	3.09	3.13	2.29
Reinforcement	2.46	2.46	3.44	4.17	2.59
Structure/Visual	2.84	2.32	3.02	2.85	2.61
Task demand	3.03	2.68	3.23	3.71	2.91
Skills to teach	1.88	1.62	2.22	1.92	1.78
Ratings: 0=Irrelevant, 1=No impact, 2=Low impact, 3=Moderately effective, 4=Effective, and 5=Highly effective.					

Table 5: Means of perceived effectiveness based on additional certification.

EBPs	01-Mar (n=4)	03-May (n=6)	06-Oct (n=6)	10-Oct (n=40)	Total (N=56)
Sensory	2.43	1.97	3.09	3.13	2.29
Reinforcement	2.46	2.46	3.44	4.17	2.59
Structure/Visual	2.84	2.32	3.02	2.85	2.61
Task demand	3.03	2.68	3.23	3.71	2.91
Skills to teach	1.88	1.62	2.22	1.92	1.78
Ratings: 0=Irrelevant, 1=No impact, 2=Low impact, 3=Moderately effective, 4=Effective, and 5=Highly effective					

Table 6: Means of perceived effectiveness based on TVIs years of experience.

TVIs perceptions of effectiveness of EBPs were further related to their experience with working with students with ASD, years of teaching experience, and additional certification as shown in Table 3. The results show two EBPs ratings of effectiveness were related to the TVIs experience with ASD. Earlier experience with working with students with ASD was moderately correlated with the TVIs perception of effectiveness ratings for generalization training, rpb (28)=0.412, $p<0.05$, and peer buddies rpb (29)=0.384, $p<0.05$.

While the ANOVA results showed no statistically significant differences in perceived effectiveness of EBPs based on TVIs experience working with students with ASD, additional certification, and years of experience, means calculated from the TVI ratings on the items (0=Irrelevant, 1=No impact, 2=Low impact, 3=Moderately effective, 4=Effective, and 5=Highly effective) showed perceived effectiveness ranging from low impact to highly effective; low effectiveness to effective across the groupings on the independent variables. Ratings of perceived effectiveness were consistently higher on the sensory, reinforcement, structure/visual, and task demands EBPs than they were on the skills to teach EBPs. It is also important to note that on the average TVIs with experience working with students with ASD's ratings were consistently higher compared to TVIs with no experience with working with students with ASD (Table 4), though the difference was not statistically significant. In addition, the TVIs with more additional certification generally had higher ratings (Table 5). Finally, there were no consistent patterns based on years of teaching experience, though often times ratings of perceived effectiveness tended to be highest for the "youngest" TVIs (Table 6). Again, the differences did not show statistical significance on any of the subscales for the EBPs.

Limitations of the study

Although this study sought to be comprehensive in its scope, there are limitations. Since only TVIs in one Midwestern state were targeted, the data is limited to the experiences of this demographic type; therefore, with this narrow group of participants, findings from the data gathered for this study cannot be generalized to all TVIs throughout America or other countries. Another limitation of the study is that no descriptions or details of the EBPs were given to the TVIs. While the elimination of explanatory information was intentional in order for the researcher to determine the true familiarity of TVIs with the EBPs, it is possible that the TVIs were familiar with the intervention and could conceivably use them, but did not know the methodological name. Consequently, it should be considered, in future studies, to include definitions and/or explanations.

Additionally, TVIs were asked if they had used the EBPs in the last month. The interpretation the TVIs may have had related to use of the EBP should be regarded with restraint as it may not be a true indicator of the actual use of the intervention, but instead, it could be that the TVIs current caseload did not lend itself to specific EBPs. As discussed previously, one should be cautious to generalize this study's findings to TVIs in general. Since this survey was only distributed to TVIs in one Midwestern state, the generalizability constitutes a threat to the external validity of this study.

Discussion

As the population of students with VI coupled with other disabilities (more especially ASD) grows, the educational system is encountering an increasingly diverse population, bringing with it a growing involvedness. It is important that these students receive the services necessary to meet their needs. TVIs are called upon to be knowledgeable about not only VI, but must also learn about the needs associated with ASD and other disabilities. Furthermore, they must possess the skills necessary to make educational decisions which meet these students' diverse needs.

While the results did not appear to be congruent, generally the hypothesis that TVIs would report familiarity, use, and high perceived effectiveness of EBPs was observed. Responses to the survey indicated

that many TVIs (80% or more) were familiar with and used several EBPs presented including prompting/cueing, contingency contracts, token economies, shaping, live modeling, incidental teaching, self-management, and social stories. Additionally, TVIs reported perceived effectiveness for choice, prompting/cueing, contingency contracts, shaping, live modeling, incidental teaching, and schedules. However, it is peculiar that 44% of EBPs were rated as effective, but use was reported as being 18% to 20% lower, displaying a clear gap between research and practice in the field of special education [23,59-61].

With the complexities students with VI are showing, TVIs have acquired familiarities with a number of disabilities. Nearly 80% of TVIs completing the survey reported experience with students with ASD. The results obtained from the correlational tests showed that this experience was moderately correlated to perceived effectiveness ratings for generalization training and peer buddies.

It is often thought that the more teaching experience one has, the more knowledge and familiarity of a variety of teaching strategies will be possessed. Quite the opposite was shown through the data in this study. The responses to the survey showed little relationship between the familiarity, use and perceived effectiveness ratings for most of the EBPs presented. The only EBPs which were shown to have a moderate correlation with years of teaching experience were use of generalization training and familiarity with video modeling. A positive correlation was found with use of generalization training indicating that the more experience a teacher has, the more likely s/he is to use this type of intervention. One explanation for this correlation is that, with more experience teaching, the educator obtains additional professional development and encounters more interactions with teachers trained in and using generalization training, thus impacting the methods used by the TVI. Conversely, familiarity with video modeling showed a negative correlation, indicating that the longer one has been in the teaching profession, the less likely they are to be familiar with video modeling. The results largely indicate that years of teaching experience were nominally related to TVIs responses to some of the survey questions.

Implications and next steps

Results from the survey indicated that the familiarity, use and perceived effectiveness of EBPs from the field of ASD by TVIs was only minimally related to their years of teaching experience (if at all), prior experience with working with ASD, and additional certification. The results suggest that the preparation that TVIs are receiving may include training in practices from the field of ASD, however, there was much variability. Therefore, school districts are urged to consider providing periodic professional development training workshops regarding current EBPs for all disabilities for their TVIs and other special educators as they endeavor to meet the needs of complex student populations.

Conclusion

Future research could explore additional factors which may influence the familiarity, use and perceived effectiveness of EBPs. Because the heterogeneity of the population of students with VI is growing, it is imperative that professionals in the field of low vision and blindness initiate research into EBPs found in fields which also support and teach students with complex learning needs (such as ASD). While the EBPs from other fields may necessitate modifications for use with learners with VI, researchers should focus their efforts on looking to these other fields. In order to meet the needs of learners with comorbid VI and ASD and other disabilities, additional training and ongoing learning opportunities must be made available, both in teacher training programs as well as in-service trainings. The characteristics and potential EBPs which can be used with this population of learners is of utmost importance for these programs.

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