PERFORMANCE FEEDBACK INFLUENCE ON SPECIAL EDUCATION TEACHER SELF-EFFICACY

by

Margaret Stout

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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ABSTRACT

This quantitative true experimental pretest posttest design research study was conducted to determine the effect two types of performance feedback had on overall special education teacher efficacy and instructional strategies efficacy. Determining the effect is important because teacher efficacy positively impacts student academic outcomes. In-service public school special education teachers who teach students with low incidence disabilities from Virginia were randomly assigned to two different virtual trainings where the Teachers Sense of Efficacy Scale was used as both the pre-training and post-training instrument. An ANCOVA was performed on the data resulting in the first null hypothesis being rejected and the second null hypothesis was not rejected. The conclusion drawn is the type of performance feedback used as part of virtual trainings may have an impact of overall special education teacher efficacy. Recommendations for further study include expanding the population to include pre-service special education teachers and providing the training in-person rather than virtual.

Keywords: ANCOVA, true experiment, performance feedback, behavioral skills training, special education teachers, low incidence disabilities

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Dedication

To my best friend of 27 years, Anney, though God called you home before this was finished you never doubted, I would become Dr. Margaret, thank you for always believing in me.

Acknowledgments

I would like to express my sincerest appreciation to Dr. Stanley, my dissertation chair and Dr. Barthlow, my methodologist for their unwavering support and guidance. I would like to extend my deepest gratitude to my husband, Mark, your sacrifices did not go unnoticed and your encouragement made all the difference. I also want to thank Jillaine, Leah, Fardowsa, and Darby who have continually provided positive words and support throughout this process.

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List of Abbreviations

Behavioral Skills Training (BST)

Elementary and Secondary Education Act (ESEA)

Enactive Mastery Experience (EME)

Every Student Succeeds Action (ESEA)

Feedback Interventions (FI)

Feedback Intervention Theory (FIT)

Free Appropriate Public Education (FAPE)

Individuals with Disabilities Education Act (IDEA)

Special Education Teacher (SET)

Teachers' Sense of Efficacy Scale (TSES)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this quantitative, experimental study is to determine if there is a difference in special education teacher efficacy between special education teachers who receive professional development using the behavioral skills training package and special education teachers who receive professional development using only the feedback component of the behavioral skills training package. Chapter One provides a background for teacher efficacy, performance feedback, and behavioral skills training before offering an overview of the theoretical frameworks of self-efficacy theory and feedback intervention theory. Next, the problem statement examines the scope of the recent literature on teacher self-efficacy and behavioral skills training. Then, the purpose of this quantitative experimental study is followed by the significance of this experimental study. Finally, the research question is presented as well as definitions pertinent to this study.

Background

Teaching students with disabilities was particularly challenging, not only because of the nature and severity of their disabilities, but also the expectation that special education teachers were to be knowledgeable of and able to implement evidenced-based instructional strategies that positively impact student outcomes (Scott et al., 2021). The Elementary and Secondary Education Act (ESEA) of 1965 provided federal funding for special education services but had guidelines requiring a free and appropriate education (FAPE) where the instructional practices were based in research (Mason-Williams et al., 2020). The latest reauthorization, Every

Student Succeeds Act of 2015, now required educational agencies to select and implement evidence-based interventions that improved outcomes for all student populations (U.S. Department of Education, n.d.). Professional organizations, including the Council for Exceptional Children, responded by creating high leverage practices for special education teachers (CEC, 2021). These standards included the expectation of teaching to mastery; this required a high level of teacher self-efficacy and implementation fidelity. Yet, Hsaio and Sorenson Peterson (2019) found only 40% of evidence-based practices were covered in teacher preparation programs and in-service trainings with the implementation of these practices focusing on behavioral interventions for students with autism only. As a result, many evidence-based practices were not being taught, were not being used as instructional strategies to improve student achievement and did not address the needs of all students with disabilities. The result was a lack of application of evidenced-based practices, not only in teacher preparation programs, but also as part of in-service trainings for special education teachers.

Historical Overview

The lack of implementation of scientifically researched interventions within the field of special education was a chronic problem (Owens et al, 2020). Despite the reference to researched-based practices in federal law starting with ESEA in 1965 (U. S. Department of Education, n.d.), it was not until thirty-five years later with the reauthorization of ESEA through No Child Left Behind Act (NCLB) of 2001 that scientifically based research was written into the law (Cook & Odom, 2013). As various organizations identified evidence-based interventions, the gap widened between theory-to-practice as implementation of these

evidence-based practices were inconsistently taught in teacher preparation programs or used in the classroom. Thus, the current focus of evidence-based practices was on implementation rather than identification to help reduce the theory-to-practice gap, with a specific emphasis on implementation fidelity (Wang & Lam, 2017).

Society-at-Large

Students with disabilities required special education teachers who were knowledgeable about and capable of addressing their unique needs so those students not only could have benefitted from FAPE but also be able to live an agentic, or self-determined, life. Due to the limited training provided in special education teacher training programs, Schles and Robertson (2019) concluded pre-service and novice teachers demonstrated inconsistent implementation fidelity of evidence-based practices resulting in poorer outcomes and limited futures for students with disabilities. Kirkpatrick et al. (2019) found in-service teacher professional development lacked opportunities to train specific skills needed in the classroom.

The social validity of evidence-based practices has not been adequately addressed either (McNeill, 2019). Social validity that has been demonstrated in the research included the unique characteristics and needs of various populations. Additionally, social validity was based on three factors: the social importance of the goals; the implementation of the procedures; and the value of the outcome for the individuals working on the goals (Park & Blair, 2019). The social importance of evidence-based practices was also enhanced through teacher self-efficacy, as teachers' perception of socially valid instruction increased the likelihood of implementation with fidelity (McNeill, 2019). Given teacher self-efficacy has been shown to positively

influence student behavior, as well as academic outcomes (McLean et al., 2019), the social validity of evidence-based practices could only have been enhanced through implementation fidelity.

Theoretical Background

Bandura (1997) defined perceived self-efficacy as, "…beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Bandura not only focused on the cognitive aspect of self-efficacy or the belief in one's abilities, but also the actionable aspect of self-efficacy namely the "…explicit guidelines on how to enable people to exercise some influence over how they live their lives" (p. 10). He identified four sources that influenced self-efficacy while explaining how individuals developed their beliefs in their own abilities, as well as predicted how individuals would engage those beliefs when using their abilities: enactive mastery experience, vicarious experiences, verbal persuasion, and affective states. Tschannen-Moran et al. (1998) noted self-efficacy theory emphasized the ability to accomplish a task regardless of the outcome of that task. Regarding teachers, Bandura (1997) noted teachers perceived self-efficacy influenced their belief in their ability to create learning environments that promoted the development of student competencies. Of note was that self-efficacy theory focused just on the potentiality of a teacher's actions, not on the actual outcome; Social Cognitive theory focused on outcome expectancy (Tschannen-Moran et al., 1998).

The construct of feedback, a factor in social persuasion, was a source of influence on self-efficacy, as well as Ericsson's (1993) theory of deliberate practice (Ericsson et al., 1993).

According to Kluger and DiNisi (1996), feedback was external information reporting about performance that influenced the performer's subsequent decision-making and performances. They developed the Feedback Intervention theory (FIT) based on five assumptions: 1) feedback is standards driven; 2) these standards are hierarchical; 3) feedback-standards gaps are the primary focus of feedback; 4) attention is first focused on goal hierarchy until 5) feedback changes the locus of attention, as well as affects behavior. Malecka and Boud (2021) emphasized FIT was ipsative feedback or feedback based on an individual's previous performances, rather than competitive feedback. FIT posited feedback was only effective if it required the receiver of the feedback to focus on improving performance by attending to the feedback-standards gap rather than directing the learner's focus to the self by attending to changes in physiological states (Nicolini and Cole, 2019).

Behavioral skills training (BST) was an evidenced-based training protocol developed to teach a variety of skills across various participants and settings. Parsons et al. (2017) detailed the components of the training package to include instruction, modeling, guided rehearsal, and performance feedback. The components of BST had some variations, such as instructions that were verbal, written or both; modeling that was in-person or computer-based; role-playing that was done one-on-one or using trainees and the trainer; and feedback that was either immediate during role-playing or at the end of role playing. BST feedback included both positive feedback and corrective feedback on the trainee's implementation of the skill or performance of an action (Bachmeyer-Lee et al., 2020). Kirkpatrick et al. (2019) completed a systematic review of BST with teachers concluded BST was used primarily with special education

teachers for students with disabilities. It was shown to be effective in each of the studies reviewed.

Problem Statement

Despite the continued federal legislation that supported scientifically researched interventions over the last 45 years, there was limited use of evidence-based practices particularly for students with low-incidence disabilities (Spooner et al., 2019). The research that did exist tended to focus on one population of students, those with autism (Lemire et al., 2020), as well as on evidence-based practices primarily about behavior interventions (Slane & Lieberman-Betz, 2021). Though the legislation regarding evidence-based practices focused on positive student outcomes, there was limited research that supported how to implement those evidence-based practices to positively affect student outcomes, particularly for students with low-incidence disabilities (Brock et al., 2017; Kirkpatrick et al., 2019). Over the last 30 years, research has moved from identifying scientifically researched interventions to implementing those interventions in the classroom successfully, so implementation science took precedence over strictly theoretical approaches (Nilholm, 2021). While implementation science was the needed step in resolving the theory-to-practice gap, there was limited research that demonstrated how to implement evidence-based practices effectively.

One opportunity for developing the successful implementation of evidence-based practices by special education teachers with students with disabilities was through implementation of effective professional development, specifically using behavioral skills training (Kirkpatrick et al., 2019). While Brock et al. (2017) showed BST was positively linked

to implementation fidelity only a limited number, eight of 118 studies, used BST. When looking at the various types of training provided, performance feedback was the most common with 102 studies. Yet Kirkpatrick et al. (2019) noted that, while BST was a successful training package, there was limited research about the successfulness of the individual components of BST. The concern was based on the fact that BST could be both time and resource consuming, with school districts not being able to support a training package that required such time-consuming resources. While Brock et al. (2017) highlighted the success of performance feedback and verbal feedback, neither was evaluated as a component of BST. The problem was, there was limited research on the effectiveness of the individual component performance feedback compared to the effectiveness of the entire BST package.

Purpose Statement

The purpose of this quantitative, experimental pretest-posttest control group study is to understand how the type of professional development affects special education teacher self-efficacy when implementing evidence-based practices for students with low-incidence disabilities. The dependent variable is special education teachers' efficacy. Special education teacher efficacy is: "…self-referent judgments of capability to organize and execute actions required to successfully perform teaching tasks and positively impact student learning" (Perera et al., 2019, 187). The covariate is teacher self-efficacy pre-test scores. The pre-test will use the *Teacher Sense of Efficacy Scale* developed by Tschannen-Moran, & Hoy (2001).

The independent variable is the type of professional development training, specifically how the single component of feedback within the training intervention of behavioral skills

training affects special education teacher efficacy as compared to the whole package of BST. BST is defined as ". . . an empirically validated teaching method consisting of instructions, modeling, rehearsal, and feedback (Kirkpatrick et al., 2019, p. 345). The specific type of performance feedback within behavioral skills training is a type of feedback intervention. Feedback interventions are defined as "…actions taken by an external agent to provide information regarding some aspect of one's task performance (Kluger & DeNisi, 1996, p. 255). The population studied will be in-service special education teachers employed in Northern Virginia public school divisions. The special education teachers will work primarily with students with low-incidence disabilities who receive more than 50% of their instruction in a self-contained setting.

Significance of the Study

Theoretically, this study will contribute to the knowledge about feedback intervention theory regarding professional development for special education teachers. A review of the literature resulted in limited research addressing feedback intervention theory regarding special education teachers who teach students with low-incidence disabilities. By IDEA definition, students with low-incidence disabilities require teachers with highly specialized skills to receive FAPE (IDEA, n.d.), yet theoretically based feedback intervention research published in the last five years is scant at best. While the literature does reflect feedback interventions, these interventions focused on non-theoretical performance feedback (Kurth et al., 2020) and feedback surveys (Andersen et al., 2018). Thus, there is a large gap in theoretically grounded

feedback intervention research for special education teachers who teach students with low-incidence disabilities, and this study is intended to contribute in order to reduce the gap.

Empirically, this study will contribute to the research on performance feedback, special education teacher efficacy, and behavioral skills training regarding evidence-based practices for students with low-incidence disabilities. An evidence-based practice ". . . must (a) include two high quality, or a combination of four high and acceptable quality studies, using rigorous research designs demonstrating positive effects; (b) include calculated effect sizes or reported data that allowed for calculation; and (c) have no evidence of negative effects" (Spooner et al., 2019, p. 155). Because IDEA requires highly specialized skills when working students with low-incidence disabilities, SETs must have strategies and techniques that have been proven to work for this small population of students. Only one mixed methods research study was found regarding efficacy of instructional strategies and struggling readers with an undiagnosed learning disability (Amendum & Liebfreund, 2019); there were no studies found addressing the efficacy of instructional strategies and students with low-incidence disabilities. One meta-analysis study regarding instructional strategies implementation training reported performance feedback was an evidence-based practice however, performance feedback alone was shown to be statistically insignificant (Brock & Carter, 2017). Thus, there is limited research addressing the influence performance feedback has on teacher efficacy and implementation fidelity of evidence-based practices for instructional strategies for SETs working with students with low-incidence disabilities.

Research Questions

RQ1: Is there a difference in overall teacher efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores?

RQ2: Is there a difference in teachers' sense of instructional strategies efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores?

Definitions

1. *Behavioral skills training* – "an empirically validated teaching method consisting of instructions, modeling, rehearsal, and feedback" (Kirkpatrick et al., 2019, p. 345).
2. *Component analysis* – "a demonstration of the effectiveness of different values of some variable in changing behavior" (Baer et al., 1968, p. 95).
3. *Evidence-based practice* – "must (a) include two high quality or a combination of four high and acceptable quality studies, using rigorous research designs demonstrating positive effects; (b) include calculated effect sizes or reported data that allowed for calculation; and (c) have no evidence of negative effects" (Spooner et al.,2019 p. 155).

4. *Feedback interventions* – “actions taken by an external agent to provide information regarding some aspect of one’s task performance” (Kluger & DiNisi, 1996, p. 255).
5. *Efficacy of instructional strategies* – “individuals’ beliefs that they can design and implement activities to aid learning” (Wilson et al., 2020, p. 219)
6. *Implementation fidelity* – “the extent to which the implemented program reflects theoretical methods, strategies, and determinants; completeness (or dose) is the extent to which all intervention components are delivered; reach is the extent to which the program has reached the intended target population” (Bopp et al., 2013, p. 194)
7. *Implementation science* – *“*the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice” (Eccles & Mittman, 2006, p. 1).
8. *Low incidence disability* – “a visual or hearing impairment, or simultaneous visual and hearing impairments; a significant cognitive impairment; or any impairment for which a small number of personnel with highly specialized skills and knowledge are needed in order for children with that impairment to receive early intervention services or a free appropriate public education” (U.S. Department of Education, n.d., paragraph 3).
9. *Special education teacher* – “Special education teachers teach students who have a wide range of learning, mental, emotional, and physical disabilities” (Bureau of Labor Statistics, 2021, paragraph 1).

10. *Teacher efficacy* – "the teacher's belief in his or her capability to organize and execute courses of action required to successfully accomplish a specific teaching task in a particular context" (Tschannen-Moran et al., 1998, p. 233).

Summary

For 45 years the federal government has attempted to impact the education of individuals with disabilities through funding and legislation. Despite numerous updates to federal laws, students with disabilities continue to lack access to instruction that provides for an agentic future. Even though legislation requires evidence-based instructional practices, special education teachers are not adequately trained to implement those practices. The focus of this quantitative, experimental study is special education teacher efficacy based on the type of professional development. The research is founded on Bandura's (1997) self-efficacy theory, as well as Kluger and DiNisi's (1996) FIT, while the professional development utilizes BST. Chapter two will review the literature regarding these theoretical frameworks, including BST and related literature.

CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this literature review is to present the essential elements of teachers' sense of teaching efficacy, the factors that influence its development, and to review the relationship between teacher efficacy and performance feedback, and its impact on teacher retention. The chapter begins with the theoretical framework of Bandura's (1977) self-efficacy theory that focuses on how four sources of information influence perception and behavior. Additionally, Kluger and DiNisi's (1996) feedback intervention theory is essential to this research study as it explores the differential influence of performance feedback on perception and behavior. A thorough review of the literature pertinent to special education law, special education teacher retention, teacher's sense of efficacy, and behavioral skills training completes the chapter, which ends with a summary.

Due to difficult working conditions, including excessive caseloads, significant non-instructional work demands, and students' challenging behaviors, special education teachers' non-migratory attrition rates have resulted in a chronic nation-wide shortage (AlignStaffing, 2020; National Coalition on Personnel Shortages in Special Education and Related Services, 2020). Additionally, recruitment of new special education teachers has failed to fill the gap since the recession of 2006, as special education teachers are 2.5 times more likely to leave the profession than their general education colleagues (CEEDAR Center, 2020). Despite the federal funding for novel approaches to recruit and retain special education teachers, research showed limited success with financial programs, such as pay for performance or one-time

bonus incentives (Billingsley & Bettini, 2019; Colson & Satterfield, 2018; Jones & Harney, 2017) or non-monetary alternatives, such as mentoring and professional development to retain effective special education teachers (Billingsley & Bettini, 2019; See et al., 2020). With the passage of Every Student Succeeds Act (ESSA) in 2015, Congress required teacher training and professional development be centered around evidenced-based practices that would positively affect students' academic outcomes (US Department of Education, n.d.). As a result, experienced researchers highlighted the need not only for more research to understand how top-performing special education teachers understand their own effectiveness, but also theoretical frameworks for understanding special education teachers' effectiveness (Billingsley & Bettini, 2019).

Theoretical Framework

Self-Efficacy Theory

Bandura (1977) developed self-efficacy theory as a way to combine two different explanations for behavioral change, outcome expectations, and efficacy expectations, into a single theory. First, Bandura clarified the difference between outcome expectation or the belief that a specific behavior will result in a specific outcome, and efficacy expectation or the belief in the ability to perform a specific behavior in order to achieve a specific outcome. Because Bandura placed the ability to control the belief through the completion of the task with the individual rather than the environment, he used the nomenclature self-efficacy to differentiate the theory. Bandura's continued development of self-efficacy theory culminated in the definition, "Perceived self-efficacy refers to beliefs in one's capabilities to organize and

execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Self-efficacy was mediated through four sources: "…performance accomplishments, vicarious experience, verbal persuasion, and physiological states" (Bandura, 1977, p. 195). The sources had moderating influence on efficacy with personal accomplishments having the most influence, and physiological states having the least influence. Because perceived self-efficacy gave an individual control over an actual outcome, it was necessary not only to understand the mediating sources of self-efficacy, but also how self-efficacy theory was understood through teachers' perceived efficacy.

Performance accomplishment (Bandura, 1977) became enactive mastery experience (EME) (Bandura, 1997) as the most influential source of perceived self-efficacy as EME was developed through research. Emphasizing there was not a simple linear relationship between EME and increased perceived self-efficacy, Bandura identified several factors essential to EME. Individuals' preexisting self-knowledge structures provided past and current understanding of perceived self-efficacy. These preexisting self-knowledge structures helped delineate task selection and effort expenditure, two other factors of EME. Additionally, contextual features, such as situational context, availability of resources, and assistance from others also affected EME. Finally, self-monitoring and reconstructing experiences also factored into EME. All these factors could either increase or decrease perceived self-efficacy based on how individuals responded to their task successes and tasks failures. In fact, he noted failure can increase perceived self-efficacy and success can weaken self-efficacy based on how individuals analyze the amount of control they utilized during the tasks. The higher level of

control, even if failure was the result, was the determining factor in increasing perceived self-efficacy during EME.

Vicarious experience or modeling was the second most influential source of perceived self-efficacy (Bandura, 1977). Bandura (1997) noted individuals cannot perform every task with a level of self-assurance that supports perceived self-efficacy. Consequently, it would have become necessary to observe others who have mastered the task, in order to engage in the task with a level of self-assurance that supported the development of perceived self-efficacy. However, it was not a linear relationship between vicarious experience and increased perceived self-efficacy. Bandura identified factors that increased the likelihood that perceived self-efficacy will develop with modeling. First, the greater the similarity between the individuals who were modeling the task and the individual attempting to learn the task, the more likely perceived self-efficacy developed. The amount of previous experience with a task prior to observing modeling will have also affected perceived self-efficacy but possibly by reducing self-efficacy, because self-doubt from former failed tasks could have impeded the development of self-efficacy. Therefore, modeling a novel task may have been more effective in develop self-efficacy. Bandura identified four types of modeling that influence perceived self-efficacy. First, actual, or live modeling was effective, particularly if the individuals were like the observer. Next was symbolic, or fictional modeling where characters act out the process. Then, videotaped self-modeling enabled the observed to literally see themselves completing the task successfully. Finally cognitive modeling that involved models explaining how their thoughts guided their action enabled the observer to understand the choices the model made to become

successful. Essential to vicarious experience was the model's competence with the task, the greater the competence the more instructional influence and promotion of perceived self-efficacy.

Suggestions, exhortations, self-instruction, and interpretive treatments were proposed by Bandura (1977) as forms of verbal persuasion that influence self-efficacy. With additional research, the concept of social persuasion became the overarching type of verbal persuasion that included performance feedback (Bandura, 1997). While verbal persuasion was less effective in generating actual perceived self-efficacy, it had a stronger link to sustaining effort and motivation during a task, as the individual's competence was positively impacted as long as the language was realistic. Additionally, positive, affirming self-talk during a difficult task also increased perceived self-efficacy. Performance feedback that emphasized individuals' capabilities regardless of how successful the individuals were on the task increased perceived self-efficacy. Again, the focus was on increasing the individuals' beliefs they were in control of their ability to navigate setbacks and realistically be successful increased perceived self-efficacy. Performance feedback compared individuals' actual performance to a specific goal and left open the opportunity to engage in devaluative feedback or feedback that focused on the deficits of the performance. Evaluative feedback that helped to guide individuals also supported self-efficacy. Because devaluative feedback was more readily offered than evaluative feedback, it was more difficult to increase perceived self-efficacy using verbal persuasion. Bandura also emphasized the importance of the individuals providing performance feedback or engaging in social persuasion be knowledgeable about the task, as well as credible.

If the verbal persuasion was based on objective markers of performance, it would have also increase perceived self-efficacy even if the evaluator had limited experience with the task.

Emotional arousal, as evidenced by attribution, relaxation, biofeedback, symbolic desensitization, and symbolic exposure, was the final source of self-efficacy proposed by Bandura in 1977. These developed in physiological and affective states that influenced perceived self-efficacy (Bandura, 1997). When emotional arousal, as evidenced by physiological signs, such as increased heart rate or affective reactions, such as high anxiety develops, perceived self-efficacy was negatively affected. Both physical states could have impacted motivation to persevere or willingness to complete a task, while mood states affected individuals' judgments of their perceived self-efficacy. Physiological states and moods could have directed individuals' attention inward rather than on the task, resulting in reduced assurance that they have the ability to complete the task. Physiological states that signaled weakness or deficiency, such as fatigue or pain, could have negatively impacted self-efficacy. However, regardless of physiological states or moods, past experience had a significant influence on how the states and moods impacted perceived self-efficacy. Preexisting levels of perceived self-efficacy could have resulted in cognitive bias, as individuals either overestimated or underestimated their capabilities or coping mechanisms. Moods could have pulled attention away from tasks, reduced success and negatively affected self-efficacy. Overall, physiological and affective states could impacted individuals' judgments about their perceived self-efficacy both positively and negatively, primarily due to previous experiences and memories.

Bandura (1997) highlighted that each of these sources of perceived self-efficacy did not work in isolation. Rather, how individuals chose to combine sources of perceived self-efficacy can be done additively or multiplicatively based on each task opportunity. Self-evaluation had a stronger effect on perceived self-efficacy than social persuasion. Levels of physiological and affective states could have biased individuals perceived self-efficacy by both overestimating and underestimating abilities. EME, though most effective in developing perceived self-efficacy, encompassed more than the experience when developing self-efficacy. When modeling or vicarious experiences were used with EME, individuals were primed for successful performances. When those performances included evaluative feedback that sustained perseverance and maintained performance levels, perceived self-efficacy was also positively impacted. Additionally, physiological states and moods could have created biases particularly regarding self-judgment developed from previous experiences and memories that may have a positive or negative impact. Overall, the sources of perceived self-efficacy were neither isolated nor linear in presentation. Rather, perceived self-efficacy was an integration of the four sources, and the magnitude of each source had a mediating effect on perceived self-efficacy.

Self-efficacy theory was one of the theoretical frameworks guiding this research study on performance feedback and teacher efficacy. Teacher efficacy was a teacher's belief in the ability to create learning environments and use instructional strategies that engaged students' motivation and developed students' cognitive competencies (Bandura, 1997). Teacher efficacy was both specific, as in the learning opportunities provided, and general, based on the

classroom management and environment. The sources of self-efficacy were evident in teacher efficacy, as teachers delivered lessons that successfully taught the objectives as evidenced by student engagement with and student achievement on the objectives. These enactive mastery teaching experiences bolstered teacher efficacy. Vicarious experiences, as evidenced by teachers who observed model lessons by mentor teachers, as well as videotaped their own lessons to review and improve on, positively impacted teacher efficacy. Verbal persuasion through student responses to instruction, as well as formal evaluations on instructional delivery and classroom management, could have also affected teacher efficacy. Additionally, teachers' physiological and affective states, as expressed through engagement in self-care and self-reflection, could have impacted teacher efficacy.

Feedback Intervention Theory

Kluger and DiNisi (1996) posited FIT in order to understand the impact of performance feedback on performance. Feedback interventions were defined "as actions taken by (an) external agent (s) to provide information regarding some aspect(s) of one's task performance" (Kluger & DiNisi, 1996, p. 255). The focus of FIT was more than how individuals perform, FIT included how effective the performance was in meeting the task objectives or goals. While some feedback interventions had an organizational development focus, FIT focused primarily on task-performance. As this research was focused on performance feedback related directly to completing a performance-based task, it had a direct application to this study.

FIT was based on five assumptions, the first being, "Behavior is regulated by comparisons of feedback to goals or standards…" (Kluger & DiNisi, 1996, p. 259). The focus

of this assumption was that performance was based on a standard and whether the performance met the standard. This feedback-standard gap had four potential behavioral responses that directly impacted task motivation. The first was a task avoidant behavior of abandoning the task before completion, which lead to learned helplessness. The second was a task avoidant behavior to lower the standard rather than abandon the standard. The third was to reject the feedback, particularly if it was negative, and continued with the current performance. The last behavioral response was to increase the effort to have met the goal. These four behavioral responses had a direct impact on perceived self-efficacy.

The second assumption, "…goals or standards are organized hierarchically…" (Kluger & DiNisi, 1996, p. 259). Influenced by negative-feedback-loops, the hierarchy demonstrated the impact of feedback on learning over time. This means that as individuals were able to perform the basic elements of a task and develop autonomy with those steps, more complex or difficult steps could have been addressed. This second assumption had a strong connection with self-efficacy theory as individuals work toward meeting a goal or standard and processed the information with the feedback-standard gap that was presented initially in a negative-feedback loop. This loop emphasized where individuals fall short of the goal, and individuals with low self-efficacy might have found closing the gap difficult, while individuals with high self-efficacy found closing the gap an engaging challenge.

The third assumption, "…attention is limited and therefore only feedback-standard gaps that receive attention actively participate in behavior regulation…" (Kluger & DiNisi, 1996, p. 259). Feedback, particularly negative feedback, would have been attended to more than neutral

or positive feedback. However, individuals could have split their attention between various types of feedback that would have resulted in changes to perceived self-efficacy. If individuals chose to accept the negative feedback, it was important that it did not reduce perceived self-efficacy, or individuals will have made little to no progress with the goals.

The fourth assumption, "…attention is normally directed to a moderate level of the hierarchy…" (Kluger & DiNisi, 1996, p. 259). This means individuals focused on the level of the task that was above automaticity but below inability to complete due to lack of knowledge or skill. In maintaining this level of attention, individuals could have continued to progress with the goal with acceptable levels of feedback that did not reduce perceived self-efficacy. Effective feedback, even negative feedback, will have provided information on the standards gap for the area on which individuals' attention was focused.

The fifth assumption, "…FIs change the locus of attention and therefore affect behavior" (Kluger & DiNisi, 1996, p. 259). Feedback interventions (FIs) had a strong influence on individuals perceived self-efficacy. FIs varied based on the level of hierarchy currently being engaged. FIs could have drawn attention away from the performance task, especially if the FIs were excessively negative, personalized, or hierarchically misaligned. All five assumptions had a direct connection to perceived self-efficacy and were relevant to the current study. Additionally, FIT delineated the hierarchy has a direct relation to perceived self-efficacy.

FIT had three levels of task hierarchy. The top level of task hierarchy was meta-tasks that directly affected the individual. The mid-level of the task hierarchy was task motivation

that directly addressed the individual's ability to complete the immediate task. The lower level of the task hierarchy was task-learning that directly engaged the individuals' ability to complete the task. At the meta-task level, attention could have been split between the individuals' perceptions of how feedback affected their physiological and affective states, and how the feedback impacted the ability to make behavioral changes necessary to perform the task adeptly. At the mid-level when FIs failed to produce the change in behavior necessary to meet the task demands, individuals' attention was diverted as well, and the task performance gaps may not have been addressed adequately, because motivation weakened. The task-learning level required significant motivation, as it required repeated behavioral change in order to learn the task to the standards level. Based on memory and affect, motivation was either heightened due to a strong sense of perceived self-efficacy or lessened due to a weakened sense of perceived self-efficacy.

FIT directly corresponded to this study on performance feedback's influence on teacher efficacy, because the study focused on the effect performance feedback had on teachers' efficacy when learning a new instructional strategy. If teachers split their attention between their affective states and the task demands, the feedback-standards gap was unmitigated. If teachers focused on task motivation and feedback-standards gap became a negative feedback loop, motivation may be reduced, and the feedback-standards gap was unresolved. If teachers focused on the task-learning level and had a high sense of teacher efficacy that enabled them to maintain a level of motivation that closed the feedback-standards gap, then progress was made.

Related Literature

The history of special education legislation was relevant when considering special education teacher efficacy because implementation of and changes to special education teacher training programs, in-service professional development, and certification could have resulted in occupational stress, a known trigger for nonmigratory special education teacher attrition (Billingsley & Bettini, 2019). As legislation passed, changes in expectations, responsibilities, and qualifications resulted in special education teachers having to complete additional professional development or face losing their licenses to teach. Yet, the intent of the legislation was not to create barriers to certification or licensure, rather the legislation was attempting to equalize the educational expectations and outcomes for individuals with disabilities. Therefore, a recap of the history of key legislative mandates not only reflects the decision to ensure educational opportunities for individuals with disabilities but also highlights the significance of identifying instructional practices that result in academic achievement for individuals with disabilities.

Though Brown v. Board of Education (1954) established the expectation of education equity for all children, the first funds for training teachers to work with students with disabilities did not occur until 1958 with the Education of Mentally Retarded Children Act (Education of Mentally Retarded Children Act, 1958). A 1969 report presented by the U.S. Department of Health, Education, and Welfare detailed the fiscal expenditures authorized by the 1958 Act made over ten years highlighting the positive gains made but concluded, “It will be a number of years before there will be a great reduction in the gap between the number of

trained teachers and ‘leadership personnel’ needed in the area of mental retardation and the number available” (U.S. Department of Health, Education, and Welfare, 1969, p. 2). It was evident the gap between the need for qualified special education teachers and actual special education teachers had been a longstanding issue.

While the 1958 statute became the Training of Professional Personnel Act of 1959 and continued to provided funding for training special education teachers and developing special education leaders (Training of Professional Personnel Act of 1959, 1959), it was one of several legislative acts that not only failed to close the gap in equitable education for students with disabilities but also failed to close the special education teacher shortage gap. The evolution of federal laws regarding educational equity particularly for students with disabilities was provided to understand the difficulty inherent in educating students with disabilities. Additionally, the legislative mandates demonstrated how special education services not only evolved but became politicized. The significance of the related literature was to highlight the need for effective professional development for special education teachers that, not only would have reduced non-migratory attrition, but also enabled equity in education for students with disabilities.

Brief History of Special Education Legislation

Special education, as a requirement in public schools, was the product of legislation based on historical grassroots movements, such as the Cuyahoga County Ohio Council for the Retarded Child of 1933 (Francisco et al., 2020; Moore, 2000), and litigation, such as Brown v. Board of Education of 1954 (Magg et al., 2018). The recognition that children with disabilities

would have required specialized instruction was first noticed in the early 20th century when compulsory attendance in school was not extended to children with disabilities (Magg et al., 2018), and instead, children with disabilities were institutionalized, receiving instruction in those institutions (Francisco et al., 2020). From the early-to-late 20th century, individuals with disabilities participated in educational settings based on individual state decisions. It would have taken a federal mandate to begin the process of change in special education, and all future changes in special education continued to require federal legislation.

Early Legislation of Special Education

The need to educate children with intellectual disabilities was initially mandated state by state with differing results. It would have taken the pressure of parents and other professionals through grassroots movements to push the federal government into enacting legislation to support the education of individuals with disabilities (Francisco et al., 2020). In fact, the Brown v Board of Education decision was the seminal argument used to show failure to educate individuals with disabilities in the public school system constituted a separate but equal situation (Francisco et al., 2020; Kleinhammer-Tramill, & Fiore, 2016). In September of 1958, the federal government passed Expansion of Teaching in the Education of Mentally Retarded Children Act that provided limited funding to states for training special education teachers specifically for children with intellectual disabilities; the nomenclature of the time called this population mentally retarded children (Kleinhammer-Tramill, & Fiore, 2016). Until Public Law 85-926 in 1958 was passed, there was limited funding to train and develop special

education teachers at higher education institutions for children with intellectual disabilities or any other disability.

In 1961, Public Law 87-276 expanded the disabilities included in the federal funding for specialized training of teachers to include individuals with hearing and speech impairments, as well as established access to speech language pathologists and audiologists to overcome their disability (Kleinhammer-Tramill, & Fiore, 2016; Public Law 87-276, 1961). This law acknowledged the need for specially trained professionals to address the deficits using the medical model of education. In 1963, Public Law 88-164 was passed creating a separate federal office to administer and oversee the funding for special education teacher training through the construction of university level research facilities, as well as facilities where individuals with disabilities would have been educated (Mental Retardation Facilities and Community Mental Health Centers Construction Act, 1963). The early legislation focused on training programs at the higher education level as it recognized that individuals with disabilities required more than what the teacher training programs offered. This was evident by the expansion of disabilities served, from intellectual disabilities to deafness, visual impairments, physical disabilities, and serious emotional disorders.

Elementary and Secondary School Act of 1965

Public Law 89-10, known as the Elementary and Secondary School Act of 1965, mandated significant changes in the education of individuals with disabilities as part of President Johnson's war on poverty. However, it also made educating individuals with disabilities a highly political issue, as well as gave the impression that poverty was a type of

disability (Paul, 2016; Elementary and Secondary Education Act, 1965). Of note, this public law provided additional funding to schools, as an incentive, for the number of students with disabilities in attendance each day, thus encouraged school divisions to ensure students with disabilities attended public school with regularity. In 1969, Nixon's amendments to Public Law 89-10 made section IV specific to the education of individuals with disabilities; it was this section that was addressed with the future Congressional amendments.

Education of Handicapped Children Act of 1975

Until two landmark state level lawsuits by parents against two different school divisions, federal mandates addressed funding for higher education institution training of teachers and encouraged attendance of individuals with disabilities in public schools by offering additional monetary incentives to school division. In the early 1970s, due to these lawsuits, Congress completed an investigation into how children with disabilities were being educated in the public school system. The results of the investigation were the basis for Public Law 94-142, also known as the Education of Handicapped Children Act (Francisco et al., 2020; Kleinhammer-Tramill, & Fiore, 2016). No longer had funding addressed just the higher education institutions' needs for research and training of teachers of special education, Public Law 94-142 required compulsory attendance of children with disabilities and afforded specific rights for children with disabilities to a free and appropriate public education. In fact, Congress cited the fact that enough research and training had been previously funded and supported by legislation to enable teachers to be able to teach children with disabilities in public school settings (Public Law 94-142, 1975).

Public Law 94-142 was significant in that it also included the definition of special education as, "…specially designed instruction, at no cost to parents or guardians, to meet the unique needs of a handicapped child, including classroom instruction, instruction in physical education, home instruction, and instruction in hospitals and institutions" (Public Law 94-142, 1975, p. 784). Additionally, the definition of a free and appropriate public education was included, as well as a clarification of average per pupil expenditure. This was significant, as public school systems had argued there was not enough funding to cover the added expense of educating individuals with disabilities. Congress provided a formula offering additional funding to school divisions for the number of children with disabilities in attendance on average from October 1 to February 1 of each year, and required specific state plans on how personnel were to receive professional development and training to work with children with disabilities. For the first time in the federal legislation, individuals with disabilities not only were granted a legal right to an education equivalent to their non-disabled peers, but also the expectation they would be educated with their non-disabled peers.

Education of the Handicapped Act Amendments 1990

A few minor changes to public education laws were enacted between 1975 and 1990, including in 1976 an amendment that included children from birth to age three with disabilities as eligible for services, as previously, children had to be age 3 (Francisco et al., 2020; Kleinhammer-Tramill, & Fiore, 2016; Magg et al., 2018). Also, in 1986 an amendment assured parents were equal partners in the development of their child's individualized education plan. However, in 1988 the Technology-Related Assistance for Individuals with Disabilities Act was

passed (Public Law 100-407). The significance of this law, beyond the allocation of funding that increased the use of technology and technological services for individuals with disabilities, was the unofficial adoption of the term individuals with disabilities that later would become IDEA in 1997. In 1990, however, significant changes were made to Public Law 94-142 through Public Law 101-476, known officially as Education of the Handicapped Act Amendments of 1990, including the term handicapped being removed and replaced with the term children with disabilities. Other significant changes included the addition of transition services, assistive technology devices and services, and the addition of autism and traumatic brain injury as types of disabilities, brought the official number of disabilities to 13 (Public Law 101-476, 1990). An extensive clarification of the expectations for training both in-service and pre-service teachers was included in the state plan section of the act as well. Another significant change was the removal of states' immunity for failure to implement Public Law 94-142 and Public Law 101-476. This meant that states could be sued for failure to meet the requirements outlined in the initial act and the subsequent amendments. As a result, not only school divisions, but also special education teachers could be sued personally and professionally for failing to provide a free and appropriate public education for children with disabilities.

Individuals with Disabilities Education Act of 1997

Congress not only took the time to enumerate the reasons why individuals with disabilities were entitled to a free and appropriate education but also recounted the issues that resulted in the need for federal legislation to protect individuals with disabilities rights to a free

and appropriate education (Education of the Handicapped Act Amendments of 1990, 1997). Significant changes found in this act included the following expectations: training and research would be geared toward the next century, academic standards for individuals with disabilities would be equivalent to their non-disabled peers, an increased requirement for professional development for in-service teachers, training for pre-service teachers be detailed and documented with the addition of highly qualified teacher designation, and the use of best practices for instructing individuals with disabilities (Education of the Handicapped Act Amendments of 1990, 1997). Once again, the pressure for teachers not only to document instruction but also demonstrate that instruction was evidence-based, best practices was mandated by congressional amendment.

Every Student Succeeds Act of 2015

In 2015 Public Law 114-95, Every Student Succeeds Act, was signed into law. This act not only reauthorized ESEA of 1965 but also had significant changes to No Child Left Behind (Every Student Succeeds Act, 2015). Public Law 114-95 identified children with disabilities as well as other underrepresented populations, including children experiencing homelessness, migratory children, English learners, immigrant children, Native Americans, and delinquent, neglected, or at-risk children. Of significance, however, were the changes in academic standards, outcome measures, and assessment requirements for students with disabilities, that permitted school divisions more flexibility with how to define challenging standards, measure student outcomes, and determined what assessments will be used (The Understood Team, 2020). Of importance for special education teachers was the elimination of the proficient

requirement for students with disabilities. Rather, ambitious goals could be selected that better matched each student with their disabilities needs. Yet, for the first time, ESSA required the use of evidence-based practices as a requirement and the use of universal design for learning for students with disabilities.

The development of special education from its inception, focusing on research and training institutions and services, to the rights of individuals with disabilities to a free and appropriate education, had put various demands and expectations on special education teachers that were not felt by general education teachers. As such, the impact had affected special education teacher recruitment and retention, as the latest iteration of special education law included the funding to address the chronic national shortage of special education teachers. ESSA had provided some relief from the previous litigious aspects of educational law; however, it has been replaced by the need to demonstrate proficiency in evidence based best practices. Consequently, teacher burnout continued to be a significant factor in the recruitment and retention of special education teachers.

Sociological, Political, and Economic Perspectives of Disability and Special Education

Carey and Najarian Souza (2021) noted that even though 19% of the United States population had a disability there was limited formal training on the sociology of disability. As sociology was the study of social groups within cultures and societies, how individuals with disabilities participated in those social groups was important. Within sociology, disability was often categorized distally within the study of social inequality in education and society (Shandra, 2018). Within the field of education, the medical model of disability, rather than the

sociological model, determined whether individuals had deficits that required remediation through specialized interventions so those individuals were able to access a free and appropriate education (Hansen et al., 2020). A closer examination of the influence of the medical model of disability on public education yielded a letter of the law approach that emphasized compliance with federal legislation and mandates; whereas the sociological model of disability yielded a spirit of the law approach that focused on diversity and acceptance (Mavrogordato & White, 2020). Yet, the sociological model stressed that the integration or segregation of individuals with disabilities within communities and society was based on the values, beliefs, and norms of those communities and society (Hansen et al., 2020; Shandra, 2018). Because the educational system was a microcosm of society at large, it was essential to understand how the sociological perspective of special education should have influenced the kind of professional development SETS received so SETs could teach individuals with disabilities how to actively participate in their communities and society as the purpose of education was to train an educated citizenry (Ford, 2020).

Critical disabilities studies focused on the political and economic implications of disability in society (Goodley et al., 2019). Politically, individuals with disabilities were unevenly distributed within the various cultural groups of society and segregated from society through marginalization and oppression (Ford, 2020; Frisch & McGuire, 2019). Within education, this uneven distribution was evidenced through disproportionality in the over-identification and under-identification of minorities and English learners as having a disability that impacted their ability to access a free and appropriate public education and requiring a

separate special education setting (Ahram, et al., 2021; Cruz, et al. 2021; Umansky et al., 2017). Because the public education system, through the political lens, was vital to creating and maintaining a democracy, the role of special education was to enable all children the opportunity to becoming participating members of a democratic society (Kondellas et al., 2020).

Historically within a capitalistic society, disability was based on the view that promoted the individuals' abilities to use their bodies to perform labor or work at a pre-defined, or normal, level (Matthews, 2021). Those unable to work at the pre-defined or normal level were less productive than others and considered weak or disabled. Those deemed weak or disabled were excluded from the work force as they lacked economic value. Within the field of education, the economics of disability was evidenced by those who due to the nature and severity of their disability were first denied an education (Ford, 2020; Kondellas, 2020) and later were placed in a more restrictive environment because they required specialized instruction to access a free and appropriate public education (Gilmour et al., 2019). This specialized instruction placed them into a separate educational setting with a less rigorous curriculum and alternate assessments to measure progress. The alternate assessments resulted in academic achievement gaps and reduced the likelihood of not only graduating on-time with a high school diploma but also acquiring the skills necessary for employment. Special education viewed through an economic lens influenced the need of SETs' professional development that demonstrated ways to correct the instruction-assessment misalignment (Dakroub et al., 2020) that not only created the achievement gap but also limited students with

disabilities opportunities to earn a living or live independently. When considering the influence of the economic perspective on special education, SETs professional development should have included instruction on how to align specialized instruction with assessment expectations in order to incorporate a more rigorous curriculum.

Overall, the sociological, political, and economic perspectives of disability and special education provided the context for society's meaning-making of disability as well as the development of special education within the American public education system. These perspectives supported and continued to support an atmosphere of ableism in American society (Keefe, 2022). Ableism not only provided non-disabled individuals with advantages but also contributed to society's oppressive response to individuals with disabilities (Ehlinger & Ropers, 2020; Keefe, 2022). Within the field of education, ableism defined the construct of non-disabled students or normal students (Alfrey & Jeanes, 2021; Phong et al., 2021). Inclusive education was a response to ableism, however, some teachers viewed inclusive education as assimilation rather than diversity (Kilinic, 2021; Phong et al., 2021). Once assimilated into the general education setting, students with disabilities were at best overlooked, at worse ignored. However, it can be argued the current structure of special education in American public education contributed to a form of structural ableism that inherently limited the education and opportunities of students with disabilities (Keefe, 2022).It was critical then, within the field of education, that teachers received professional development that supported students with disabilities opportunities to move beyond inclusion so that these individuals with disabilities may be seen as differently-abled rather than disabled.

Behavioral Skills Training

One of the key principles of professional development, especially for special education teachers, was training in specialized content that developed the requisite knowledge, skills, and abilities pertinent for planning and implementing curriculum for students with significant disabilities (Woulfin & Jones, 2021). Failure to offer this type of professional development continued to contribute to the special education teacher attrition rate of 25% for the last 20 years. In addition to increasing knowledge, skills, and abilities, specialized content must have included federally mandated evidence-based practices (EBPs) that were either focused on intervention practices (FIPs) or comprehensive treatment models (Hugh et al., 2022; Leaf et al., 2021). However, just including EBPs was not sufficient, EBPs also required implementation fidelity to be effective with students with significant disabilities (Brock, et al., 2017; Wang & Lam, 2017). The importance of moving theory into practice with EBPs was supported by Alhossein's (2021) research that found knowledge of EBPs and use of EBPs were positively correlated. So, professional development must provide quality instruction on EBPs that included their selection, and their implementation. BST not only was identified to be the most effective training method for employing EBPs with increasing implementation fidelity but also increased teacher self-efficacy regarding EBPs (Brock et a., 2017). Understanding BST, its components and its uses was essential then in increasing the use of EBPs as well as increasing teacher efficacy.

BST was a training approach that included instructions, modeling, rehearsal, and feedback (Paff et al., 2019; Ryan, et al., 2019). Erhard et al (2021) reviewed the history of BST

noting that it was developed as a training package over time, therefore its exact origins are not known. However, within education when Koegel et al. (1977) implemented a training program for teachers of students with autism using a structured behavior modification training program, it was the first of its kind. This training was developed out of Koegel's work with Lovaas who was known for his work using discrete trial training with children with autism. Since the 1960s, the systematic and intentional use of instructions and feedback as part of behavior modification procedures to change both adult and child behavior has been well documented in the training literature (Johnson & Brown, 1969; Mira, 1970; Wahler, et al., 1965). While parents were the primary participants particularly when addressing challenging behaviors in the home, teachers and educational staff also engaged in these activities as part of increasing access to educational opportunities in the school setting.

In the 1970s, behavior modification research focused on training staff working with individuals with significant disabilities introduced, demonstrated, and documented modeling as a necessary and effective component of training both in-person (Cotler et al., 1972; Miller & Sloane, 1976) and videotaped (Gladstone & Sherman, 1975). Researchers continued to change and adjust the behavioral modification training techniques as they focused on training and modifying students' social and self—stimulatory behaviors (Russo & Koegel, 1977) and improving motivation during educational tasks (Dunlop & Koegel, 1980). During the next two decades, researchers investigated the effectiveness of instructions, modeling, role-playing, and feedback in various combinations and purposes (Flanagan et al., 1979; Hudson, 1982; Nay, 1975). They concluded that role playing and modeling were more effective as single training

components compared to when these components were combined with instructions and teaching of theoretical principles of behavior modification (Hudson, 1982) and role playing and modeling lead to greater efficacy (Flanagan et al., 1979). Still, when evaluating the overall effectiveness of generalizing the behavior modification skills to novel environments, researchers determined more than one component was required to be effective (Nay, 1975). Through component analyses conducted by these researchers, it was evident there was a need for a multi-component training package to effectively train staff to modify the behavior of individuals with significant disabilities across settings and generalizable skills to novel behaviors (Anderson et al., 1986). Overall, the research conducted during these decades would contribute to the development of BST as a multi-component training package for human services staff and educators.

During the 1980s, research involving training of human services staff for individuals with significant cognitive disabilities consistently used the four components of instructions, modeling, rehearsal, and feedback (Fleming & Sulzer-Azaroff, 1989; Kissel et al., 1983; Page et al., 1982; Pol et al., 1983). Additionally, the use of a rationale or explanation as to the reason for the implementation of the new procedure was included in some teacher trainings (Parsons et al., 1987). However, researchers began to note that the effectiveness of the behavioral change, particularly during maintenance checks, could not be correlated to a single component. As maintenance ensured generalizability of the skill or behavior, researchers were interested in understanding what components were most effective. In the next two decades, Ducharme (1992) identified the use of modeling, rehearsal, and feedback as a general training procedure.

Feldman et al. (2002) clarified the general training procedures as "… discussions, reading materials, modeling, role-playing, practice, and feedback" (p. 385) as part of research to train staff who worked with individuals with developmental disabilities and severe behavioral issues. Over the last 50 years, staff working with individuals with significant cognitive disabilities required training that ensured those individuals with significant disabilities were able to reduce problematic behaviors and increase skills to live safely and meaningfully. As researchers studied various training processes that utilized different training components, the studies demonstrated repeatedly that a multi-component training package was most effective for maintaining behavioral reductions and generalizing learned skills.

Reid and Parsons (1995) introduced BST as a specific seven step multi-component training package. The steps included an operational definition of the skill to be taught; a task analyzed checklist for the skill; a trainer led discussion of the skill; trainee reviewing a video of how to teach the skill; the trainer observing the trainee in vivo teaching the skill; the trainer providing performance feedback after the observation; and repeating the video watching, implementation observation, and performance feedback until the trainee reached the mastery criterion (Lavie & Sturmey, 2002). However, Iwata et al. (2000) used a four-step process that included written information that contained an operational definition and a task analyzed list of the skills; a discussion about the skill and a video reviewing the correct implementation of the skills; a quiz that required the trainee to achieve 90% mastery; and immediate performance feedback after in vivo implementation of the skill. This process utilized the four essential components that research had identified as key to training: instructions, modeling, role playing,

and feedback. However, these research studies did not have special education teachers as the participants or skills focused on teaching procedures.

Training special education teachers to implement a teaching procedures using BST was the focus of Sarakoff and Sturmey's (2004) research on implementing discrete-trial teaching. The researchers' use of BST reflected Iwata et al. (2000) method more than Lavie and Sturmey (2002) with one exception. Sarakoff and Sturmey (2004) included data graphs of baseline and implementation trials that the trainers discussed as part of the performance feedback component. The researchers concluded the four essential components were responsible for the significant improvement in the teachers' performance. Additionally, the researchers found the use of BST as a training procedure to be effective and efficient. When Kirkpatrick et al. (2019) completed a review of twelve research studies focused on the use of BST with teachers to determine the effectiveness of BST. The majority of the skills trained using BST were not teaching procedures, rather, the skills trained were behavioral techniques meant to increase compliance, communication, and instructional engagement. Also, these twelve studies were all single subject case studies meaning only one student was involved in each case study even if there was more than one teacher or experiment. The review not only determined BST was an evidence-based approach to training performance-based tasks to mastery and independence but also reflected characteristics found in self-efficacy theory and feedback intervention theory.

BST was comprised of six essential steps that had elements of self-efficacy theory and feedback intervention theory in those steps ((Kirkpatrick et al., 2019; Parsons et al., 2017). Step 1 was to describe the target skill, so the standard is set. Step 2 was to provide a written

description of the target skill, enabling the feedback-standards gap to be measured. Step 3 was to demonstrate the skill, which enables modeling the behavior expected. Step 4 was to require the learner to practice the target skill, which promotes efficacious physiological and affective states, as well as self-modeling. Step 5 was to provide feedback as the learner engages in the task, allowing for verbal persuasion in the form of performance feedback. This feedback was positive to maintain motivation and negative to close the feedback-standards gap. Step 6 was to repeat Step 4 and Step 5 until the skill was mastered, which supports EME. Overall, BST was comprised of four features: instructions, modeling, rehearsal, and feedback that increased competency and potentially self-efficacy. Overall, the systematic review of BST by Kirkpatrick et al. (2019) found BST was primarily used with SETs. When used with SETs, the focus was to improve student outcomes. BST ensured implementation fidelity in generalized settings. Training was thought to be most effective when all four features, instruction; modeling; rehearsal; and feedback were included. The value-added feature of BST was it provide opportunities for rehearsal and practice of the skill outside of the classroom so teachers could develop confidence in applying the skill prior to using it as an instructional strategy. However, single components have been used effectively to train teachers, but research was less conclusive as to which components had the greatest effect on increasing skill acquisition and implementation fidelity.

Current research on training SETs using BST continued to check the impact of individual components. Slane and Lieberman-Betz (2021) completed a systematic review of BST focused on teachers. The researchers not only looked at the effectiveness of BST on

implementation fidelity but also the impact of enhancements or modifications used with the four main components of BST. The addition of procedures such as self-monitoring and coaching may have improved the effectiveness of BST. Bottini and Gillis (2021) evaluated the effectiveness of online training and virtual role play in BST. The online training was used as part of the first step of BST in place of in-person instruction. The use of virtual role play was used as part of the third step of BST in place of in-person rehearsal. Immediate feedback was also provided virtually. The conclusion showed online training and virtual role play were as effective as in-person training and took less time than in-person training. Luck et al. (2020) used computer-based instruction to teach key concepts and terminology prior to the implementation of step one of BST. The teachers did not have any prior knowledge of the concepts or terminology prior to the computer-based instruction. The computer-based instruction enabled the teachers to engage in BST and reach mastery quickly and effectively. The ability to build prior knowledge of participants not only ensured mastery of the skill but also reduced training time. LaBrot et al. (2021) added a rationale when providing corrective feedback during the rehearsal step of BST. By providing an enhancement of a rationale, the participants were able to achieve skill mastery. Giannakakos et al. (2021) used equivalence-based instruction with BST during in situ training to reach skill mastery. The participants were able to reach skill mastery when an enhancement of equivalence-based instruction was added. The modification of in situ training rather than in vivo during the rehearsal step enabled the participants to demonstrate skill mastery for safety skills (Carrow et al., 2020; Giannakakos et al., 2021). Overall, researchers continue to modify and enhance BST components to increase

skill development and decrease training time. Yet, there were still challenges when implementing BST.

Reid et al. (2018) evaluated the responses of 646 staff trained using BST on their perception of how the training was conducted. Responses demonstrated the need for the content to be relevant and important. Parsons et al. (2012) BST model used a six-step method. The first step was a rationale of why the skill being trained was relevant and important. Responses also demonstrated the importance of modeling of correct implementation of the skill. Modeling of the skill was presented both before and after rehearsal in the six-step method. The use of role playing was also a preferred step. Within BST the use of skill rehearsal not only was expected but also the use of a mastery criterion. This made BST both performance-based and competency-based. Mastery criterion varied from 80% to 100% depending upon the skill be trained. Participants were also asked to identify areas of improvement. The one area of concern expressed was location of training. Given that BST has used video-based training since its inception, location of training can be addressed by providing video-based training and virtual instruction as demonstrated by previous research. The use of video-based BST was found to be as effective as in-person training.

The chronological evaluation of the research using the components of BST demonstrated by not only the components were evidence-based but also BST was evidence-based. The importance of using an evidence-based practice when developing SETs' knowledge, skills, and abilities benefitted SETs' students. In addition, it met the federal legislation mandating the use of evidence-based practices when working with individuals with

disabilities as the majority of teacher-based trainings using BST were with SETs working with individuals with disabilities. As BST is both a performance-based and competence-based training program, BST met the federal mandate for an evidence-based practice.

Performance Feedback and Teacher Efficacy

Research has shown the value of evaluative feedback was based on the type of feedback provided. Smith et al. (2020) concluded that specific feedback, regardless of the teacher evaluation system used, led to greater teacher efficacy. Additionally, teachers' perceptions of the effectiveness of their instructional practices increased with specific feedback. Wisniewski et al. (2020) determined the value of feedback, particularly critical feedback, was based on the information provided. Three key factors of that made critical feedback valued were feedback was focused on the instructional task or process; critical feedback provided an explanation of why the evaluatee needed to change; and how to improve the instructional practice in the future. Critical feedback that incorporated these factors consistently not only strengthen the evaluator's evaluative practice but also increase evaluatee's self-efficacy. Yet not all teacher observation or evaluation systems used feedback effectively.

One issue noted in by researchers was the lack of teacher observation or evaluation systems that were able to evaluate EBPs (Johnson et al., 2018). This was particularly true for special education teacher observation or evaluation systems. As SETs were federally mandated to use EBPs but the evaluative systems were unable to provide meaningful feedback on the implementation of those EBPs, feedback was based more on binary accountability indicating whether EBPs were being used and less on whether the EBPs were being implemented

accurately and effectively. Failure to use observation or evaluative systems that have demonstrated the feedback provided positively correlated with changes in teacher instructional practices diminishes the value of the feedback and perpetuate the belief that the purpose of observation or evaluation systems was accountability rather than instructional improvement. As a result, feedback that was focused on accountability resulted in a reward or punishment perception particularly in the evaluatee (Ho et al., 2017). Feedback focused on communicating ways to improve instruction not only resulted in changes to current instructional practices but also was inferentially rich meaning the feedback enabled the evaluatee to infer or perceive future benefits from changes made to current instructional practices. This perception of positively affecting future outcomes was correlated to teacher efficacy and professional growth (Bach et al., 2020).

Fingelkurts and Neves (2020) researched the negative impact of the evaluation process on the evaluator and evaluatee noting that feelings of anxiety and stress for both evaluator and evaluatee negatively affected self-efficacy and self-esteem. The resultant negative feedback was personalized by the evaluatee and instructional performance did not improve. This research supported FIT in that performance feedback that was personalized by the ratee was internalized and became ineffective in changing or improving performance. Current research confirmed that feedback must focus on the task or action and that feedback must motivate the recipient to change the specific task for that feedback to be effective (Jelly, 2021; Legault et al., 2020). This was particularly true for tasks that the evaluatee was not yet fluent in performing as negative feedback disrupted the development of task fluency including

instructional delivery (Legault & Csikszentmihalyi, 2020). Bach et al. (2020) confirmed Kluger and DiNisi's (1996) FIT assumption that self-efficacy was necessary for an evaluatee to accept and receive performance feedback and teacher efficacy was essential teachers' engagement in professional development.

Summary

BST was an evidence-based practice training strategy that has been used with SETs successfully (Kirkpatrick et al, 2017). The four components of BST were instruction, modeling, rehearsal, and performance feedback. These components of BST supported both self-efficacy theory and FIT. While BST has been used with SETs as an entire package, there was limited research regarding individual components as being effective when training SETs.

An overview of special education through the sociological, political, and economic perspectives aided in the understanding of the complexity of providing a free and appropriate education to individuals with disabilities and how this complexity impacts legislation. A review of special education legislation demonstrates a reactionary approach to educating students with disabilities. Initially, the expectation to educate students with disabilities was based at the state level, yet states failed to implement equitable practices. This resulted in increasing federal oversight and legislation where compliance was acknowledged with federal funding. It is important to note, however, that from the earliest special education legislation, training teachers in specific techniques that are effective with students with disabilities was emphasized in all the federal legislation. A renewed interest and emphasis on the implementation of effective instructional practices resulted in a significant change in the most

recent legislation, the mandate of evidence-based practices and universal design for learning. Due to the current special education legislation governing the use of evidence-based practices with students with disabilities, it is imperative that school division develop professional development that ensures the use of effective evidence-based practices. This significance of this study is to identify if a single component, performance feedback, can be used as effectively as the entire BST package to provide effective professional development to special education teachers when learning an evidenced-based instructional strategy.

CHAPTER THREE: METHODS

Overview

The chapter reviewed the research methodology for this quantitative true experimental pretest posttest design selected for this study about the effect of performance feedback on special education teacher overall efficacy and instructional strategies efficacy. This study was conducted to determine if there was a statistically significant difference between special education teachers who received performance feedback only and special education teachers who received behavior skills training as part of professional development while controlling for preintervention teacher efficacy. The design, research questions, hypotheses participants, setting, instrumentation, and data analysis were reviewed.

Design

This study was a quantitative true experimental design where a pretest-posttest was used, and the research participants were randomly assigned (Gall et al., 2007). The rationale for this experimental design was that it could account for and prevent the eight threats to internal validity, however pretest sensitization must be considered. True experimental design was used to determine causality between the independent variable and the dependent variable. In addition, participants who were determined to be similar were randomly assigned either to the one experimental or the one control group to avoid the internal validity that resulted from differential selection. The experimental group received the treatment while the control group did not receive the treatment. Also, the researcher manipulated the independent variable while the dependent variable was measured on a continuous scale.

The purpose of an experimental design was to conduct research that involved manipulating specific variables with actual participants in order to determine if and what the affect was on the dependent variable (Gall et al., 2007). Research in special education that used the experimental design involved special education teachers participating in a stress reduction program (Ansley et al., 2021), school psychologists determining if they exhibited bias as part of eligibility decisions (Sullivan et al., 2019), and elementary school students' receptiveness to social-emotional learning instruction (McCormick et al., 2019). Based on the variety of studies in the special education field that used an experimental design, the use of an experimental design was an appropriate choice.

The dependent variables were teacher's sense of efficacy and teacher's sense of instructional strategies efficacy, both measured using the TSES long form (Tschannen-Moran & Woolfolk, 2001). Because the research design had a pretest-posttest, the covariate was the teacher self-efficacy pretest scores also measured using the TSES. Of particular interest on the TSES was the instructional strategies subscale, as the intervention was an instructional strategy. Consequently, another dependent variable was special education teacher instructional strategies efficacy and was measured using the TSES long form. The independent variable was the type of professional development, specifically BST. There were two categorical groups for the independent variable: 1) special education teachers who received only the feedback component of the professional development training package and 2) special education teachers who received the entire professional development package. The experimental group was the special education teachers who received only the feedback component of the professional

development package while the control group was the special education teachers who received the entire professional development package.

Research Questions

The research questions were:

RQ1: Is there a difference in overall teacher self-efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores?

RQ2: Is there a difference in teachers' sense of instructional strategies efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores?

Hypotheses

The null hypotheses for this study were:

$H_0$1: There is no statistically significant difference in overall teachers' sense of efficacy between special education teachers of students with low-incidence disabilities who have received professional development using only the feedback component of behavioral skills training and special education teachers of students with low-incidence disabilities who have

received professional development using all the components of behavioral skills training as shown by the *Teachers' Sense of Efficacy Scale* long form when controlling for pre-test scores.

$H_0$2: There is no statistically significant difference in teachers' sense of instructional strategies efficacy between special education teachers of students with low-incidence disabilities who have received professional development using only the feedback component of behavioral skills training and special education teachers of students with low-incidence disabilities who have received professional development using all the components of behavioral skills training as shown by the *Teachers' Sense of Efficacy Scale* long form when controlling for pre-test scores.

Participants and Setting

This research study was focused on special education teachers' sense of efficacy as a result of a specific type of professional development. This section discussed from where the population was drawn, the composition of the population, the sampling technique, and the setting.

Population

The participants from this study were drawn from a convenience sample of special education teachers located in two different school districts in Northern Virginia. The school divisions were highly heterogenous in socio-economic status both within and across the divisions. The nonprobability convenience sampling procedure was chosen, because the population being studied had limited previous research conducted involving them. The generalizability of this study beyond the identified population was limited, as the feedback

interventions selected specifically address the need to implement highly specialized skills for students with low-incidence disabilities. The expectation was that the results will generalize to the specific population of SETs working with students with low-incidence disabilities employed in a public-school division in Virginia.

Participants

For this study, the number of participants was 27 teachers, which, according to Gall et al (2007) equals the required minimum when assuming a large effect size, covariate $r = .7$, the statistical power of .7 and alpha level = .05. A review of research showed sampling sizes of as few as 35 (Saremi et al., 2017) and as many as 103 (Dennie et al., 2019). The population was highly diverse ethnically but majority female, as males tend not to work with students with low-incidence disabilities at the number as females. The sample consisted of 5 male and 23 female special education teachers from two different Northern Virginia school divisions. In the two categorical groups, the one receiving the feedback only component had 14 participants and the one receiving the full intervention package had 13 participants.

The experimental group was made up of the participants who received performance feedback only and the control group was made up of the participants received the entire professional development. The groups were not made up of an equal ratio of males and females. Years of experience, grade level, and ethnicity were not considered at the group level, as it made it too difficult to recruit enough special education teachers who worked with students with low-incidence disabilities in a self-contained classroom.

The participant demographic collected included grade level taught, years of teaching

experience, teaching in a Title 1 school, teaching in a majority minority school, teaching license type, years of experience teaching students with disabilities, degree type, experience with behavioral skills training, experience with stimulus equivalence, and years of experience working with students with low incidence disabilities. Demographic information was aggregated rather than disaggregated by group type. 78% of participants provided demographic information; 22% of participants did not provide demographic information. Of the 21 who chose to answer, 61.9% taught at the elementary level, 28.6% at the middle school level, and 9.5% at the high school level. 28.6% had no more than three years of teaching experience, 33.3% had four to nine years of experience, and 38.1% had more than nine years of experience. 66.7% of participants had a master's degree in special education, 9.5% had a master's degree in education, 4.8% had a master's degree in both special education and education, while 9.5% had a master's degree but not in education or special education. 9.5% did not have a master's degree at all. 61.9% taught in a Title 1 school while 38.1% did not. 76.2% taught in a majority minority school, 14.3% did not teach in a majority minority school, and 9.5% did not know if they taught in a majority minority school. 23.8% of participants held a provisional license while 76.2% held a professional license. 23.8% of participants had three or fewer years teaching in students with disabilities, 38.1% of participants had four to nine years of experience, and 38.1% had more than nine years of experience. 19% have been teaching students with low incidence disabilities for three or fewer years, 38.1% have been teaching students with low incidence disabilities for four to nine years, and 42.9% have been teaching students with low incidence disabilities for more than nine years. 76.2% had previous

experience with behavioral skills training, 19% did not have previous experience with behavioral skills training, and 4.8% preferred not to respond. 14.3% had experience with stimulus equivalence, 81% had no experience with stimulus equivalence, and 4.7% preferred not to answer.

Setting

The setting was based on special education teachers who worked with students with low-incidence disabilities were working in self-contained special education classrooms where those students received at least 50% of their instruction daily. The classrooms provided instruction in academics, social emotional skills, and functional living skills. Additionally, self-contained classrooms had multiple grades within each room, meaning elementary had K-5th, middle 6th-8th, and high school 9-12th and post high school. Post high school students were still in attendance, as federal law mandates students with disabilities who had not earned a high school diploma and had an individualized education plan may continue to attend high school until their 22nd birthday.

Instrumentation

Teachers' Sense of Efficacy Scale

A demographic survey that included level of education, licensures, certifications, grade levels, special education settings, years of teaching if any, student populations, age, gender, and ethnicity was included. Additionally, the TSES long form (Tschannen-Moran & Woolfolk, 2001) was selected; see Appendix A for the instrument. Given this study focused on special education teachers' response to training on an instructional strategy, the long form of the

teacher efficacy scale was used, because the construct of instructional strategies was a specific subscale. Having more responses by using the long form on this specific subscale was preferred.

The purpose of the TSES was to emphasize a classroom teacher's responsibilities when working directly with students (Tschannen-Moran & Woolfolk, 2001). Developed initially with 52 items, the first study reduced the number of items on the long form to 24 and the short form to 12. The second study showed the factors that had the greatest variance were efficacy for student engagement, efficacy for instructional strategies, and efficacy for classroom management. A second order of factor analysis combined data revealed moderate positive correlations for the efficacy construct (p. 798). Construct validity confirmed with positive correlations with the Rand and Gibson & Dembo measures for efficacy. Discriminant validity confirmed, as efficacy was negatively correlated to work alienation and pupil control ideology. Because the researchers took the extra step of re-running the test with in-service teachers only to ensure preservice teachers did not skew the short-form scores, the long form was used.

The third study testing enabled the researchers to develop the efficacy of classroom management factor, as it was initially weak. The researchers added and adjusted questions making this subscale more conceptually meaningful. After testing, the researchers demonstrated a strong factor based on eight questions rather than the original three. The reliability for all the scales was strong, above .85 across all three, and intercorrelations between the subscales were .55 or greater (p. 799). Additionally, factor analysis between the long and short form demonstrated strong intercorrelations between .95 and .98. Overall, the TSES

demonstrated high reliability and validity.

The final short and long form version of the TSES had a total of 12 and 24 questions, respectively. The scale used a Likert scale of 1 to 9 with 1 = Nothing, 3 = Very little, 5 = Some influence, 7 = Quite a bit, and 9 = A great deal. A total possible score for the short form ranged from 12 to 108, the long from ranged from 24 to 306. The higher the score the greater overall sense of efficacy. Within each subscale, the range was 8 to 72; again, the higher the score the greater the sense of efficacy. When using the instrument with preservice teachers, the researchers recommended the long form, as the short form had less contrast between subscales. As the research was conducted with special education teachers with an emphasis on instructional strategies, the long form was used to ensure a clear measure of teacher self-efficacy regarding instructional strategies that was quantifiable.

The appropriateness of the TSES was evidenced in the variety of studies on efficacy including sociodemographic factors (Minghhui, et al., 2018), occupational stress (Antoniou et al., 2020), inclusion (Saloviita, 2020), and student-teacher relationships (Koenen, et al., 2019). Globally, TSES was translated into Spanish (Burgueno et al., 2019), Chinese (Lu et al., 2021), and Italian (Pintus et al., 2021). Geographically, TSES was used on five of the seven continents: Asia (Minghhui et al., 2018), Europe (Frumas, 2018), Africa (Raath & Hay, 2016), and Australia (Berg & Smith, 2018). TSES was used with teacher populations, including preservice (Berg & Smith, 2018), teacher candidates (Yazici et al., 2021), elementary (Oakes et al., 2021), middle (Ozturk et al., 2021), and high school (Thompson & Woodman, 2019). Academically, TSES was used to evaluate teacher efficacy relative to mathematics (Sevgi et

al., 2021), science (Cronin, et al., 2010), and dance (Renner & Pratt, 2017). However, regarding students with low-incidence disabilities, only one study on autism spectrum disorder was available (Catalano et al., 2020).

The TSES was administered online via email. Special education teachers had five days for each administration of the TSES. The approximate time to complete the TSES was reported as between 3 to 5 minutes (McGraw, 2020). Once completed, the scores were collected and stored on a secure USB removable device.

Procedures

Upon IRB approval, permission for the use and publication of the TSES was obtained. See Appendix B for IRB approval letter. Following the research approval process for each school division, research approval was requested for two school divisions in Northern Virginia. A request was also made to each school division to provide all participating special education teachers an opportunity to earn four professional development points towards license renewal. This represented only 2% of the total points needed for license renewal, so it was not an inducement to participate. These points were mentioned as part of the special education teacher consent form so teachers understood all aspects of the research study process.

An email survey was distributed to all principals at the school level, sharing information about the study and requesting the email addresses of SETs who work with students with low-incidence disabilities. An email was sent to the teachers explaining the study and asking them to complete the consent form and demographics survey if they wanted to participate. For one school division, teachers who agreed to participate were given the option to

sign up for professional development as the research study was added to the school division's professional development catalog. Participating teachers were sent the TSES long form to complete prior to receiving the training. No minimum number of special education teachers were required from each school as there were varying numbers of special education teachers depending on grade level.

Teachers were randomly assigned to either the full component package group, which was the experimental group, or the performance feedback only group, which was the control group. Behavior analysts were selected to work remotely with two to three participants. In the full component package group, all components of behavior skills training were provided remotely by behavior analysts. In the feedback only group, teachers watched a video with an opportunity to ask questions of the behavior analyst trainer before being observed implementing the strategy. The teacher demonstrated the strategy, and the behavior analyst trainer took notes and provided direct feedback for both groups. For both the experimental and control group, participants were required to reach 90% accuracy to achieve mastery of the instructional strategy. After the second feedback session, the teacher was emailed the TSES long form once more and asked to complete the survey within five days. Teachers were then awarded 4 recertification points once the TSES survey was received.

The researcher generated the script for training and trained the trainers. See Appendix C. The researcher developed the implementation checklist. The researcher sent all emails to the participants and answered inquiries from the participants. The researcher gathered the scales information and implementation feedback information. The researcher was not a trainer or

observer to avoid any researcher bias.

Data Analysis

An ANCOVA was used in this study. The rationale for the ANCOVA was based on the characteristics of ANCOVA, including the one independent variable that was categorical and had two groups, as well as one dependent variable that was a continuous measure. Also, a covariate was used. For this research study, the ANCOVA was to determine if the difference between the special education teachers' efficacy scores in the feedback only group and the special education teachers' efficacy scores in the full intervention package group was due to the different training methods. (Gall et al., 2007). Additionally, it was to ensure the two categorical groups were as equal as possible with respect to the control variables.

Data screening included visual screening for missing and inaccurate entries for all statistical analysis techniques used. The assumption tests included a box and whiskers plot for each group to assess for extreme outliers. The Shapiro-Wilks was used for normality, because the sample size was less than 50. The Assumption of Linearity was conducted using scatter plots between the pretest and posttest variable for both groups. The Assumption of Bivariate Normal Distribution looked for the cigar shape curve to determine if the distribution of both pretest and posttest groups was equal both individually and when the pretest and posttests scores were combined. The Assumption of Homogeneity of Slopes evaluated interactions between the groups. To test for equality of variance, Levene's Test of Equality of Variance was used. Since two tests of significance were conducted, a Bonferroni correction was needed to guard against type I error. The alpha level was calculated to be: 0.05/2 = .025, rounded to

.03(Warner, 2013). The alpha level was identified for each statistical technique using $\alpha = .05$. The effect size used was the partial eta η^2.

CHAPTER FOUR: FINDINGS

Overview

This chapter reviewed the research questions, null hypotheses, and descriptive statistics. Additionally, the results including data screening and assumptions were presented. Finally, the outcome of each null hypothesis was shared.

Research Question(s)

RQ1: Is there a difference in overall teacher self-efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores?

RQ2: Is there a difference in teachers' sense of instructional strategies efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores?

Null Hypotheses

$H_0$1: There is no statistically significant difference in overall teachers' sense of efficacy between special education teachers of students with low-incidence disabilities who have received professional development using only the feedback component of behavioral skills training and special education teachers of students with low-incidence disabilities who have

received professional development using all the components of behavioral skills training as shown by the *Teachers' Sense of Efficacy Scale* long form when controlling for pre-test scores.

$H_0$2: There is no statistically significant difference in teachers' sense of instructional strategies efficacy between special education teachers of students with low-incidence disabilities who have received professional development using only the feedback component of behavioral skills training and special education teachers of students with low-incidence disabilities who have received professional development using all the components of behavioral skills training as shown by the *Teachers' Sense of Efficacy Scale* long form when controlling for pre-test scores.

Descriptive Statistics

Descriptive statistics were obtained on the groups of the independent variables overall special education teacher efficacy and instructional strategies special education teacher efficacy. Tables 1-2 provide the descriptive statistics.

Table 1
Descriptive Statistics – Overall Special Education Teacher Efficacy

Group	*n*	Mean	S.D.
Performance Feedback Only	14	175.21	20.70
Behavioral Skills Training	13	189.62	14.24

Table 2

Descriptive Statistics – Instructional Strategies Special Education Teacher Efficacy

Group	*n*	Mean	S.D.
Performance Feedback Only	14	59.14	7.53
Behavioral Skills Training	13	62.62	5.50

Table 3 and Table 4 descriptive statistics for overall special education teacher efficacy and special education teacher instructional strategies efficacy are presented with the adjusted means based on the covariate of pretest scores. Table 3 and Table 4 were used when the independent variable, type of professional development, was being evaluated for statistical significance.

Table 3

Descriptive Statistics – Overall Special Education Teacher Efficacy

Group	*n*	Mean	S.E.
Performance Feedback Only	14	177.23	3.02
Behavioral Skills Training	13	187.45	3.14

a. The covariate pre-test score is 164.81 from the TSES Long Form.

Table 4

Descriptive Statistics – Special Education Teacher Instructional Strategies Efficacy

Group	*n*	Mean	S.E.
Performance Feedback Only	14	60.00	1.15
Behavioral Skills Training	13	61.69	1.19

b. The covariate pre-test score is 55.00 from the TSES Long Form.

Results

Data Screening

Data screening was conducted on each group of the independent variable. The researcher sorted the data on each variable and scanned for inconsistencies. No data errors or inconsistencies were identified. Box and whiskers plots were used to detect extreme outliers on each dependent variable. No extreme outliers were identified for the pre-test scores. however, an outlier (data point 4) was denoted with an open circle on the box and whisker plot for overall special education teacher efficacy. The researcher converted the data point to a z-score and it fell within +3 and -3 standard deviations of the sample mean (Warner, 2013, p. 153). Thus, the data point was not considered an extreme score and was maintained in the data set. See Figure 1 and Figure 2 for box and whisker plots.

Figure 1

Box and whisker plot overall special education teacher efficacy

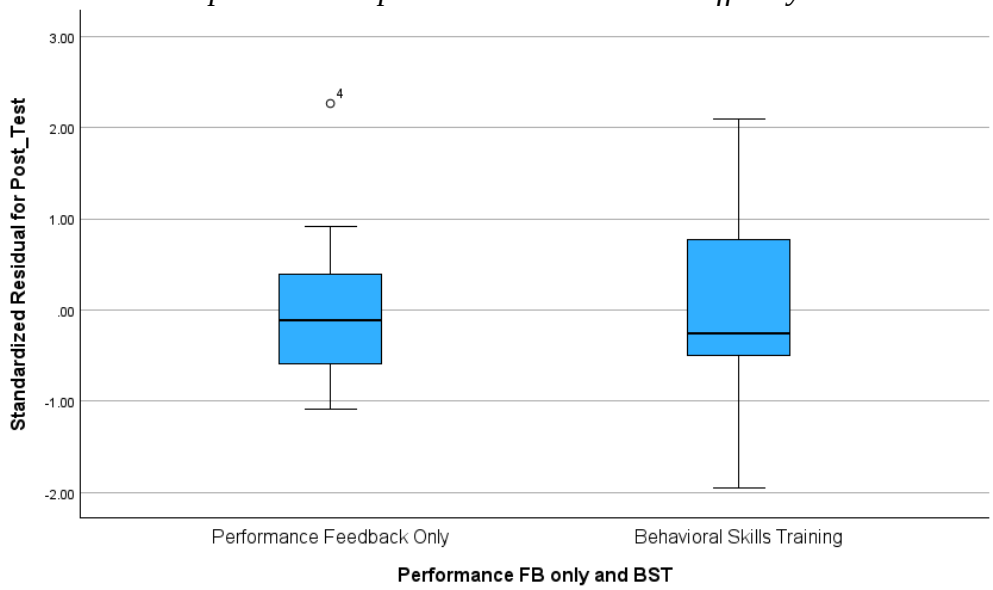
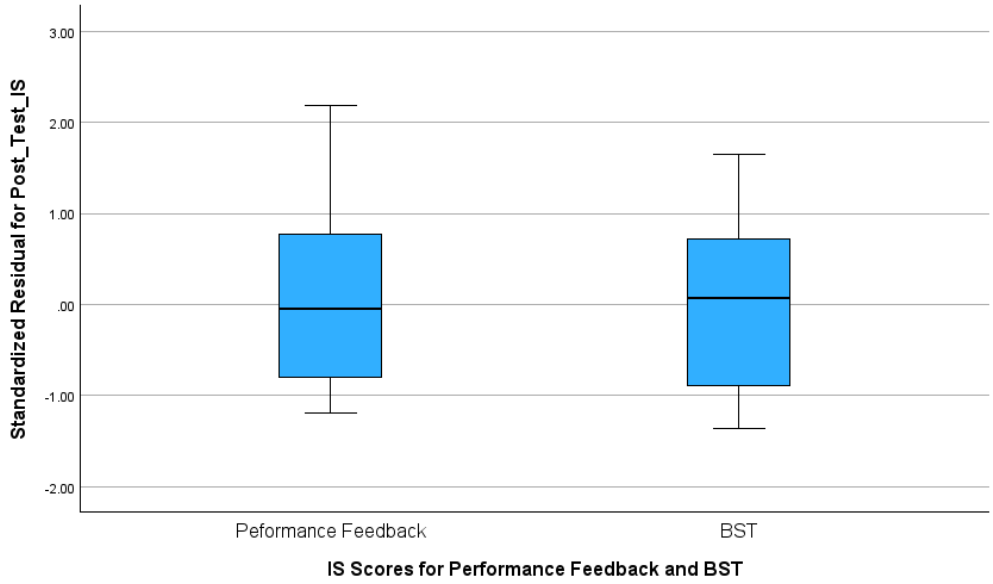


Figure 2

Box and whisker plot instructional strategies efficacy



Assumption Tests

An Analysis of Covariance (ANCOVA) was used to test the null hypotheses. The ANCOVA required that the assumptions of normality, assumption of linearity and bivariate normal distribution, assumptions of homogeneity of slopes, and the homogeneity of variance, are met. Normality was examined using a Shapiro-Wilk test. Shapiro-Wilk was used because the sample size was less than 50. No violations of normality were found. See Tables 5 and 6 for Tests of Normality.

Table 5

Standardized Residual for Post Test for Performance Feedback only and Behavioral Skills Training Overall Special Education Teacher Efficacy

	Shapiro-Wilk		
Group	Statistic	*df*	Sig
Performance Feedback Only	.918	14	.209
Behavioral Skills Training	.959	13	.734

Table 6

Standardized Residual for Post Test for Performance Feedback only and Behavioral Skills Training Instructional Strategies Efficacy

	Shapiro-Wilk		
Group	Statistic	*df*	Sig
Performance Feedback Only	.913	14	.175
Behavioral Skills Training	.976	13	.955

The assumption of linearity and bivariate normal distribution where tested using scatter plots for each group. Linearity was met and bivariate normal distributions were tenable as the shapes of the distributions were not extreme. Figure 3 and Figure 4 includes the scatter plot for each null hypothesis.

Figure 3

Scatterplot for Performance Feedback Only and Behavioral Skills Training Groups for Overall Special Education Teacher Efficacy

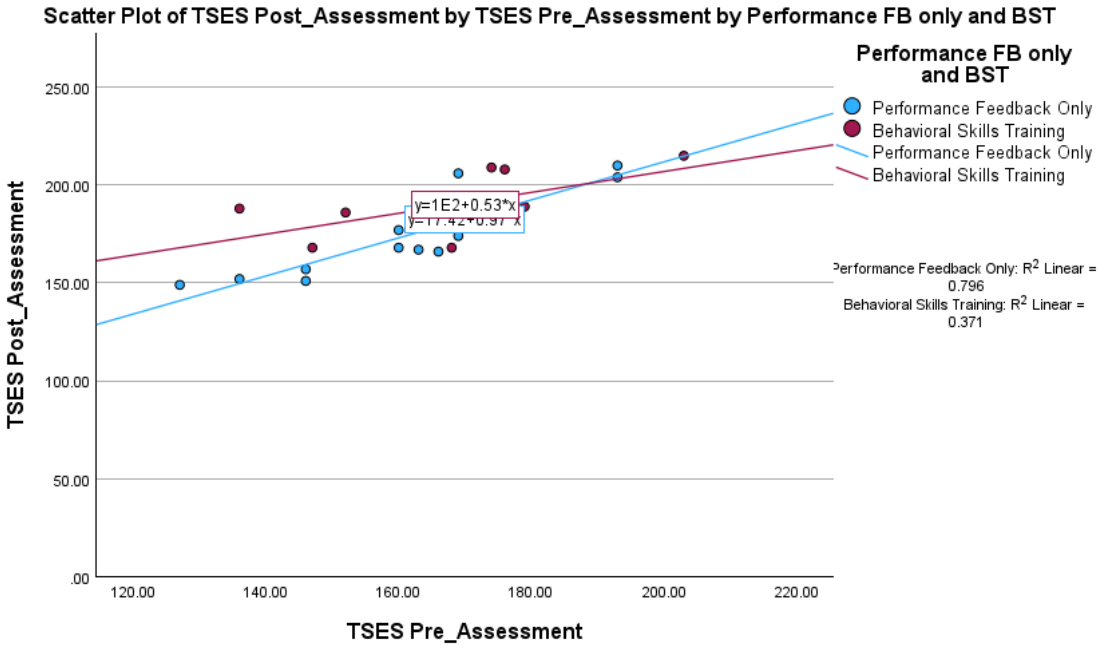
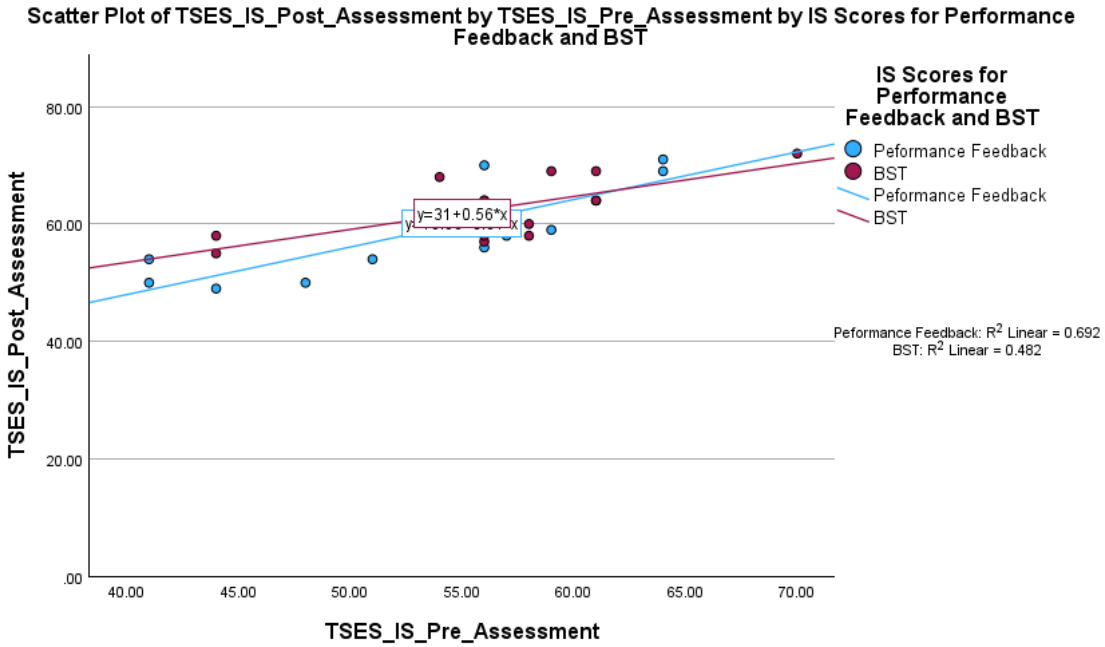


Figure 4

Scatterplot for Performance Feedback Only and Behavioral Skills Training Groups for Instructional Strategies Efficacy



The assumption of homogeneity of slopes was tested and no interaction was found where p = .90 for $H_0$1 and p = .304 for $H_0$2. Therefore, the assumption of homogeneity of slope was met for both null hypotheses. The assumption of homogeneity of variance was examined using the Levene's test. No violation was found where p = .499 for $H_0$1 and p = .500 for $H_0$2. The assumption of homogeneity of variance was met for both null hypotheses

Hypotheses

Results for Null Hypothesis One $H_0$1

An ANCOVA was used to test $H_0$1 regarding the overall teacher self-efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and

those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores. The null hypothesis was rejected at a 95% confidence level were $F(1, 24) = 5.445$, $p < .028$, partial $\eta^2 = .185$. The effect size was very large.

Results for Null Hypothesis One $H_0$2

An ANCOVA was used to test $H_0$2 regarding teachers' sense of instructional strategies efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores. The null hypothesis was not rejected as there was not a statistically significant difference in overall teachers' sense of efficacy between special education teachers of students with low-incidence disabilities who have received professional development using only the feedback component of behavioral skills training and special education teachers of students with low-incidence disabilities who have received professional development using all the components of behavioral skills training as shown by the *Teachers' Sense of Efficacy Scale* long form when controlling for pre-test scores.

CHAPTER FIVE: CONCLUSIONS

Overview

The aim of this quantitative, pretest/posttest experimental study was to determine if there is a difference in special education teacher overall efficacy and instructional strategies efficacy between special education teachers who receive professional development using all the components of the behavioral skills training package and special education teachers who receive professional development using only the feedback component of the behavioral skills training package when controlling for pre-test scores. The data from the Teacher Sense of Efficacy Scale (TSES) was examined to determine the potential effect the type of performance feedback has on special education teachers' overall efficacy and their instructional strategies efficacy. This chapter discusses the importance of the potential effect and how it may influence the type and delivery of professional development for in-service special education teachers. Finally, the implications, limitations, and recommendations for future research conclude this chapter.

Discussion

The purpose of this study is to determine if there is a significant difference in special education teachers' overall efficacy or their instructional strategies' efficacy based on the type of professional development the participants received when controlling for pre-test scores. This study examined two research questions:

RQ1: Is there a difference in overall teacher self-efficacy for teachers of students with low-incidence disabilities between those who have received professional development using

only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores?

RQ2: Is there a difference in teachers' sense of instructional strategies efficacy for teachers of students with low-incidence disabilities between those who have received professional development using only the feedback component of behavioral skills training and those who have received professional development using all the components of behavioral skills training when controlling for pre-test scores?

The results show that there was a statistically significant difference in special education teachers' overall sense of teacher efficacy when controlling for pre-test scores; however, there was no statistically significant difference in special education teachers' instructional strategies' efficacy when controlling for pre-test scores. Therefore, the null hypothesis for research question one was rejected, but the null hypothesis for research question two was not rejected. These findings will be reviewed and explained in comparison to other studies.

With regards to overall teacher efficacy, one study, Smolkowski et al., (2022), found teachers' overall sense of efficacy improved, as measured by the TSES, after a professional development in an evidence-based practice that included performance feedback through coaching. While the short TSES form was used rather than the TSES long form, and the performance feedback was completed over one to two years of coaching, the initial pretest/posttest scores showed a statistically significant difference. The current study, though it used the TSES long form rather than the short form, also showed overall teacher efficacy

having a statistically significant difference. However, teacher efficacy for the sub-score for instructional strategies did not have a statistically significant difference, compared to Smolkowski et al., (2022), which did result in a statistically significant difference in the sub-score of classroom management. A potential reason for a statistically significant difference on the sub-score was the number of participants (*N*=127) compared to this study that had only 27 participants. An increase in participants may have resulted in a greater statistical power that could not be found in a smaller participant size. In addition, the sub-scores were different; this too could be a moderating factor. However, McCullough et al. (2022) had a small participant size (*N*=26), similar to this research study, and the study could not find a statistically significant difference in classroom management, student engagement, or instructional strategies sub-scores. The researchers suggested that participant size could have influenced the statistical power. However, the study did not report overall teachers' sense of efficacy or which version of the TSES, short form or long form, was used. In Sulla and Rollo (2023), researchers evaluated a training's impact on overall teacher efficacy. The study participant size (*N*=32) was similar to this current study (*N*=27) and resulted in a statistically significant difference in overall teacher efficacy based on pre and post assessment using the long form of the TSES, as did the current study. Yet, sub-scores for classroom management, student engagement, and instructional strategies were not reported as part of that study. In Ginsburg et al. (2022) the researchers used the short form of the TSES with a larger participant size (*N*=51) than the current study and found a statistically significant difference in overall teacher efficacy based on a three-year training program that included performance feedback through individualized

coaching; however, the study did not report sub-scores. The Ginsburg et al. (2022) research study supported the results of the current study with regards to overall teacher efficacy. In Peterson-Ahmad et al. (2023), the researchers evaluated the impact of training with performance feedback on both pre-service general education and special education teachers' student engagement and instructional strategies efficacy. In the Peterson-Ahmad et al. (2023) study, the participant size (N=36) was greater than the current study (N=27), and the scores were statistically significant for teacher efficacy for both student engagement and instructional strategies. However, the type of professional development delivered in the Peterson-Ahmad et al. (2023) study could have influenced the effects on teacher efficacy. Zhou et al. (2023) completed a meta-analysis of experimental studies about professional development features and the effect those features had on teacher efficacy. The meta-analysis showed job-embedded professional development had a statistically significant higher effect on teacher efficacy than demonstration-based training that included feedback. Peterson-Ahmad et al. (2023) study involved training that was job-embedded with immediate feedback, whereas the current study was demonstration-based training with performance feedback. As a result, more than participant size, the type of professional development could explain the difference in teacher efficacy between Peterson-Ahmad et al. study and the current research study.

In summary, the current research study's results show that there is a statistically significant difference in overall teacher efficacy was consistent with published research, regardless of participant size. Yet, the current research study's results show that there is not a statistically significant difference in teacher instructional strategies' efficacy was inconsistent

with published research. This means that there is a potential that participant size or type of professional development could have been a moderating variable with regards to teacher instructional strategies' efficacy.

Implications

This study added to the existing body of knowledge and theory regarding in-service special education teachers who teach students with low-incidence disabilities. There is limited research that addresses the unique professional development needs of in-service special education teachers who teach students with low-incidence disabilities. Overall special education teacher efficacy was shown to have a statistically significant difference based on professional development and performance feedback. As such, consideration should be given to the type of professional development offered, as well as the way performance feedback is provided. Even though instructional strategies' efficacy was not shown to have a statistically significant difference, the results could have been impacted by moderating factors, such as participant size or professional development type. Given the current research study used two different types of professional development regarding performance feedback, one implication is to consider how performance feedback is provided as part of professional development when working with special education teachers. More specifically, the type of professional development provided to in-service special education teachers who work with students with low-incidence disabilities should also be a consideration. This is supported by other research that showed the features of professional development, for example job-embedded versus role-play (Peterson-Ahmad et al., 2023), resulted in a statistically significant difference.

Additionally, the current study focused on in-service special education teachers who teach students with low-incidence disabilities. This population is an area of limited research regardless of the topic of research, and the current study contributes to the research on this population. The current study focus on the impact of the type of professional development and feedback on special education teachers' efficacy is important because special education teacher attrition and retention is a serious problem across the United States. LaRon et al. (2024) found that professional development not only should be provided but also should be useful as a factor for special education teachers to persist in teaching students with disabilities. This has not changed since Billingsley's (2004) seminal article identified four key factors that affect special education teacher retention, one of which was professional development.

Limitations

This research study had several limitations. First, the number of participants (N=27) may have impacted the statistical significance particularly for research question two. Additionally, the limited number of participants affects the ability to generalize the findings. Recruitment was also challenging, which impacted on the number of participants. The ability to control how the professional development was delivered to ensure all participants received the same level of instruction was also challenging.

There were eight threats to internal validity or the ability to draw a causal conclusion; however, true experiments, such as the current research study, are least likely to be impacted by these threats. No historical threats impacted the current study. With regards to maturation, testing response, mortality, and instrument decay, these threats are not applicable for the

following reasons: the post-test questionnaire was completed within 30 minutes of the end of the professional development presentation; the questionnaire used a Likert scale, so there were no incorrect answers; the amount of time was limited and completed over a short time frame; and the instrument is considered the gold standard for teacher's sense of efficacy. Threats, including regression to the mean, selection bias, and selection interaction bias, were less of a potential threat though possible. Participants' responses to the pre/posttest questionnaire could result in the same score, though it did not occur. Selection bias or how the participants were chosen could have impacted the study, as it could not be verified that all potential participants received the invitation to participate in the research study. Selection interaction bias was possible because there was a time difference of up to two hours between the treatment groups. However, there were no participants who mentioned time being an issue.

There are four threats to external validity or the ability to generalize the findings. Again, selection interaction bias was possible because of how the participants were selected. However, because the group was such a narrow part of the population, specifically special education teachers who teach students with low-incidence disabilities that receive instruction for more than 50% of their time in a self-contained setting, generalization would be most affected by this threat to external validity. Sensitization, or a change in the way a participant acts because they are part of a research study, is less impactful as a threat to external validity. Because participants were being trained, a change in behavior should have occurred though the degree of change would vary. Artificial response or the belief that a participant's true behavior would be different in a real world situation was not a real threat to external validity because the

participants were presented real world examples as part of the training. participants responded as would be expected in a real world event. Explanatory power could be an external threat, as there were only two groups, and neither was a control group. This could impact the ability to generalize the results.

Recommendations for Future Research

Recommendations for future research include additional populations, alternate instruments, and potential theoretical constructs. Additional populations to consider are in-service general education teachers who work with student with disabilities in an inclusive setting. As federal law mandates the least restrictive environment for students with disabilities, general education teachers who teach academic classes need to be trained to use evidence-based practices that support not only the inclusion but also the success of students with disabilities in the general education academic classes. General education teachers need to demonstrate a consistent level of teacher efficacy, particularly with instructional strategies, to effectively address the needs of students with disabilities in a core academic classroom setting. Another population to consider is the pre-service teachers, both general and special education candidates. As these teacher candidates will need to have knowledge of and competency with evidence-based instructional strategies, their teacher efficacy needs to be developed to ensure their knowledge and competency. This is particularly true for new special education teachers who are often working with students with significant disabilities who are two or more grade levels below their same-aged peers. Closing that achievement gap is critical for those students with disabilities, and it is evidence-based instructional practices that offer the most successful

way of accomplishing this goal. Another population to consider are special education coaches and administrators who work with or supervise special education teachers. To effectively evaluate special education teachers' implementation of evidence-based practices, coaches and special education administrators need to have a level of efficacy with evidence-based practices to provide feedback as part of observations and evaluations. Overall, additional populations, including general education teachers, pre-service special and general education teachers, as well as those who coach, supervise, and evaluate teachers who implement evidence-based practices, require teacher efficacy in order to effectively implement, as well as evaluate those who implement evidence-based practices.

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APPENDIX A

The Teachers Sense of Self-Efficacy Scale (Tschannen-Moran & Woolfolk, 2001)

THE OHIO STATE UNIVERSITY COLLEGE OF EDUCATION AND HUMAN ECOLOGY

ANITA WOOLFOLK HOY, PH.D.

PROFESSOR
PSYCHOLOGICAL STUDIES IN EDUCATION

Dear

You have my permission to use the *Teachers' Sense of Efficacy Scale* in your research. A copy the scoring instructions can be found at:

http://u.osu.edu/hoy.17/research/instruments/

Best wishes in your work,

Anita Woolfolk Hoy

Anita Woolfolk Hoy, Ph.D.
Professor Emeritus

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APPENDIX B

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

August 26, 2022
Margaret Stout
Susan Stanley

Re: IRB Exemption - IRB-FY21-22-985 PERFORMANCE FEEDBACK INFLUENCE ON SPECIAL EDUCATION TEACHER EFFICACY

Dear Margaret Stout, Susan Stanley,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2. (iii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification

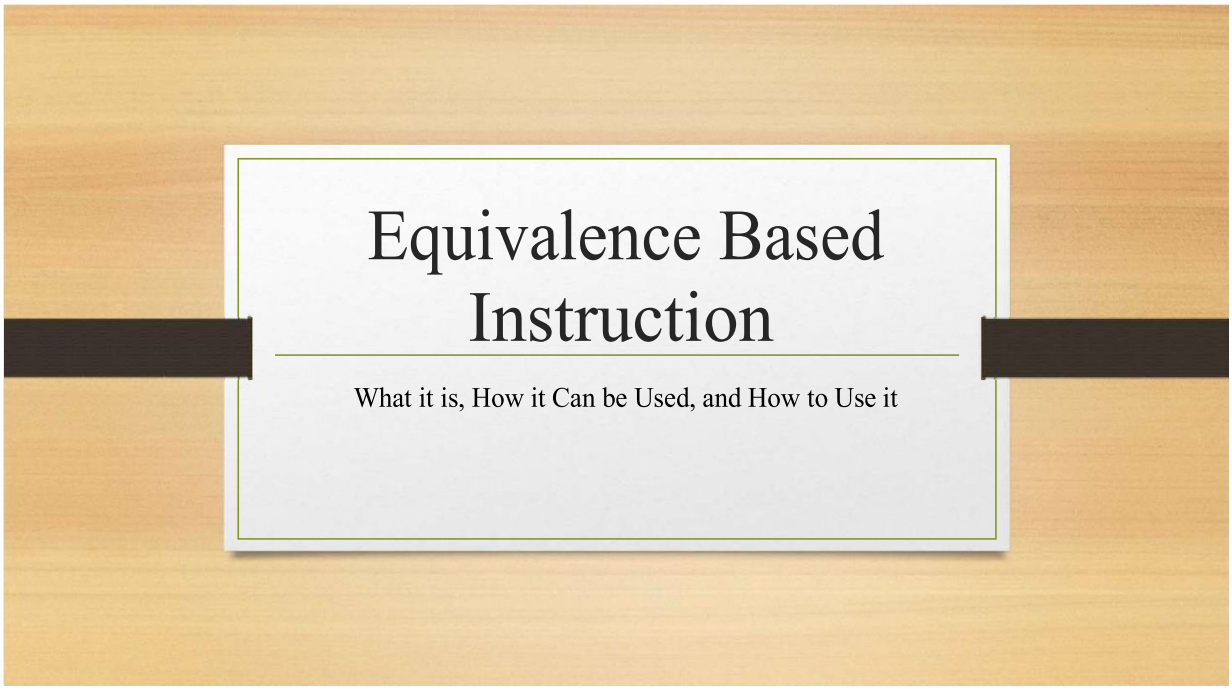
of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

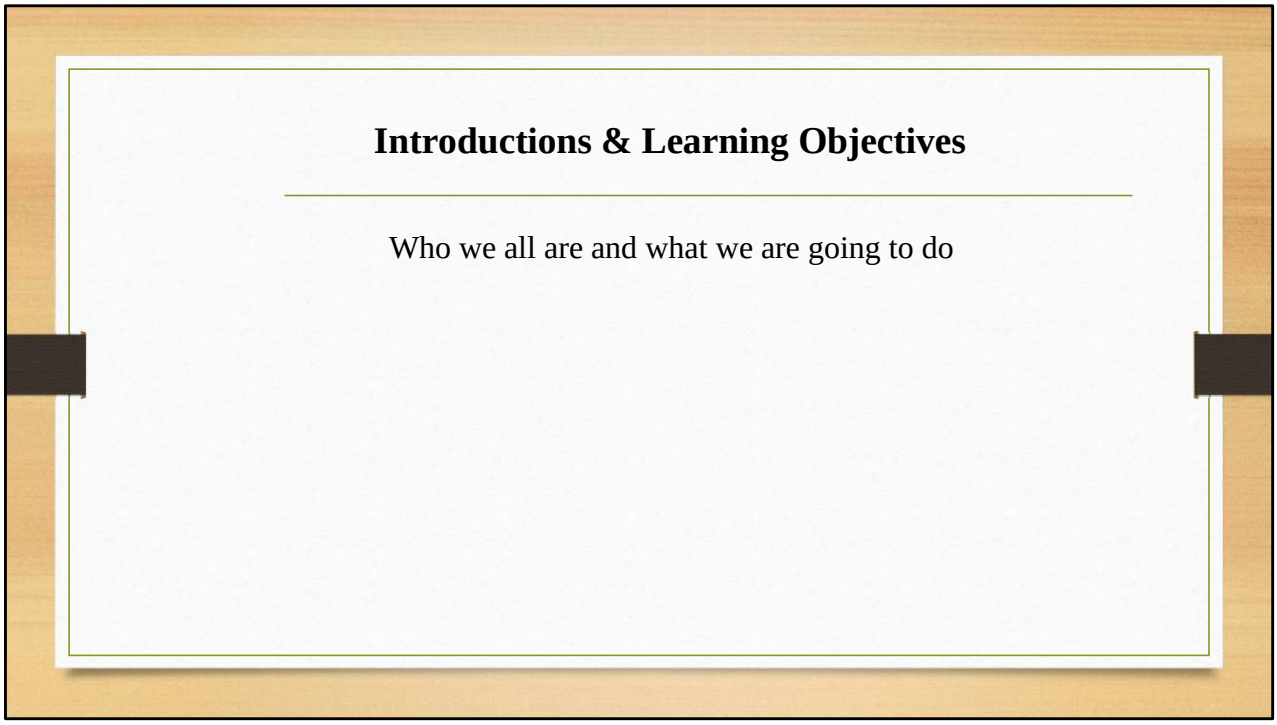
Sincerely,
G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

APPENDIX C

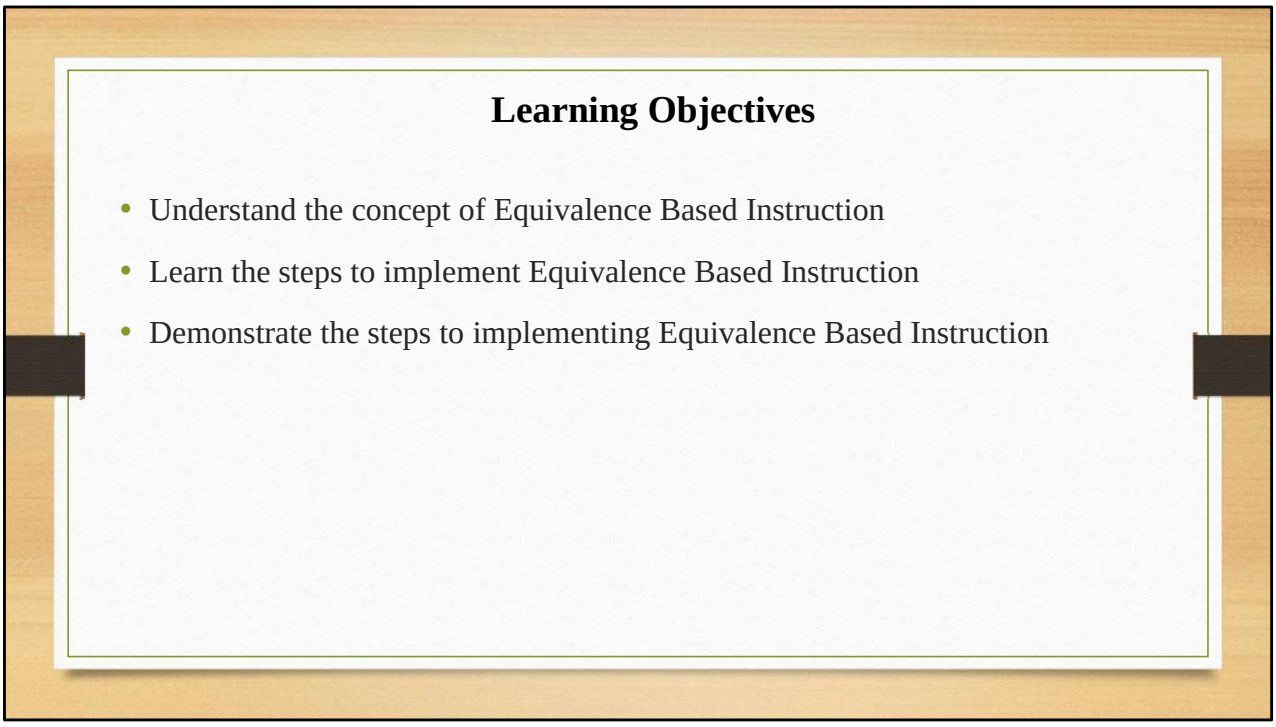
Script for the BCBA Trainers



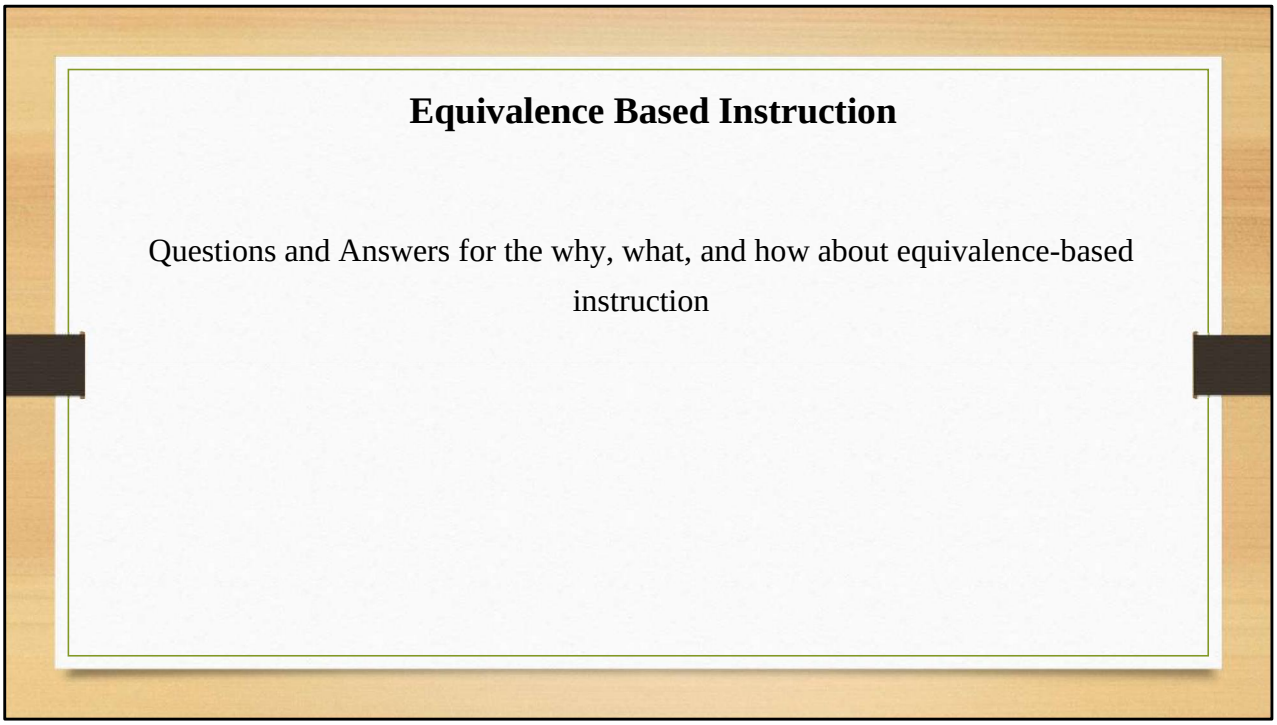
Welcome the teachers. Confirm they took the pre-assessment survey and emailed it back to mestout1@liberty.edu. If they have not, please have them go to their email and complete it before the training begins. Capture the teachers phone numbers in case you have to wait for one or both to finish. Give them 30 minutes and then text them to see if they are ready to go to Zoom for the training.



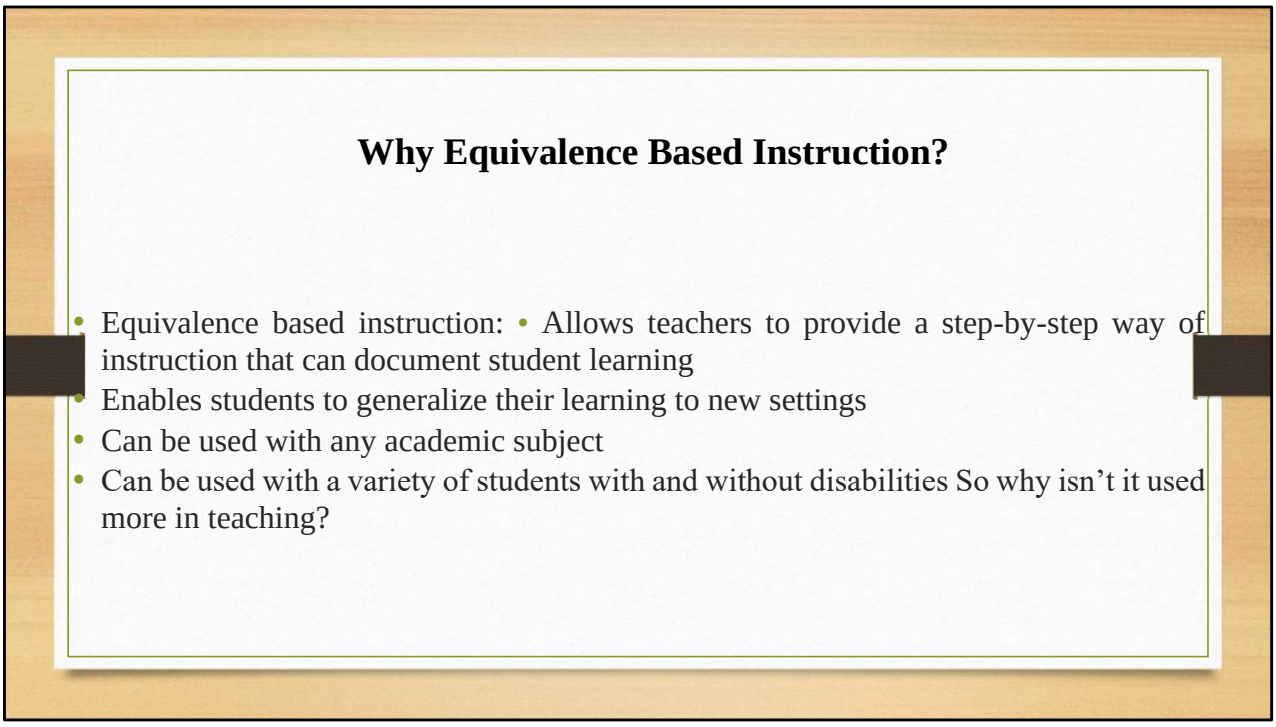
Introduce yourself and ask the teacher participants to introduce themselves – first name only and the student population they teach. Share who you are and what you do.



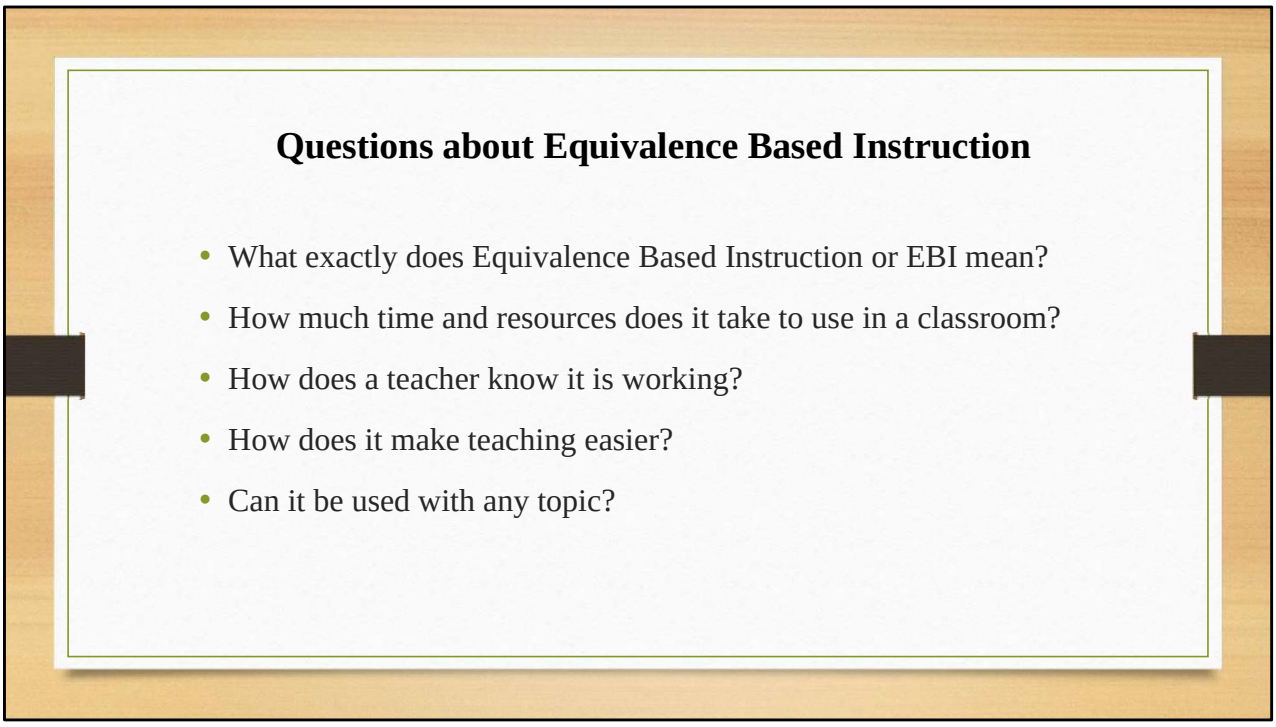
Based on the teacher participants' responses to ABA, you may want to discuss how to focus is to get the teachers familiar with the instructional technique and develop a willingness to try the technique. Since you will be using BST to move the teacher participants forward, you may want to spend more time on one area of the BST framework than others. Use your expertise in understanding behavior to place your emphasis. For example, if the teachers are hesitant about ABA spend time on explaining in plain language what stimulus equivalence and equivalence-based instruction is. Get them to provide examples from their own teaching. If they choose to use students' names remind them that this is a confidential environment and you've signed a non-disclosure so what happens in training stays in training.



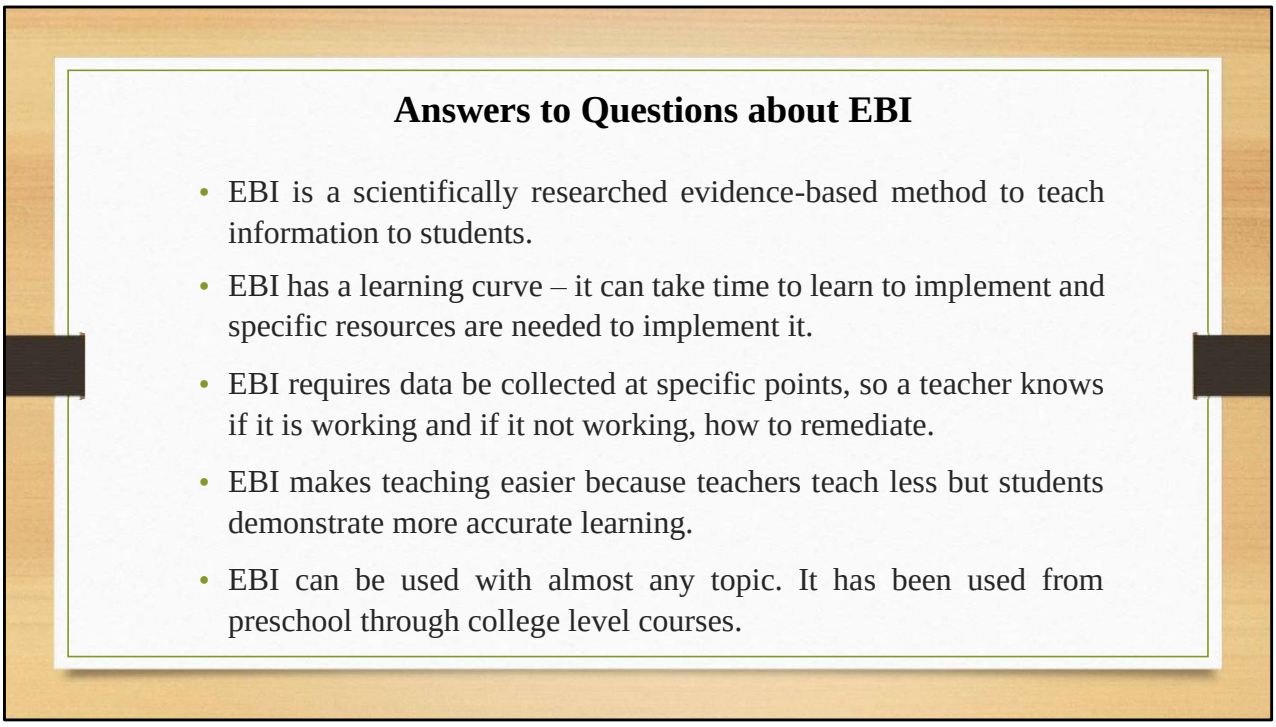
This is the rationale phase of BST. We will try to help the teachers understand what equivalence-based instruction is and how to use it.



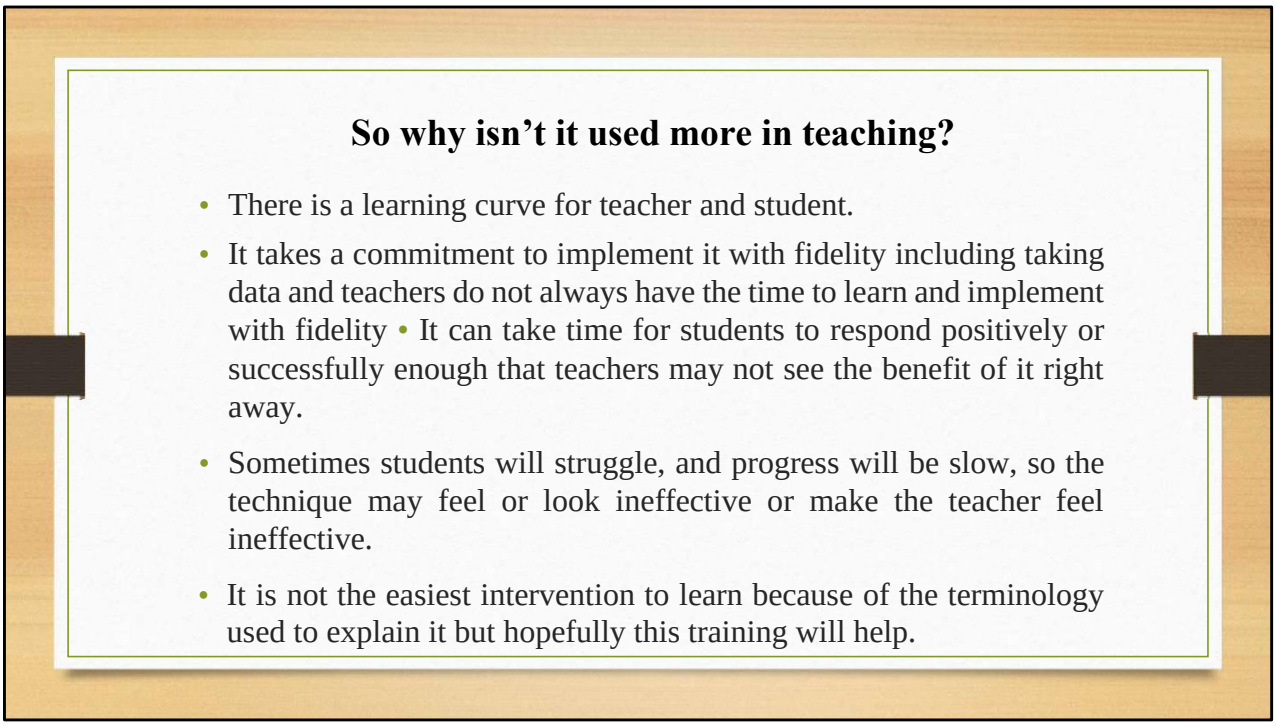
Rationale: Here we want to focus on the benefits of equivalence-based instruction. Because it promotes familiar teaching practices like sorting and matching, the concept is not necessarily new to teachers. It just uses known teaching techniques in a systematic way. Have teachers name ways in which they already have students engage in matching and sorting activities. Give teachers an opportunity to share how they have seen their students learn something and then use it in a new setting or with a new person or during a new skill being developed. This will allow them to connect to the idea of generalization easier. Ask teachers what subjects they like or are most comfortable teaching. This information will help with what examples you provide later. What they may realize with the final question is that they use portions of equivalence-based instruction without knowing it and this may be an opportunity to refine their approach rather than try to learn something new.



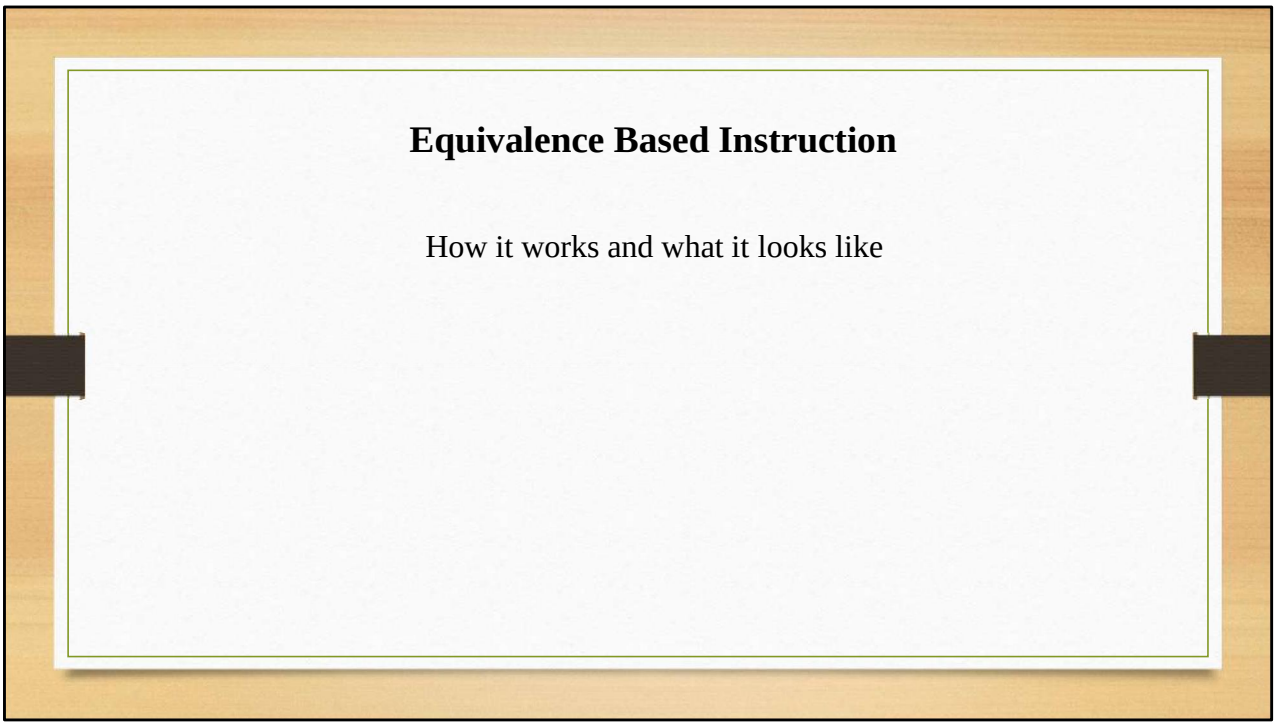
Let the teachers know you will refer to equivalence-based instruction as EBI to make it easier. On the following slides the answers to the questions are provided.



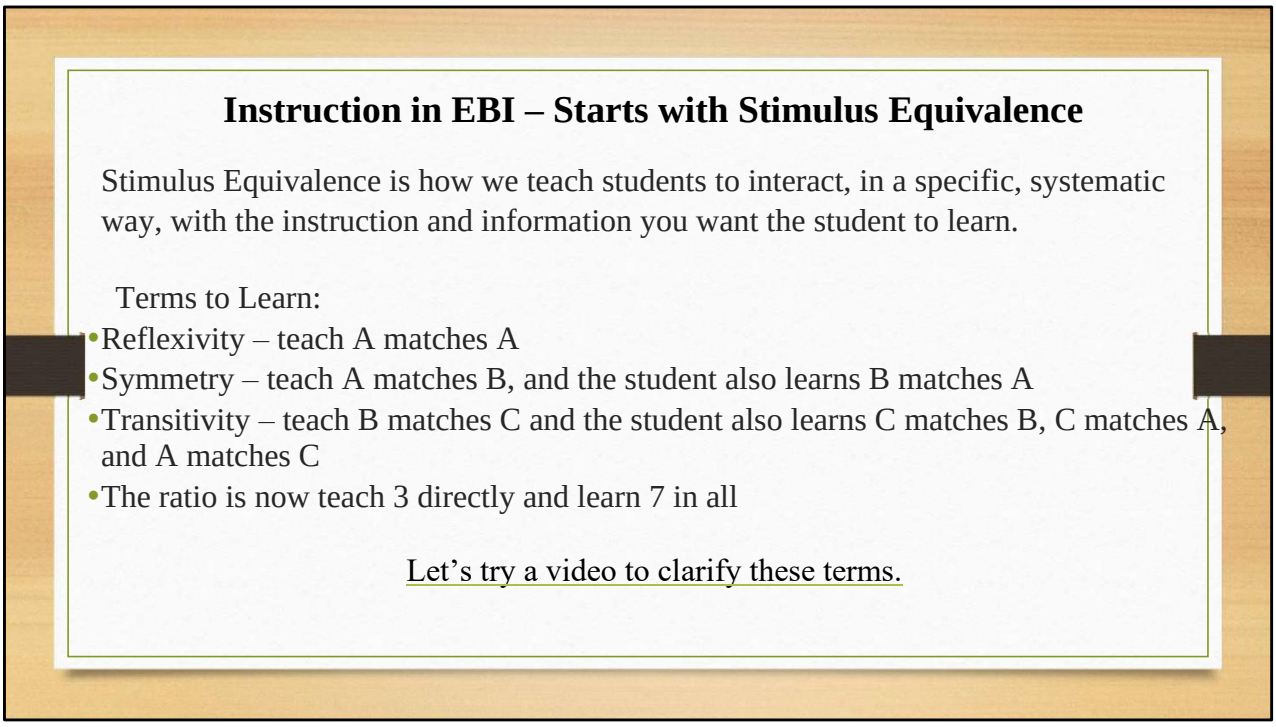
Let the teachers know the answers are based in research and we are happy to share the references if they would like to read about it on their own. Some examples include reading comprehension, science, geography, statistics, pharmacology



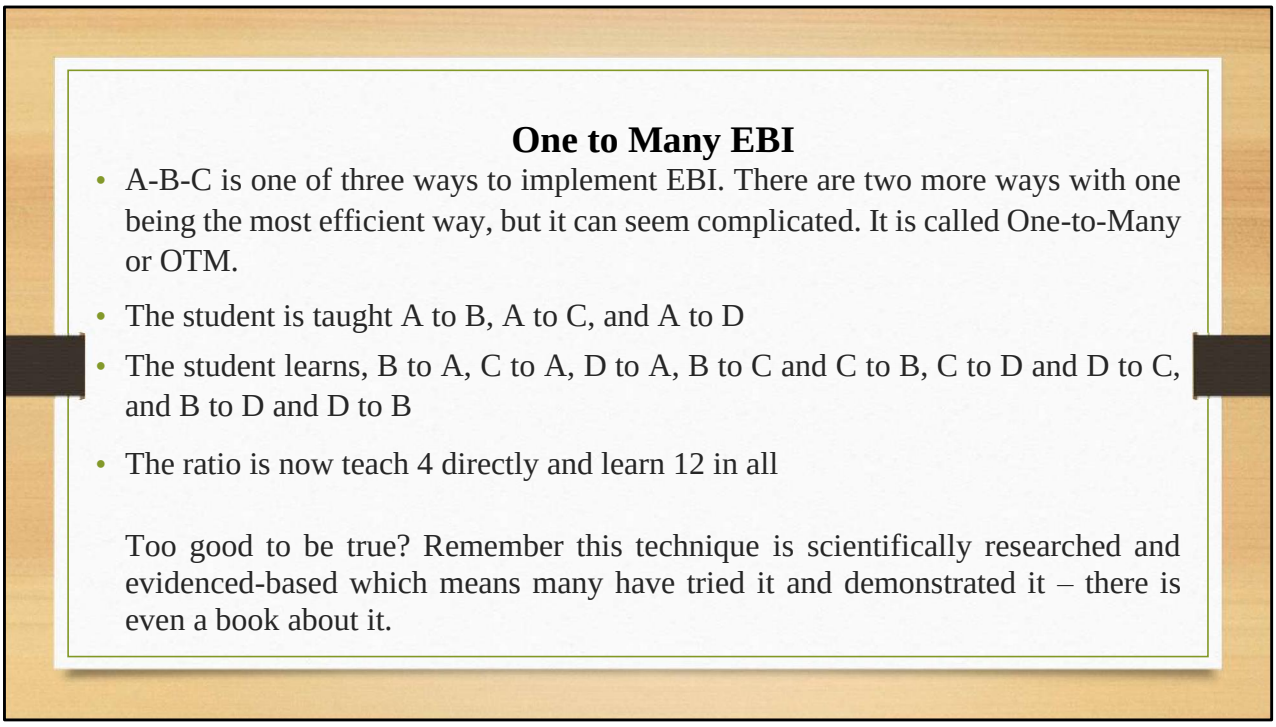
So, to emphasize the last part of the rationale – why use EBI, because in the long term EBI makes learning easier for the student while also reducing instructional demands on the teacher, especially special education teachers. Given everything SPED teachers must do, finding a way to provide more instruction in all subjects while allowing students to demonstrate what they learned more easily and accurately – the time commitment is worth it. This training hopefully will provide the teachers with the motivation to learn the basics. Hopefully by participating in this training the terminology will be clarified, the implementation will be first modeled, then practiced, and the feedback provided will encourage teachers to try this later on with at least one student in their classroom.



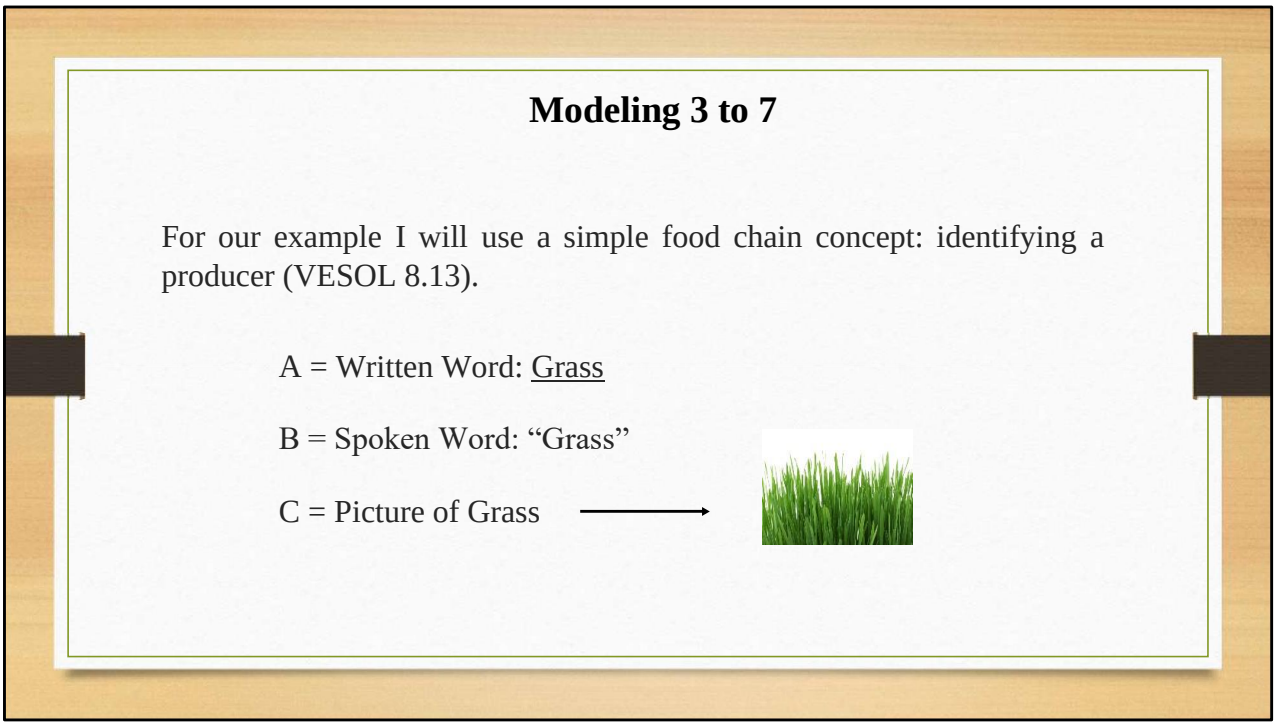
This is the instruction phase of BST. You may need to spend some time here clarifying the concepts and answering questions. That is okay.



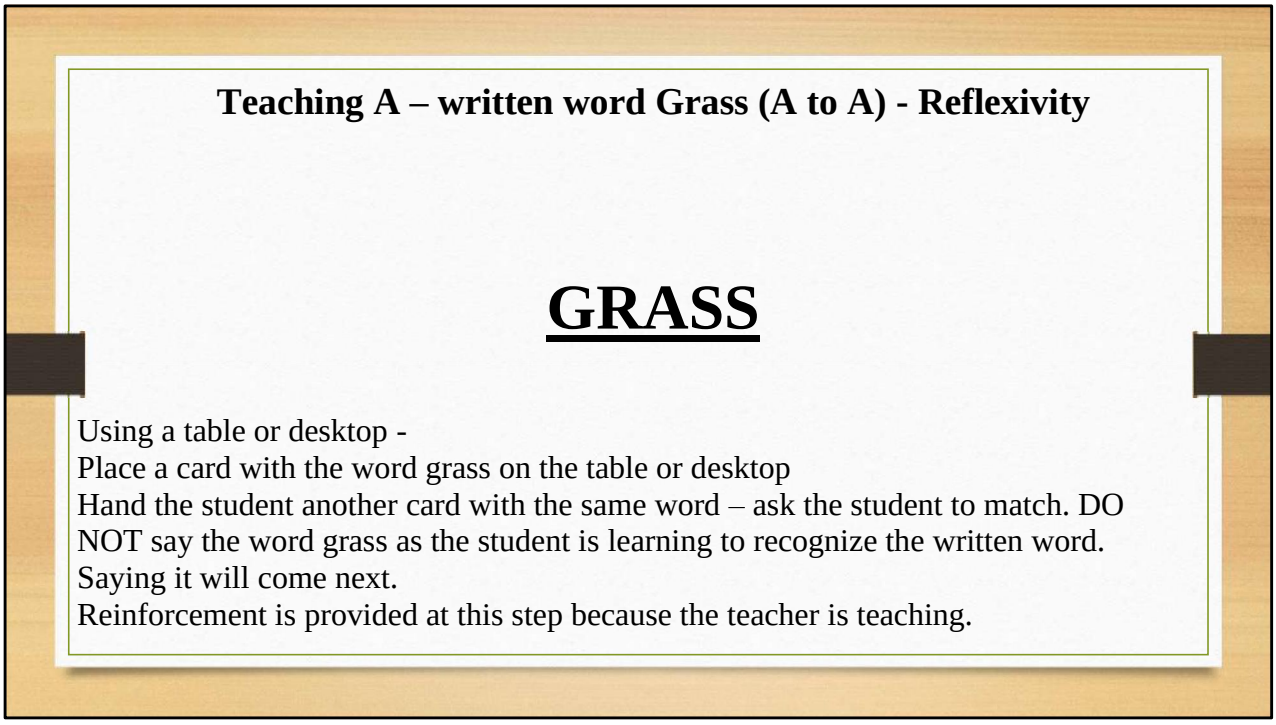
Here we start with the concept of stimulus equivalence. Because we use the term EBI enough, bringing in the term stimulus equivalence will not be a big deal. Stimulus Equivalence is the foundation of EBI. It is based in reflexivity, symmetry, and transitivity. Here you recall what teachers like to teach. If they like to teach science have them name three ideas preferably ones that will show up on standardized testing. Identify the A, B, and C and then explain what the teacher will teach and what the students will learn. The included video uses a basic idea (rainbow) to explain stimulus equivalence. The real focus is not that the teachers learn these terms but rather they understand how these terms apply to concepts they already are comfortable with teaching.



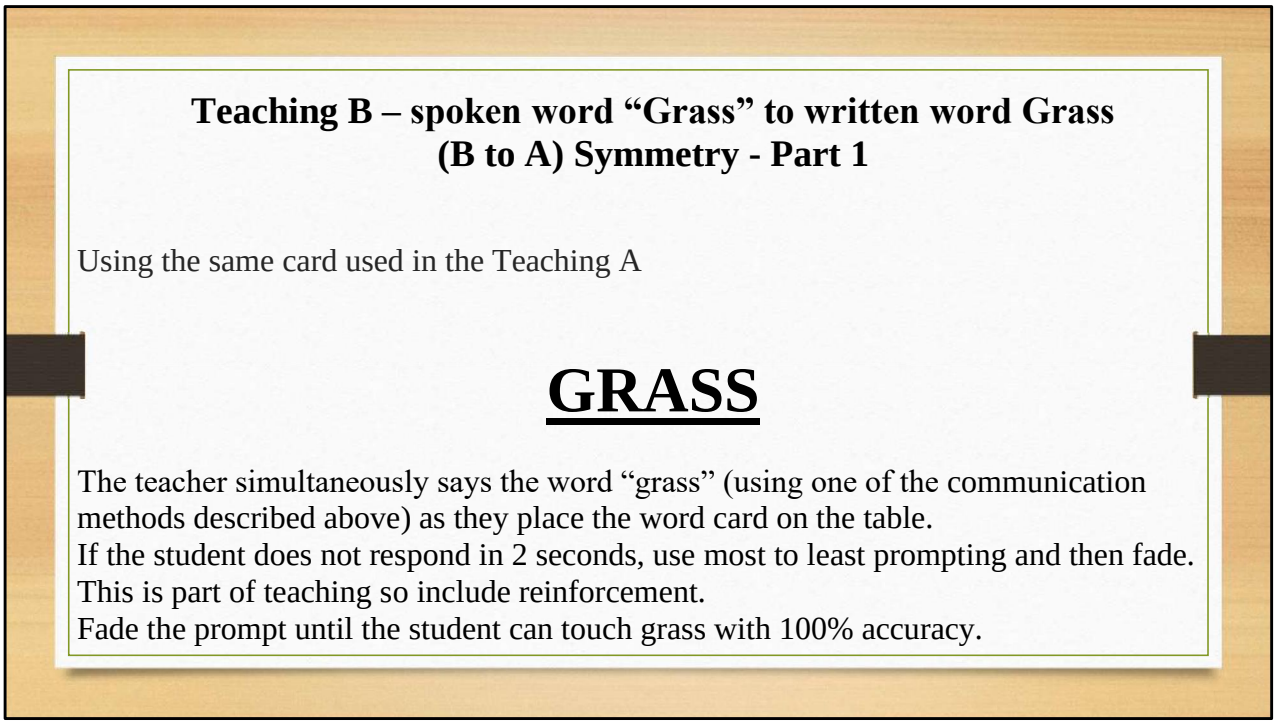
Before teaching this level, check with the teachers' comfort level with the basic A-B-C level. This level demonstrates the exponential power of stimulus equivalence and may make some teachers uncomfortable. Others may be excited.



The idea is the teacher teaches the student to visually recognize the written word grass, to receptively recognize the spoken word grass, and to visually recognize the picture of grass. Then the student learns to connect the visuals and spoken concepts, even the ones that are not taught directly.



Make sure the student can match the written word one-to-one with 100% accuracy on 3 checks for understanding – no reinforcement is provided during checks for understanding. Once the student can match the written word on 3 checks for understanding, the student has demonstrated mastery – MOVE ON! Emphasize the student should not have to do more than 3 checks for understanding to demonstrate mastery. It will begin to annoy the teacher and the student may engage in some inappropriate behaviors because they do not want to do this. Reinforcement is needed as well during teaching. The best is a token system where the student completes 3 to 5 attempts. Each correct attempt earns a token. Incorrect attempts are re-taught using most-to-least prompting (hand over hand, to wrist, to delayed prompt). Once all tokens are earned, they receive the reinforcer/reward. The session ends as well so the student is not overwhelmed. If the student can demonstrate the skill on the first attempt the next time you teach it, move on to teaching b and c.



Here we need to clarify how a student communicates – verbally, verbal approximations, AAC, PECs, switch, gesture/touch. The approach is going to need to match the way they communicate.

IMPORTANT:

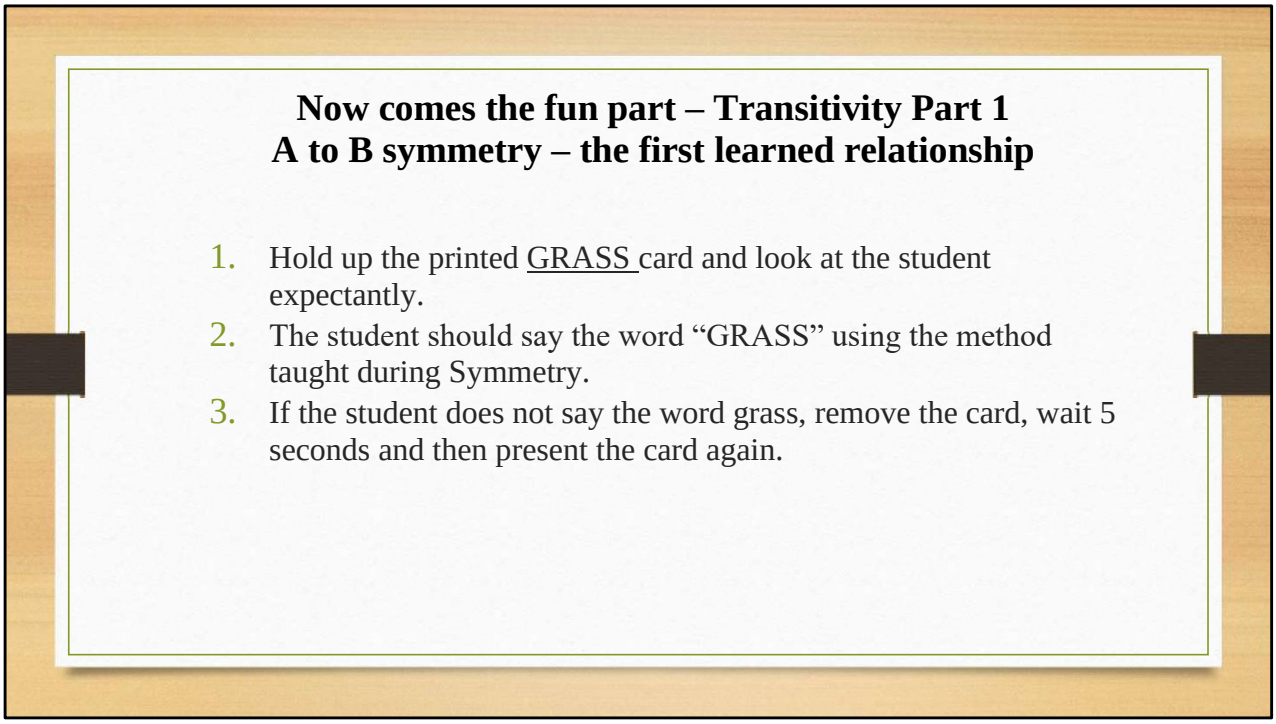
If the student uses an AAC device, eye gaze, or switch, the teacher should use the device to say the word rather than speak it, so the student sees where the word is on the device and can find it. If the student uses PECS, then have them touch the card. The student is not requesting to have some grass, rather they are naming it by touching the card. If the student communicates using touching or gestures, then they would touch or point to the card to say it. If the student is verbal or uses verbal approximations, then the teacher speaks. If you are uncertain how the student most effectively communicates, then use the touch or point option. The teacher simultaneously says the word "grass" (using one of the communication methods described above) as they place the written card on the table. If the student does not respond in 2 seconds, use most to least prompting and then fade. This is part of teaching so include reinforcement. If the teachers are not sure, use the touch method and use most to least prompting during teaching. Fade the prompt until the student can touch grass with 100% accuracy. Do 3 to 5 checks for understanding to ensure mastery – there is no reinforcement during checks for understanding.

Teaching C – picture Grass to spoken "Grass" (B to C)
Symmetry – Part 2

Using the picture of grass on the table -

The teacher simultaneously says the word "grass" (using one of the communication methods described above) as they place the picture card on the table.
If the student does not respond in 2 seconds, use most to least prompting and then fade.
This is part of teaching so include reinforcement.
Fade the prompt until the student can touch grass with 100% accuracy.

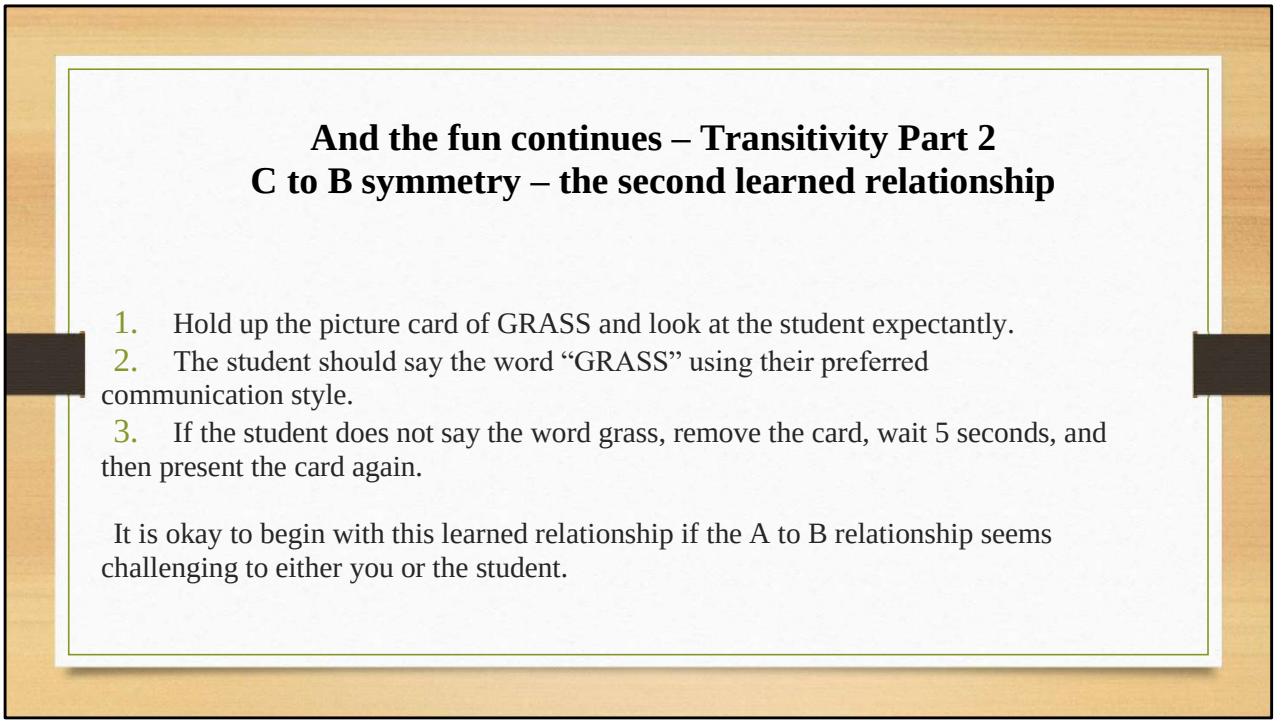
Remember:
If the student uses an AAC device, eye gaze, or switch, the teacher should use the device to say the word rather than speak it, so the student sees where the word is on the device and can find it. If the student uses PECS, then have them touch the card. The student is not requesting to have some grass, rather they are naming it by touching the card. If the student communicates using touching or gestures, then they would touch or point to the card to say it. If the student is verbal or uses verbal approximations, then the teacher speaks. If you are uncertain how the student most effectively communicates, then use the touch or point option.
The teacher simultaneously says the word "grass" (using one of the communication methods described above) as they place the picture card on the table.
If the student does not respond in 2 seconds, use most to least prompting and then fade.
This is part of teaching so include reinforcement.
Fade the prompt until the student can touch grass with 100% accuracy.
Do 3 to 5 checks for understanding to ensure mastery – there is no reinforcement during checks for understanding.



Remind the teachers that the student can recognize the printed word, recognize the spoken word, and recognize the picture. Transitivity is where we systematically have the student put it all together, as the teacher watches.

Review that the last three teachings included reinforcement followed by checks for understanding without reinforcement. The next four steps do not include reinforcement because they are concept/comprehension checks for understanding. As the teacher you are seeing if the student can show they understand the relationship between the printed word and the spoken word because you taught the student the spoken word goes with the printed word.

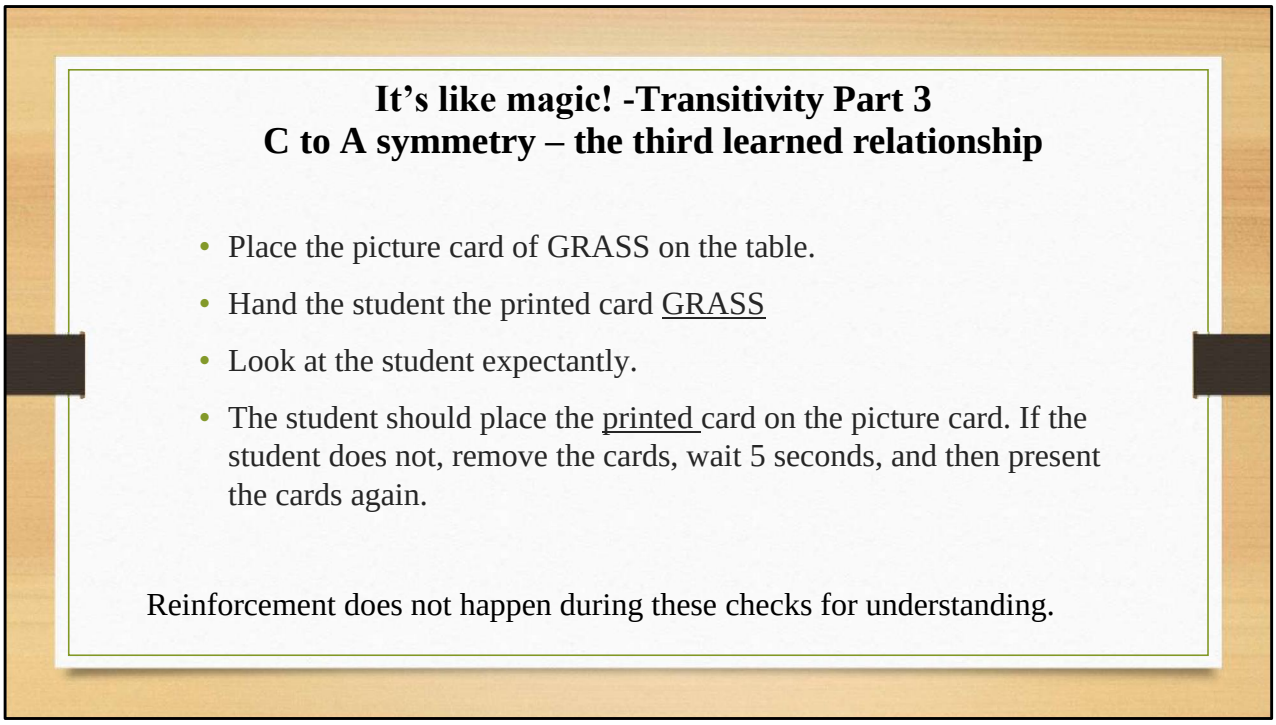
This may take some time, so do not give up. This is the hardest skill to demonstrate especially if your student is low vocal or non-vocal.



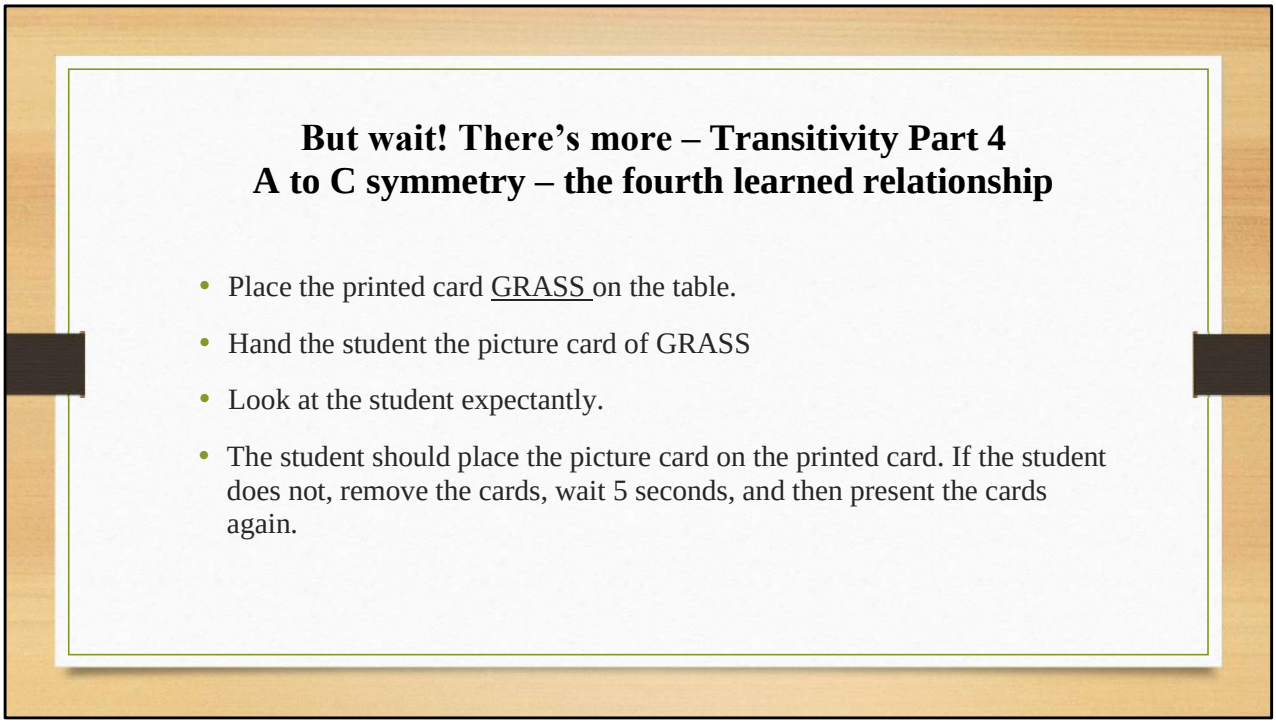
Discuss how the teacher might use the C to B before the A to B. There is no right or wrong order when moving through transitivity. The important part is checking all four relationships in a systematic way. Try twice and then move on. No reinforcement, not even praise, is used. No feedback to correct errors or missed trials. Why? Because the student may equate reinforcement with responding and they will scroll through the choices waiting for the reinforcement to appear. They have learned to scroll for reinforcement rather than learn the term or concept.

IMPORTANT: Sometimes students will initiate the word as soon as the card is shown. You do not need to repeatedly check for understanding this if the student initiates the labeling. Credit them with what they know and move on.

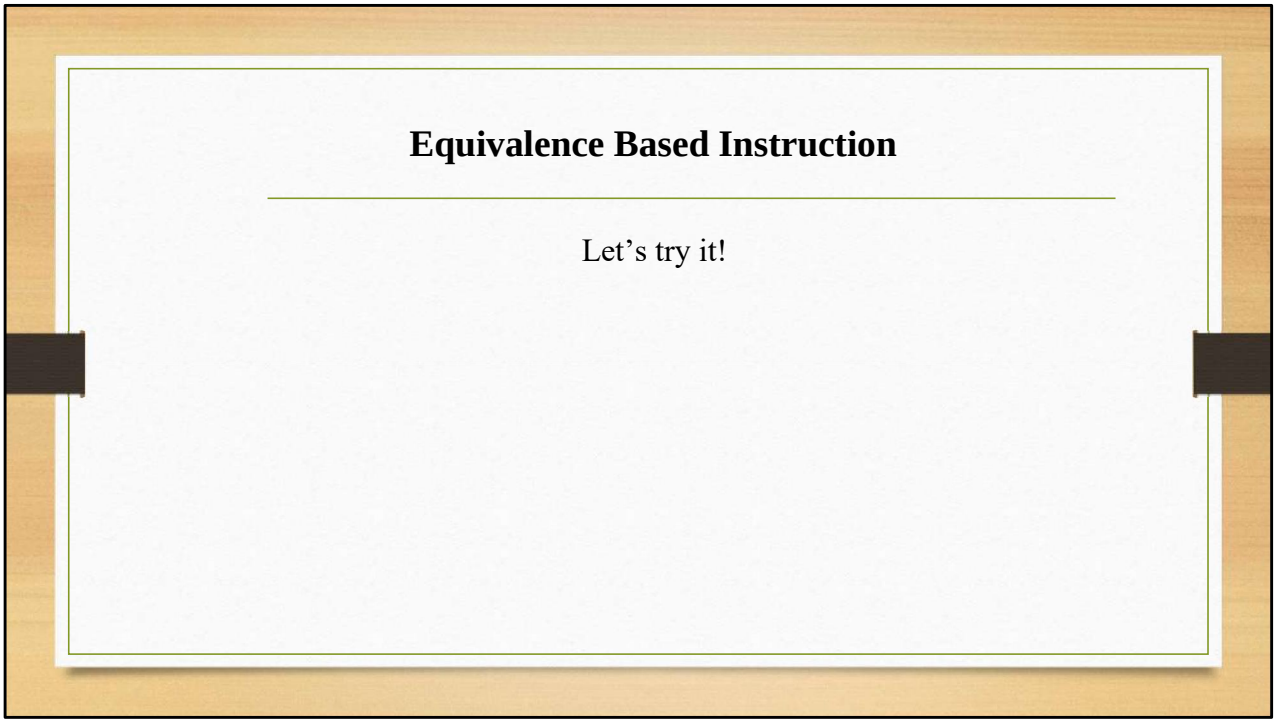
REMINDER: Explain the difference between teaching and checks for understanding. When we teach, we reinforcement with specific praise, immediate reinforcers, or token systems. You and the student should have fun during teaching. The checks for understanding are quick – either the student demonstrates understanding or does not.



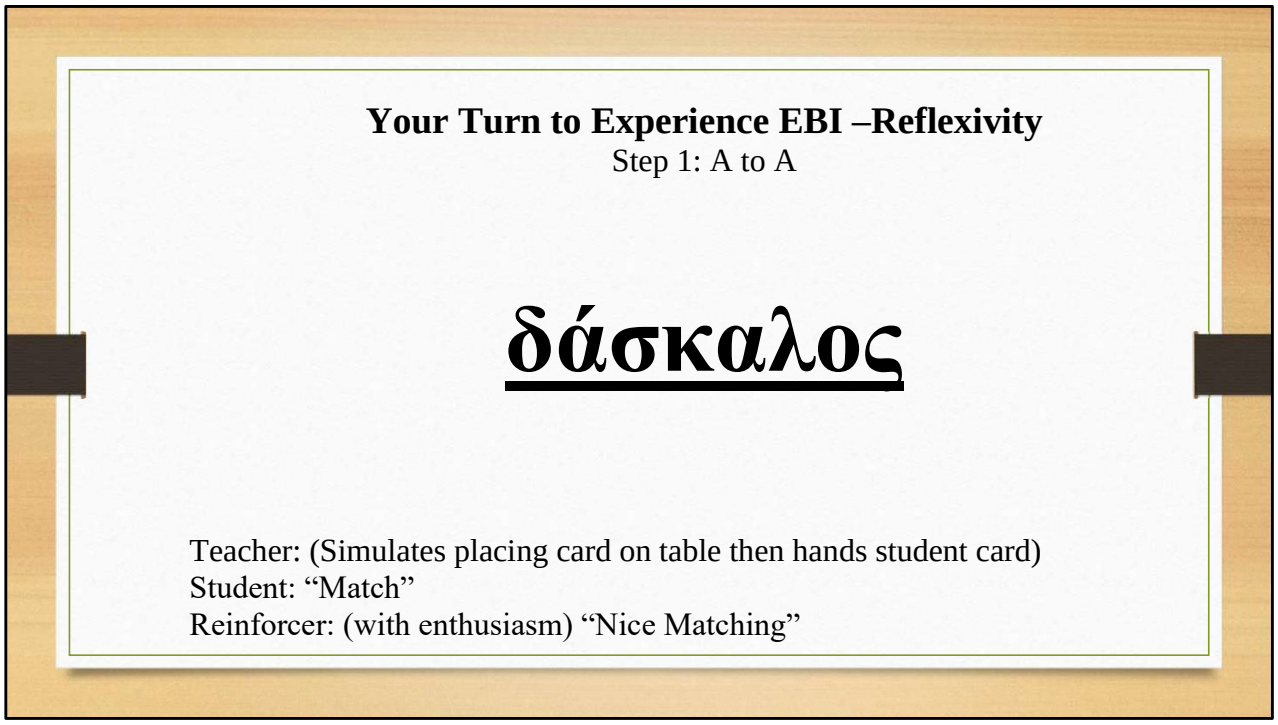
This is the first time the student has two presentations (picture and printed) that have not been directly taught by the teacher. If the student places the printed card on the picture card, then they are saying they understand that this written word goes with this picture. This is the first derived relationship which means the student derives or connects the relationship without instruction.
Clarify what is happening and if necessary, explain the concept of stimulus equivalence and EBI again. EBI is using the steps of stimulus equivalence to teach academic content. The cards are in the same space and the student realizes, understands, has learned the equivalence – that the cards go together – one can be substituted for the other – this is Sidman's original definition of the word equivalence. At this point you may have to answer questions.



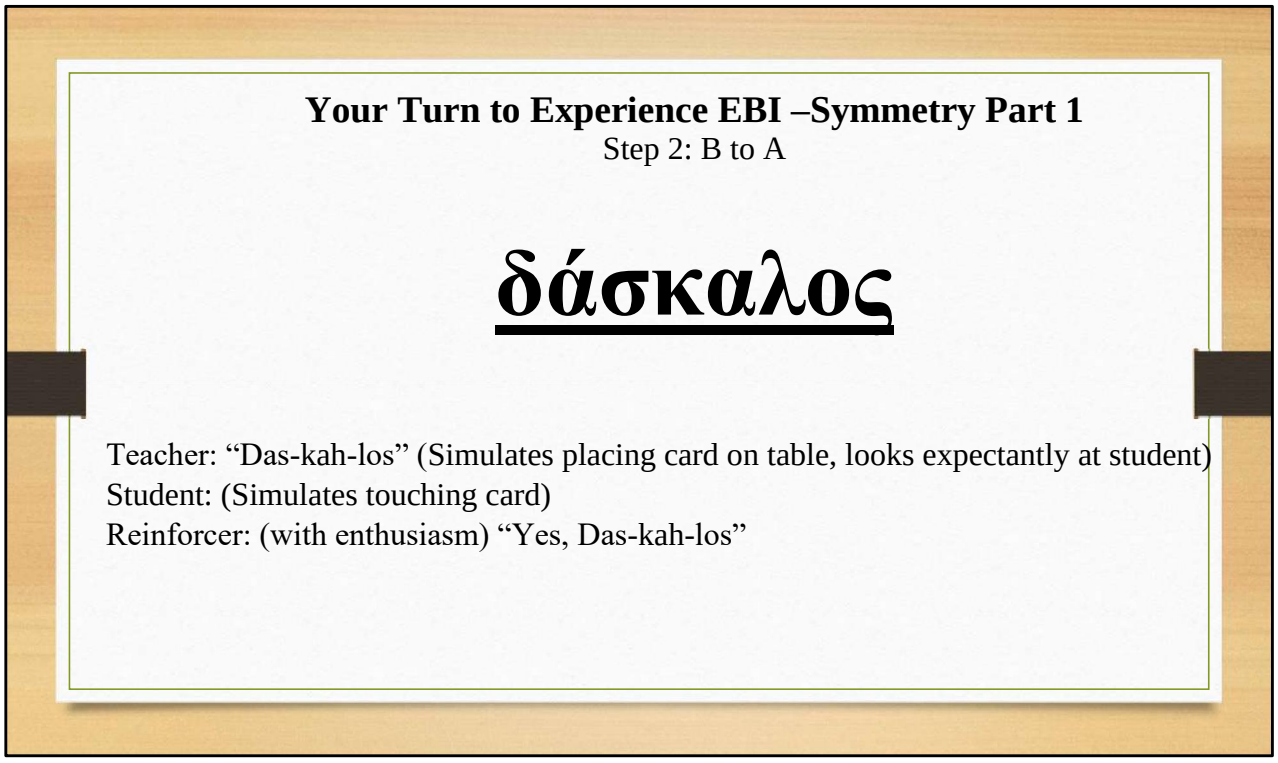
Point out again that the relationship between these two cards were not in the original teaching trials. The student has figured out that these two cards go together. The student is demonstrating learning in real time! This never gets old! As a teacher, this is what we live for, the light bulb moments, the progress, and seeing the student's smile of satisfaction the student feels when they know they know it.



This is the model phase of BST. The scripts have been placed on the slides. Remember to note whether reinforcement is provided or not. This may take some time as the teachers get used to the steps, what to say, what to do, and how to reinforce.



Say, "Because this is virtual, we will have to simulate the modeling of the steps. The purpose is to get a feel of the pacing. The words and actions are on the slide.
We are going to model EBI with me being the teacher, one of you will be the student, and the other will be the reinforcer.
Say, "Who would like to be the student? Great, thanks."
Say, "The other teacher will practice providing reinforcement."
REMINDER: Make sure the reinforcement comes as close to the student response as possible. You may need to explain why reinforcement must occur so close to the response.



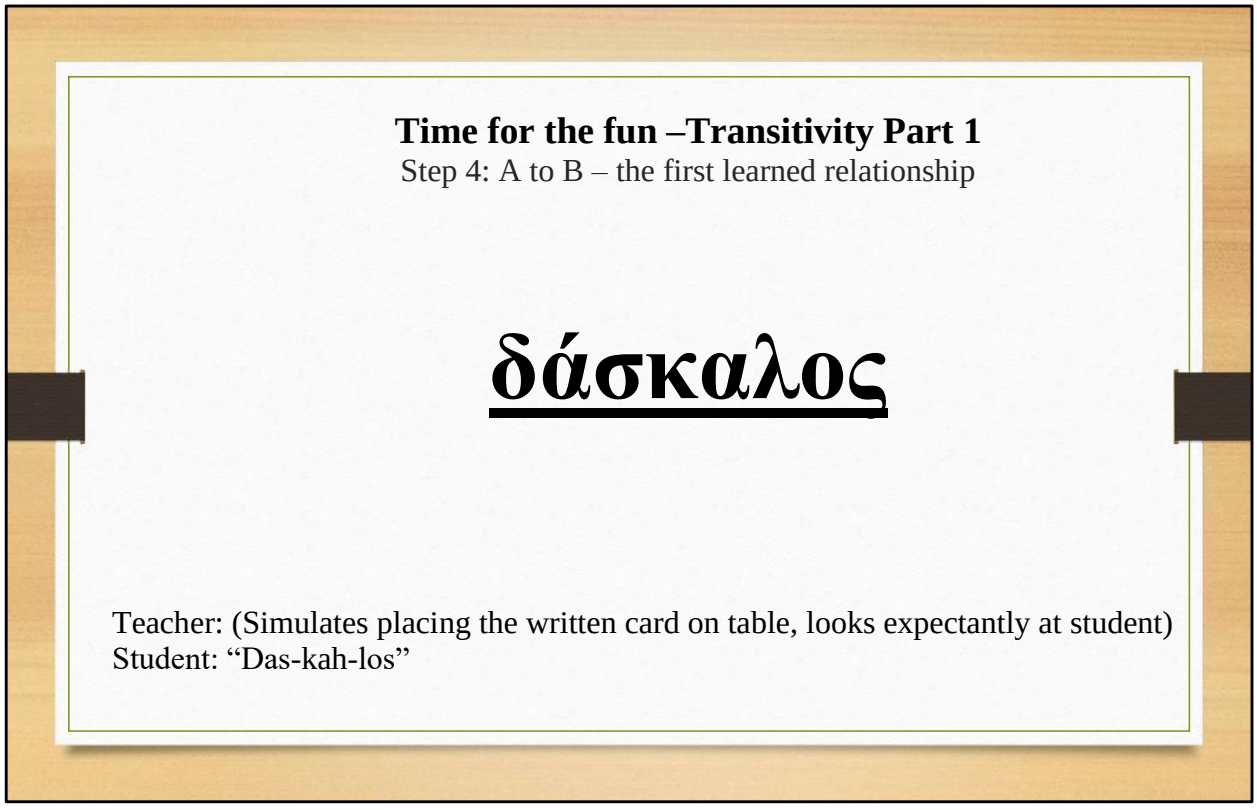
Make sure the reinforcement was done correctly. Answer any questions. You can repeat the step if the teachers want to do so.

Your Turn to Experience EBI –Symmetry Part 2

Step 3: B to C

Teacher: “Das-kah-los” (Then places the picture card on the table)
Student: (Simulates touching inside the oval) “Touch inside oval”
Reinforcer: (with enthusiasm) “Yes, Das-kah-los”

It is okay to practice this step again too. Make sure the reinforcement is happening. The next four cards have no reinforcement so the reinforcer part will drop after this slide.



If the participant who is providing reinforcement asks why their part is not included, remind them that there is no reinforcement during checks for understanding. All the slides with Transitivity are checks for understanding even though it looks like symmetry. Technically it is symmetry but because this relationship (A to B) was not previously trained, it become the first learned relationship. This means the student connected the concept on their own rather than having it taught and reinforced.

And the fun continues –Transitivity Part 2

Step 5: “C to B” the second learned relationship

Teacher: (Places the picture card on table looks expectantly at student)
Student: (Simulates touching inside the oval) “Das-kah-los”

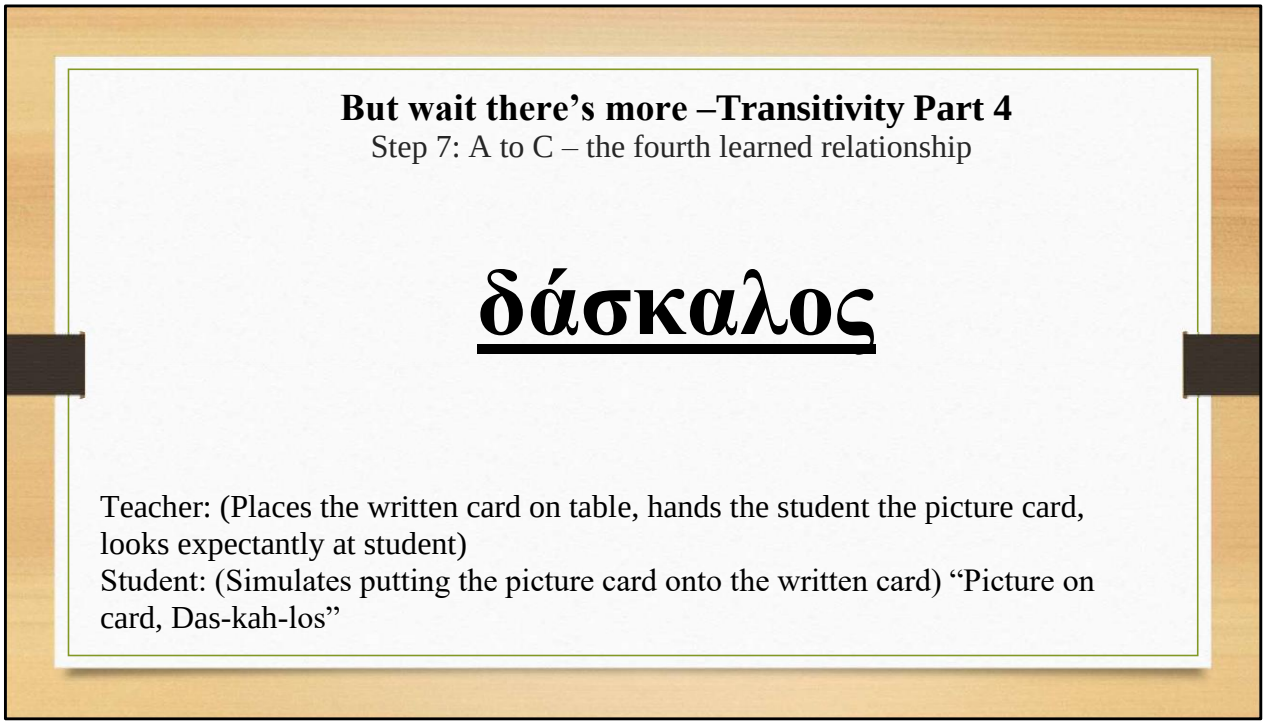
Remind the participants that the focus is we are checking for understanding of (C to B) after learning (B to C).

It's like magic –Transitivity Part 3

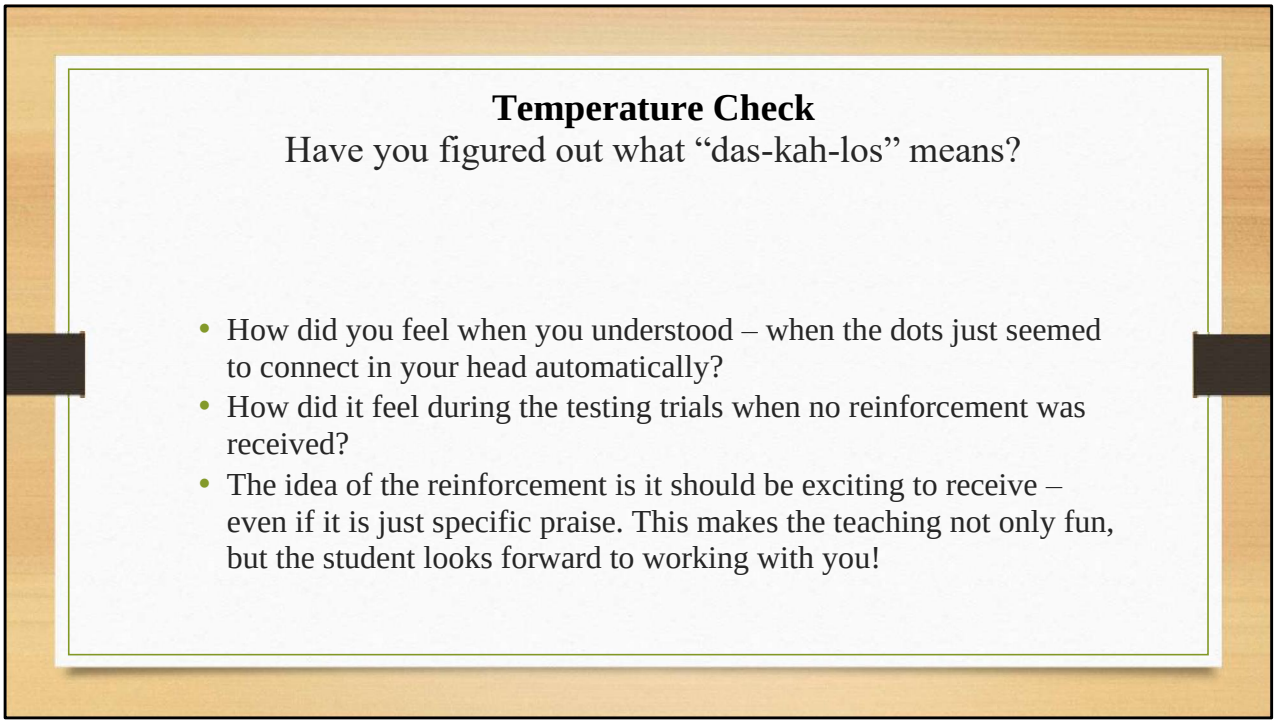
Step 6: C to A – the third learned relationship

Teacher: (Places the picture card on table, hands the student the written card, looks expectantly at student)
Student: (Simulates putting the card onto the oval) "Card on oval, Das-kah-los"

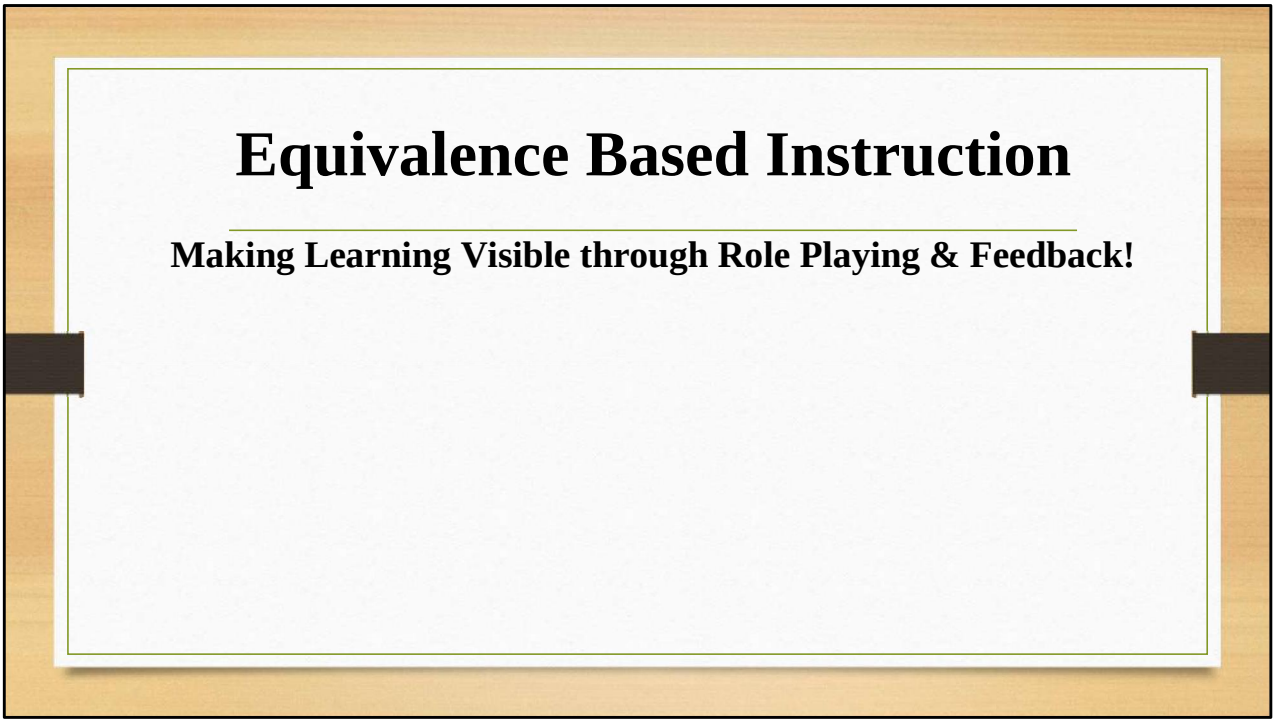
This time the student labels the picture by placing the written card onto the picture card.



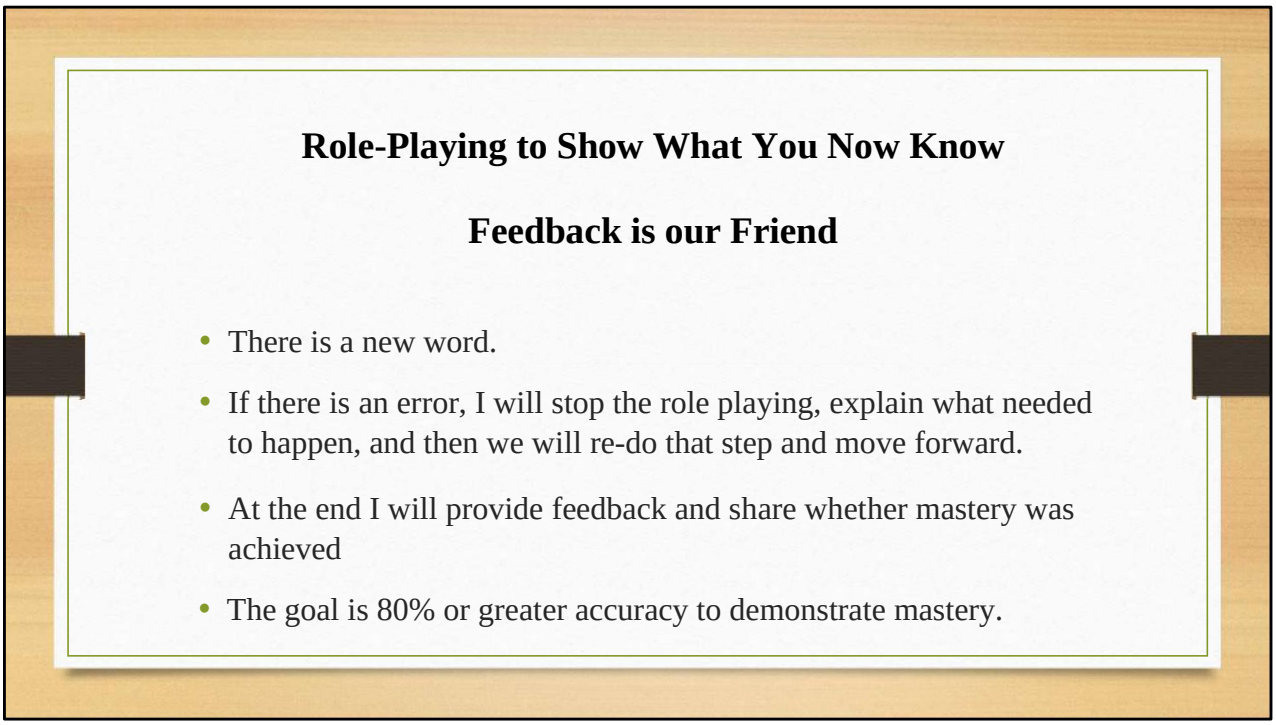
I hand you the picture card – tell me where you put it –
Again, this is a testing trial so no reinforcement



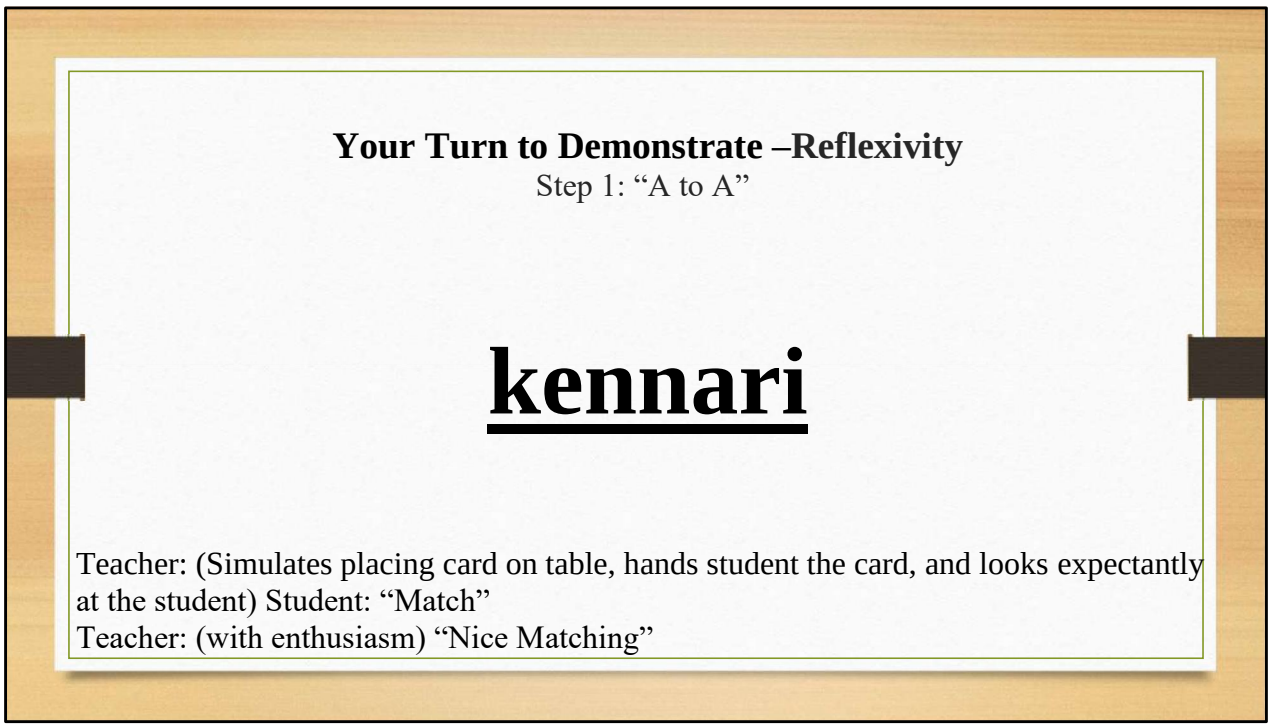
You can discuss these additional ideas if the teachers do not mention them or are trying to make it makes sense. Did you notice the change in statements on the last two steps? This is where all the parts together – written word, spoken word, and picture – and are substitutable or interchangeable. This is the part where concept comprehension, an invisible or internal event, becomes an external behavior in a systematic way.



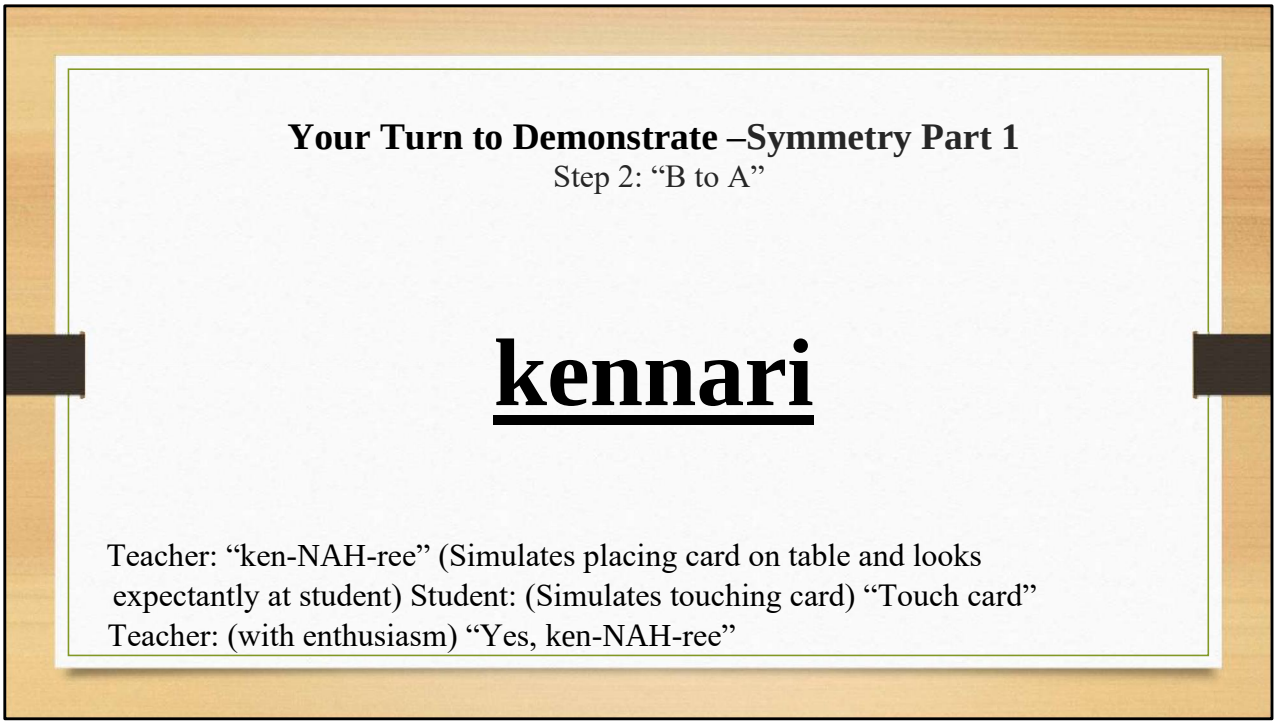
This is the rehearsal phase of BST.
You move into the trainer role of observing, providing immediate corrective feedback, counting how many of the 7 steps were done correctly and providing overall positive feedback for participating.



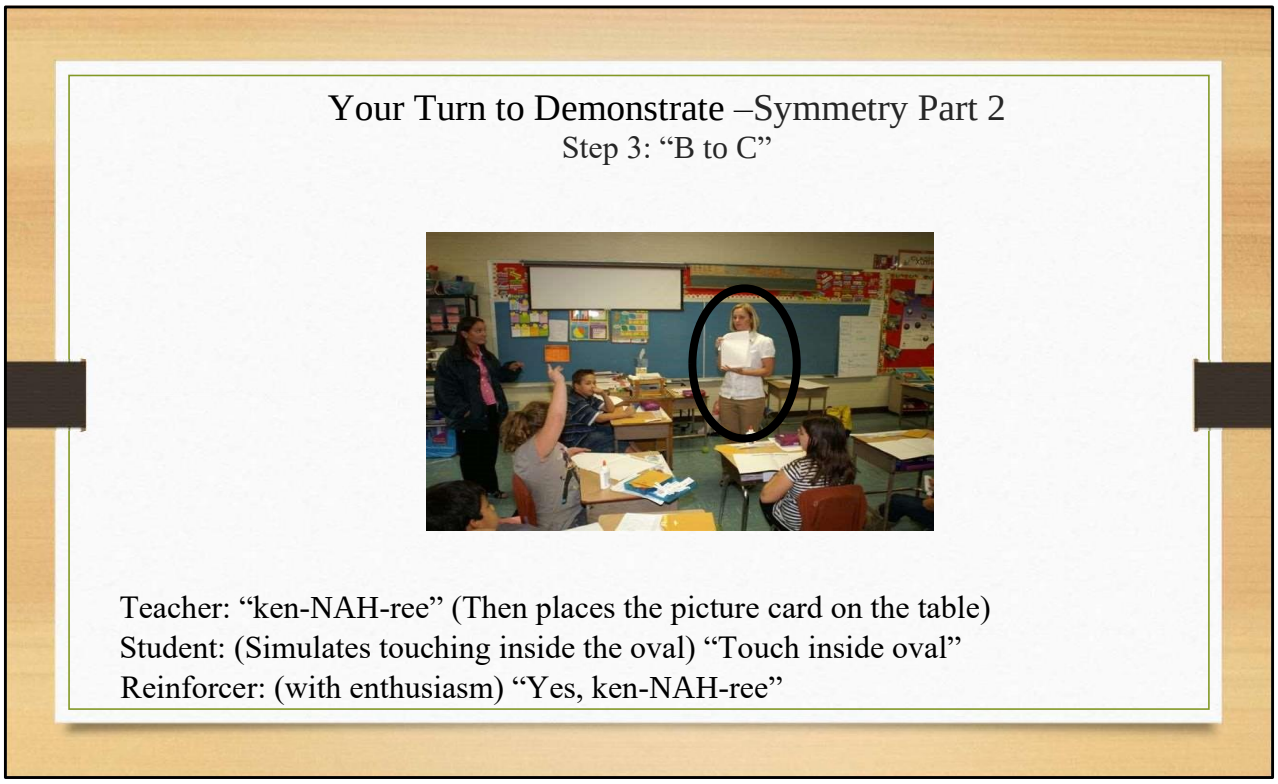
REMINDER: Remember that reinforcement only happens during the teaching, not the checking for understanding.
The teacher that played the student will now play the teacher role. The reinforcer is now the student.
NOTE: Let them know you will be watching for accuracy of step implementation. If there is an error, you will step in, provide corrective feedback, and then ask to just start at that step and move forward. Mastery is 80% so one step can be corrected, and mastery can still be achieved.



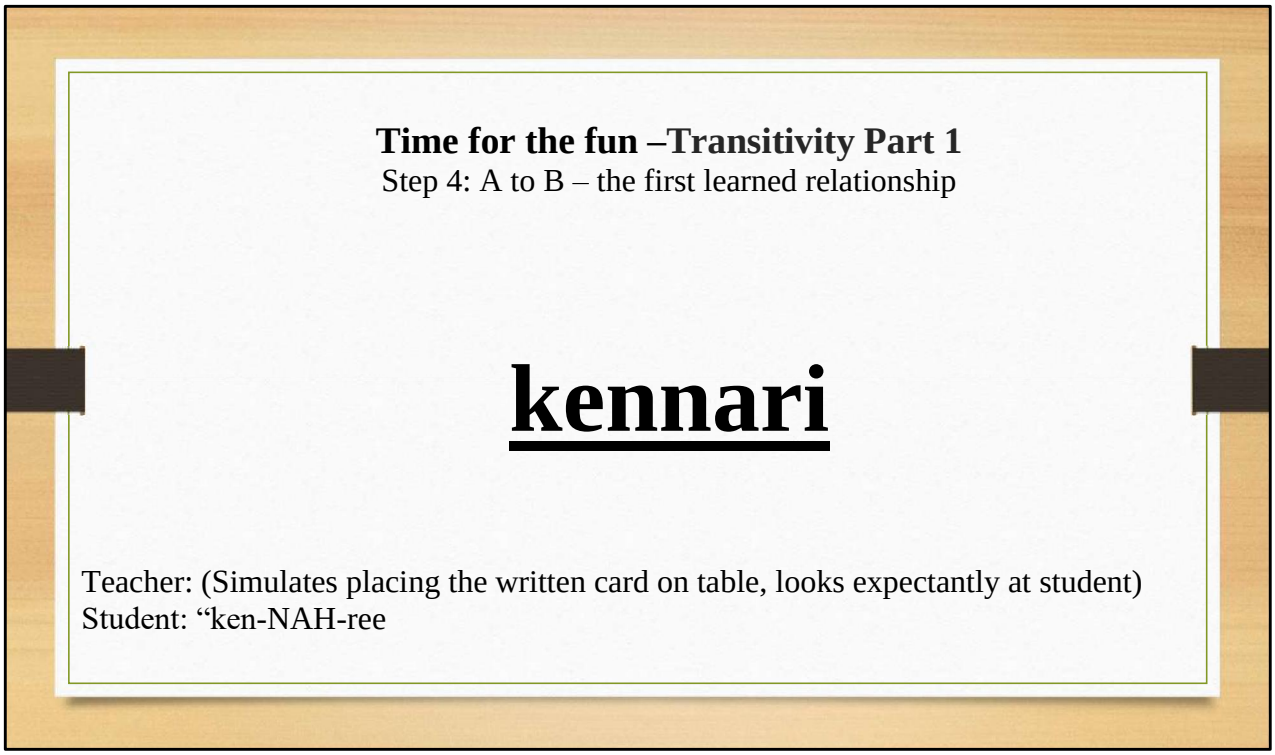
REMINDER: Make sure the reinforcement happens as close as possible to the student response. If done correct, click to next slide. Only provide feedback if the is an error.



Make sure the reinforcement was done correctly. If everything is correct, click to next slide.



Make sure the reinforcement was done correctly. If everything is correct, click to next slide.



Make sure the reinforcement was done correctly. If everything is correct, click to next slide.

NOTE: this is typically where an error occurs as the teacher is used to providing reinforcement. Remind the teacher this is a check for understanding so reinforcement is not provided. If the error occurs here, stop and restart from this slide, do not go back to the beginning.

And the fun continues –Transitivity Part 2

Step 5: C to B the second learned relationship

Teacher: (Places the picture card on table, points to the oval, looks expectantly at student)
Student: “ken-NAH-ree”

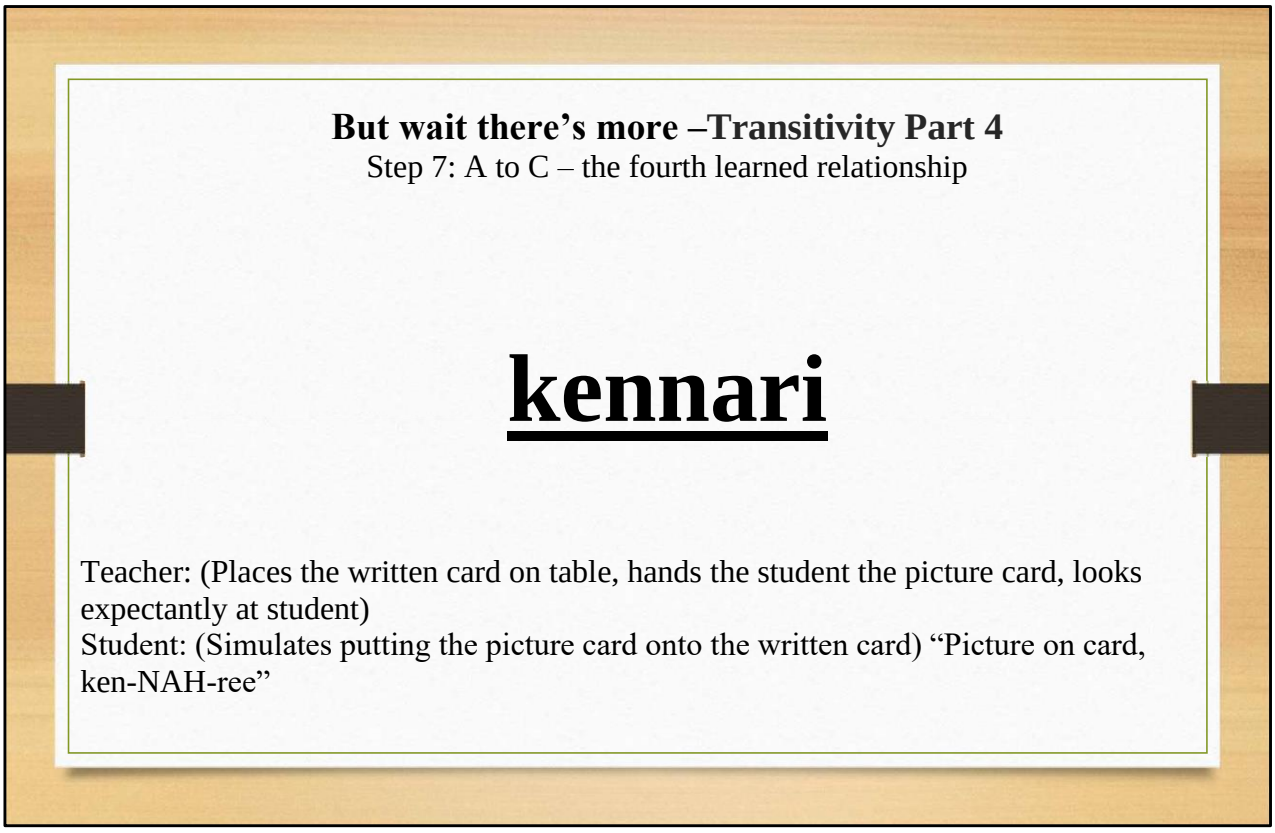
If everything is correct, click to next slide.

It's like magic –Transitivity Part 3

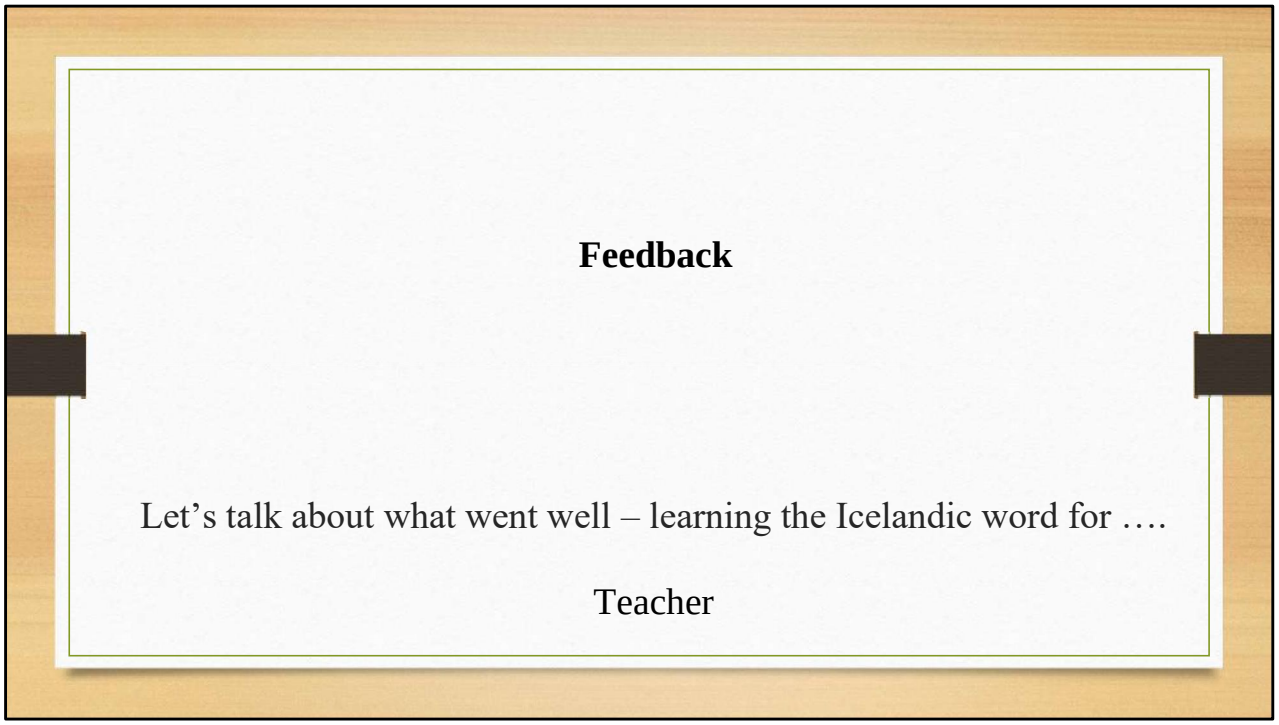
Step 6: C to A – the third learned relationship

Teacher: (Places the picture card on table, hands the student the written card, looks expectantly at student)
Student: (Simulates putting the card onto the oval) "Card on oval, ken-NAH-ree"

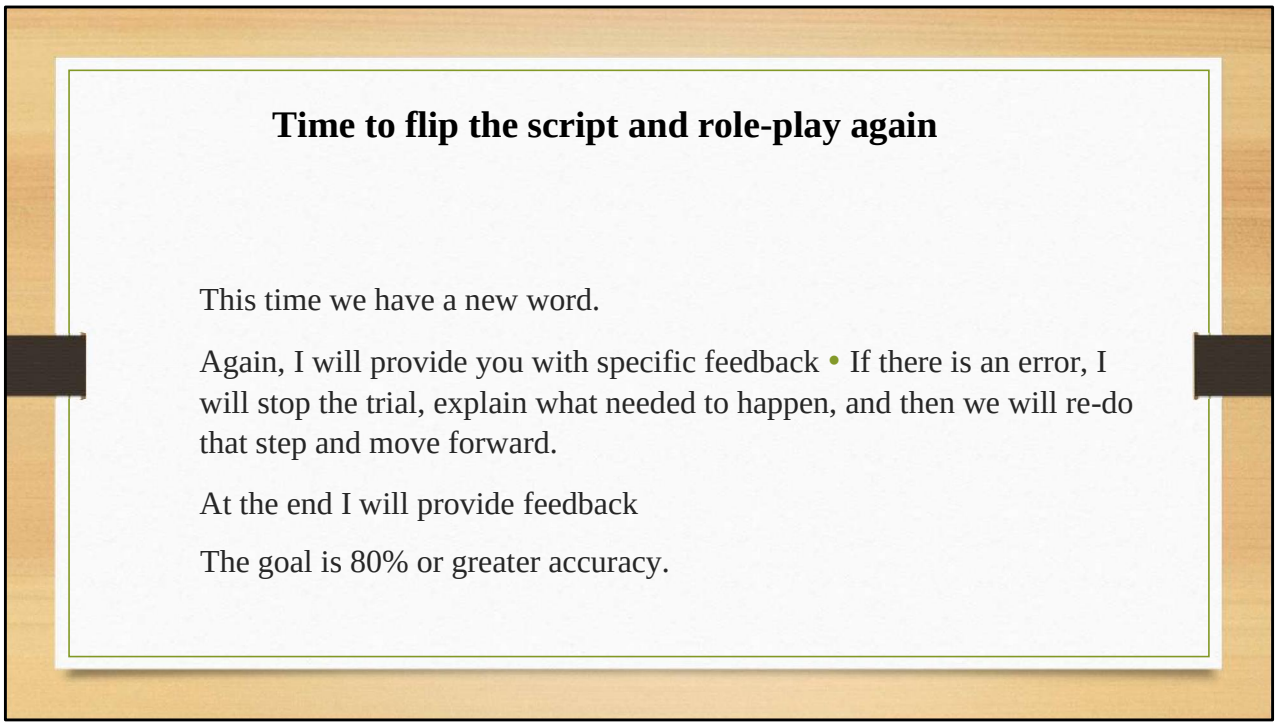
If everything is correct, click to next slide.



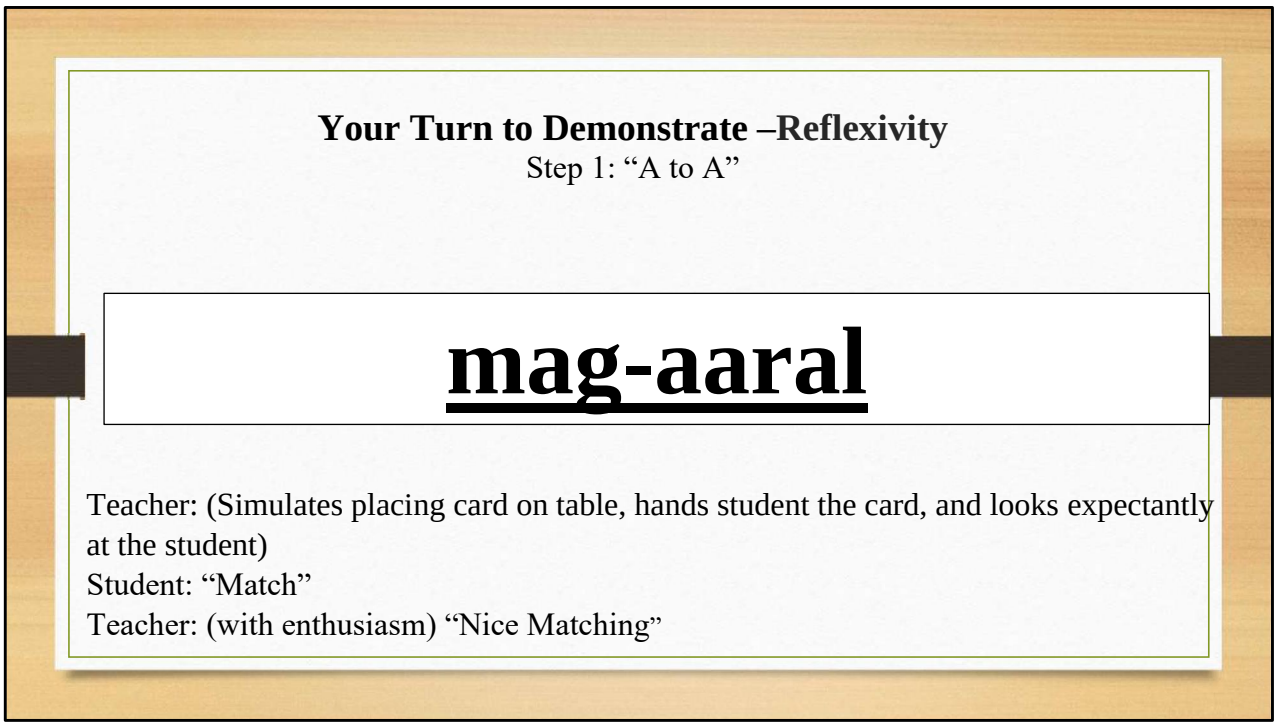
If everything is correct, click to next slide.



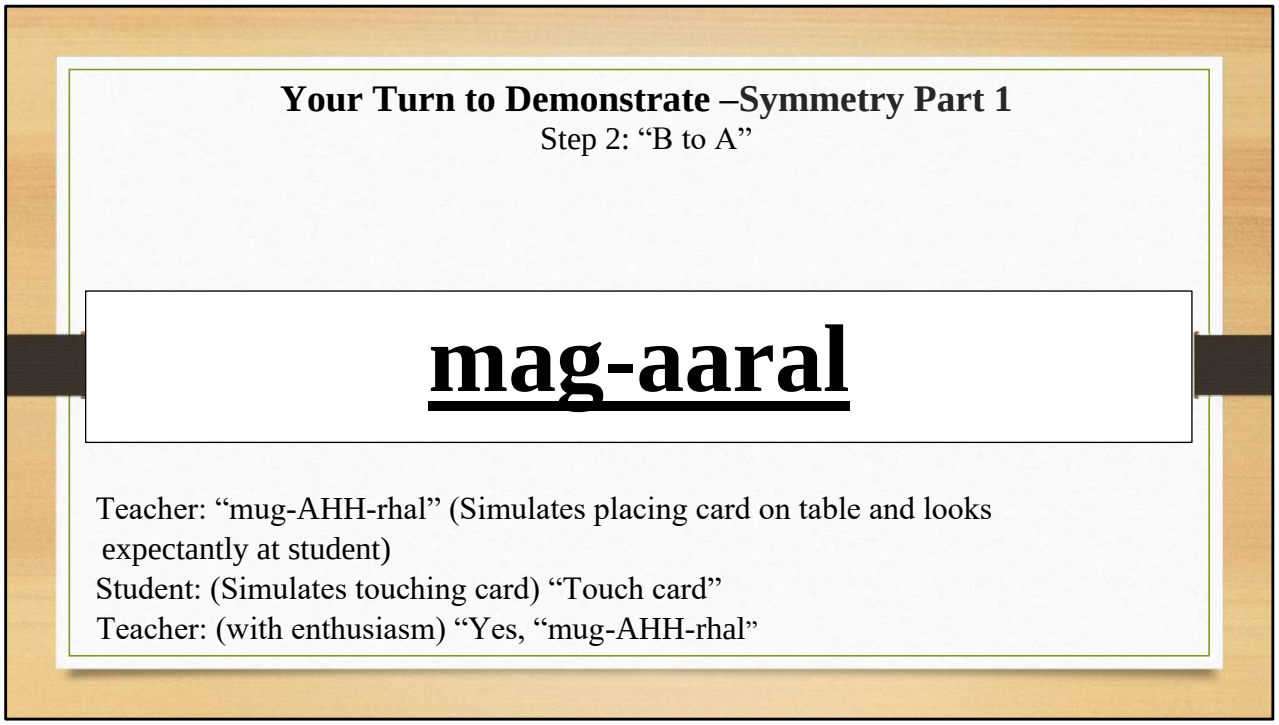
Teacher …Share all the things that went well – be as specific as possible. The positive feedback should outweigh the corrective feedback if any was given. Provide the score for the number correct – what percentage. If 80% or higher highlight the fact that it was achieved on the first go around.



The participant who was the student is now the teacher, and the participant who was the teacher is now the student.



REMINDER: Make sure the reinforcement happens as close as possible to the student response. If done correct, click to next slide. Only provide feedback if the is an error.



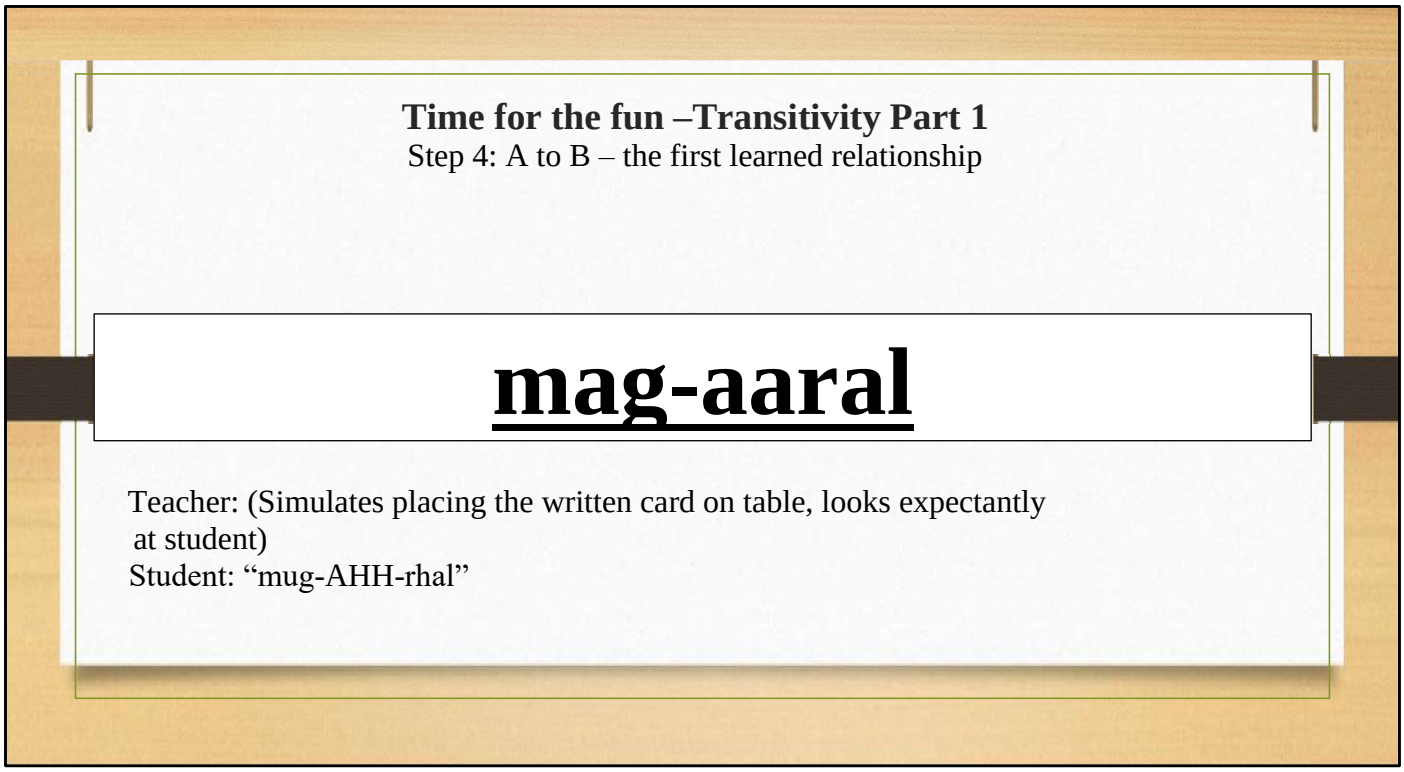
Make sure the reinforcement was done correctly. If everything is correct, click to next slide.

Your Turn to Demonstrate – Symmetry Part 2

Step 3: “B to C”

Teacher: “mug-AHH-rhal” (Then places the picture card on the table)
Student: (Simulates touching inside the oval) “Touch inside oval”
Reinforcer: (with enthusiasm) “Yes, mug-AHH-rhal”

Make sure the reinforcement was done correctly. If everything is correct, click to next slide.



Make sure the reinforcement was done correctly. If everything is correct, click to next slide. NOTE: this is typically where an error occurs as the teacher is used to providing reinforcement. Remind the teacher this is a check for understanding so reinforcement is not provided. If the error occurs here, stop and restart from this slide, do not go back to the beginning.

And the fun continues –Transitivity Part 2

Step 5: C to B the second learned relationship

Teacher: (Places the picture card on table, points to the oval, looks expectantly at student)
Student: "mug-AHH-rhal"

If everything is correct, click to next slide.

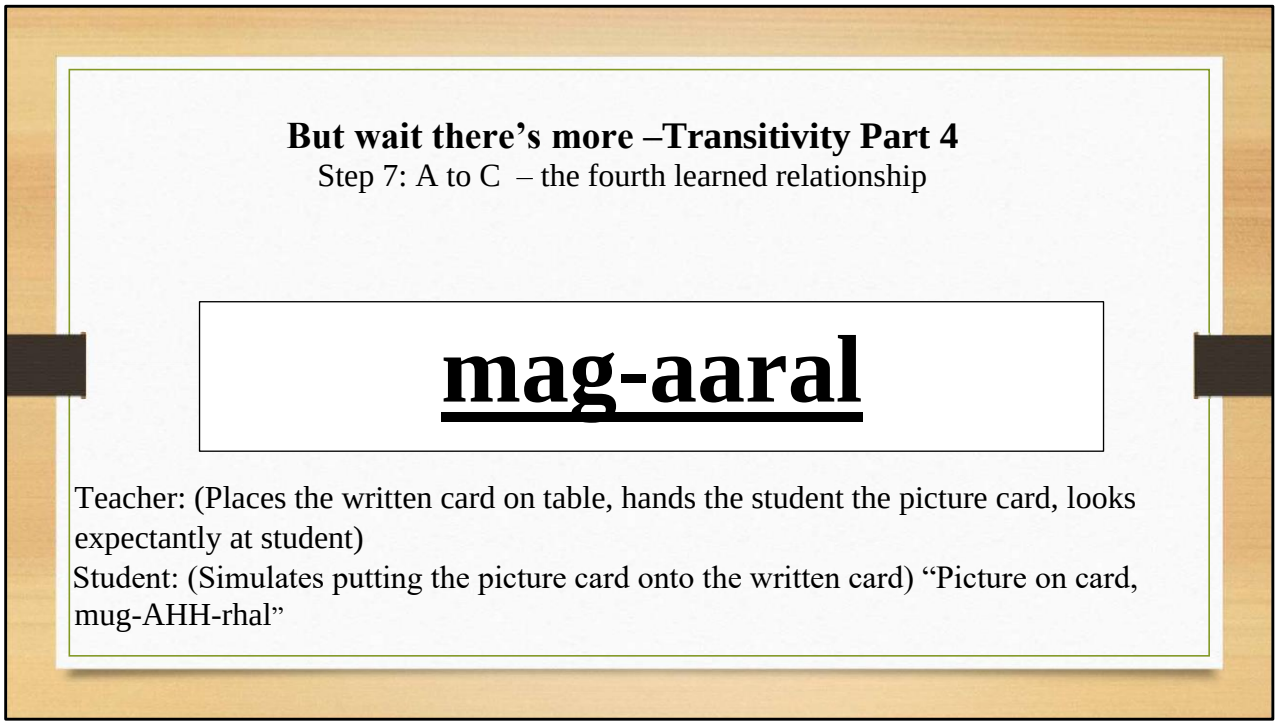
It's like magic –Transitivity Part 3

Step 6: C to A – the third learned relationship

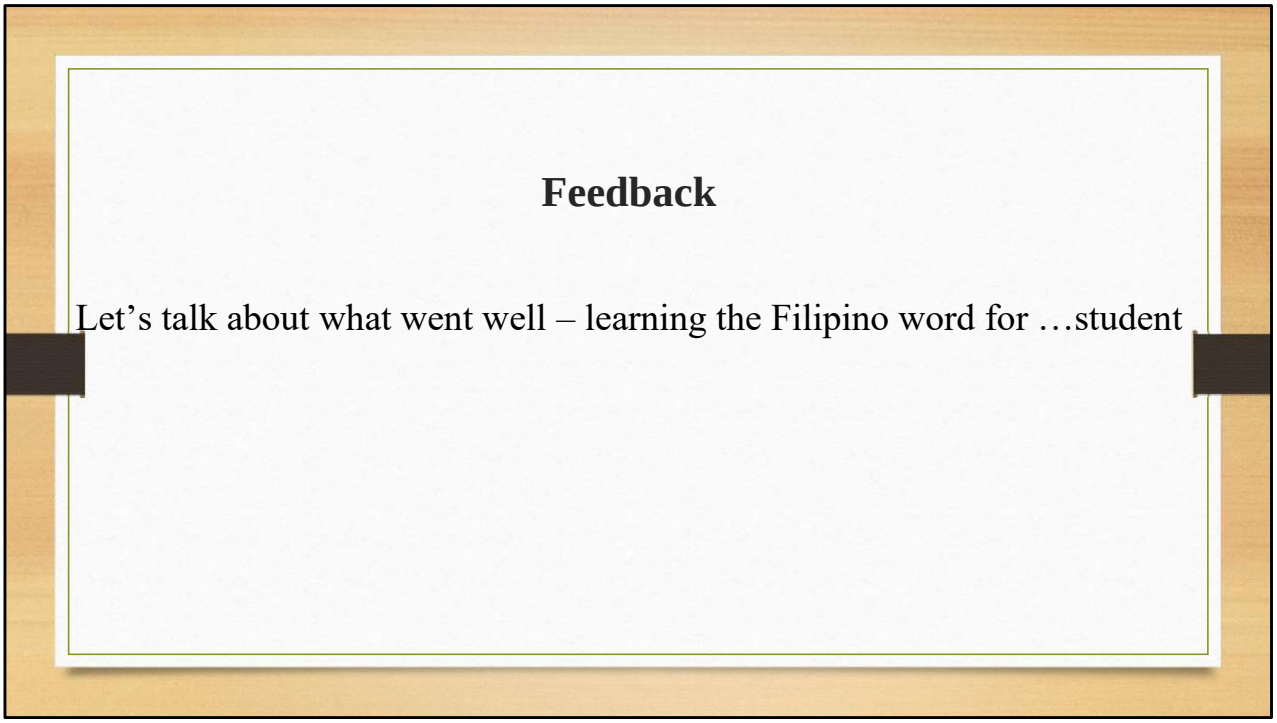
Teacher: (Places the picture card on table, hands the student the written card, looks expectantly at student)

Student: (Simulates putting the card onto the oval) "Card on oval, mug-AHH-rhal"

If everything is correct, click to next slide.



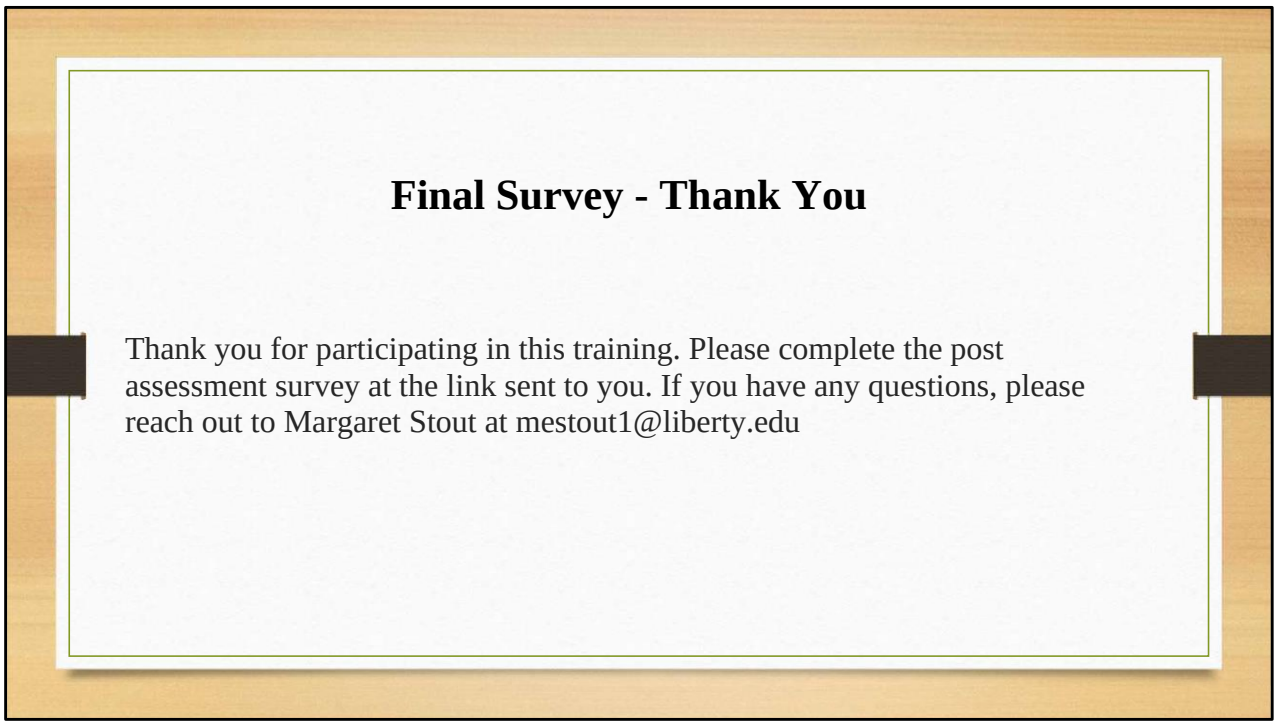
If everything is correct, click to next slide.



Share all the things that went well – be as specific as possible. The positive feedback should outweigh the corrective feedback if any was given. Provide the score for the number correct – what percentage. If 80% or higher highlight the fact that it was achieved on the first go around. Ask at what point did the lightbulb go on? Did they anticipate the word to be "teacher" rather than "student". Emphasize that it is important to teach different words as students can sometimes anticipate the word as well and make incorrect connections. This results in scrolling and generalization errors.

Questions?

What can I answer or clarify for you…
Do you have any questions? Need any clarifications?



Remind the teachers that this was part of a research study. Please highlight the need for the post-assessment survey to be done. Be sure to thank you participants. Contact Margaret to let her know the training is completed.