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Development and Testing of the Performance Diagnostic Checklist for Instructors

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Development and Testing of the Performance Diagnostic Checklist for Instructors

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Applied Behavior Analysis
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DEDICATION

Dedicated to my parents, Jan and George DePaolo, whom I thank for always letting me attempt to, as my toddler self once coined, “do it mine self” and for being there to help me if I couldn’t.

Mom, thank you for ingraining and feeding my curiosity, and for teaching me that in order to succeed, you cannot be afraid to fail along the way. And thank you for always being my biggest supporter - from sports games, to ballroom dance class, to academics, and every other endeavor I have embarked on, you were always there cheering me on and for that, I am forever grateful.

Dad, thank you for teaching me that hard work always pays off. Maybe not right away, but eventually. And thank you for the early morning newspaper runs that allowed me to get where I am today, 20+ years later.

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ABSTRACT

Behavior analysts have been studying behavior related to academic instruction for decades (Dunlap et al., 2001). Instruction has focused primarily on K-12 teachers with much less emphasis on college level instructors (Baum & McPherson, 2019). Additionally, studies related to improving instruction often lack information related to why a particular intervention was chosen. Creating an assessment tool to assist in determining interventions that would be most effective for improving classroom or virtual instruction could be beneficial. Therefore, the purpose of study one was to develop the Performance Diagnostic Checklist for Instructors (PDC-I) which will help guide supervisors of college instructors into choosing the most effective and efficient type of intervention(s) to improve at least one aspect of their teaching behavior. The purpose of study two was to evaluate the use of the PDC-I with three instructors teaching online courses at the graduate level. Results suggest that the interventions developed based on the results of the PDC-I improved each instructors performance of responding appropriately to student discussion board posts.

CHAPTER ONE:

INTRODUCTION

Applied Behavior Analysis (ABA) has been used within the education system for decades and has resulted in success in improving instruction and student performance (Dunlap et al., 2001). Many studies have focused on K-12 instruction with very little attention paid to instruction at the college or university level (Baum & McPherson, 2019). The quality of preparation for instruction in higher education is not well documented. Additionally, Ph.D. programs meant to prepare students in teaching may only include one teaching course and limited teaching assistantships (Arum & Roksa, 2011; Baum & McPherson, 2019). With the advent of online education, instruction practices may not only need to be studied further but also updated for successful virtual instruction. Even prior to the COVID-19 epidemic, the growth of the online education market was predicted to be as much as \$350 billion by 2025 (Koksal, 2020). With a substantial portion of college students enrolling in online courses, it is important to examine how to improve online instruction.

Training Online Instructors

Some research has focused on training online University instructors (Cook & Steinert, 2013; Taylor & McQuiggan, 2008; Wolf, 2006). Cook and Steinert (2013) conducted a literature review pertaining to online faculty development training for health professionals. During their review, the authors found that the evidence base for online faculty development is, “sparse and

unsubstantial” and that improving the effectiveness of online learning is needed. The authors suggested that future research investigate the specific principles that will allow for successful instruction. Taylor and McQuiggan (2008) evaluated how online educators at Pennsylvania State University obtained the knowledge and skills needed to teach online courses. They also sought to examine what additional resources those educators thought would benefit them in the future. Via an online survey they found that the university was not meeting the “professional development needs” of their faculty and staff and suggested that future research focus on a “needs assessment.” Respondents to the survey also recommended that instructors give feedback to students, engage in high-quality interactions, and set clear expectations for students. The course delivery topic that the survey participants indicated facilitated the most interest by students was discussion forums. A meta-analysis and interviews conducted by Wolf (2006) found that no universal practices exist for training faculty but those faculty who completed a formal training on the course delivery system, information on pedagogical strategies, and received feedback were successful in teaching online. Wolf suggested that formal training and on-going support is essential for instructors teaching online courses.

Online instructor trainings are often conducted through workshops and brief one-on-one sessions focused mainly on how to use the technology including the course management system that is used (e.g., Blackboard, Canvas, Teams etc.) and embedded software (Meyer & Murrell, 2012). Some programs also include instructional design components, such as class objectives and learning assessments, but very few programs include actual teaching strategies for improving online learning. The Meyer and Murrell study found that 90% of the 44 higher education institutions that participated in their survey reported workshops and short information trainings were used as the main or only training activity. The lack of diversity in interventions to improve

instruction is problematic because while an antecedent-based procedure like training may lead to behavior change in some instances, implementing additional procedures could enhance training and result in greater more sustained behavior change over time. Research in improving K-12 instruction has resulted in improvements in teacher behavior and student outcomes (Conroy et al., 2014; Gianoumis et al., 2012; Hogan et al., 2015). For example, behavior skills training, which includes instruction, modeling, rehearsal, and feedback, was successful in training elementary education teacher's to correctly implement behavior intervention plans (Hogan et al., 2015) and to conduct discrete trial training with high levels of fidelity (Moore et al., 2002). Additionally, studies that have taught teachers to increase academic engagement and respond positively to students have resulted in improved educational outcomes for students in K-12 classrooms (Armendariz & Umbreit, 1999; Craft et al., 1998; Partin et al., 2010).

Unfortunately, studies on instructor performance in higher education do not state if or how interventions were matched to the factors contributing to deficits in performance, so it is not known if the most effective and efficient strategies were chosen. The current research does not provide supervisors guidance on choosing the most appropriate interventions for the needs of their instructors. A possible solution to this problem is to have instructors use assessment tools before choosing interventions, much like other behavioral research that uses functional assessments to identify factors contributing to problem behavior so that information can be used to guide treatment selection (Beavers et al., 2013; Hanley et al., 2003; Iwata et al., 1982/1994). Such an assessment would allow supervisors of college level instructors to choose the most appropriate interventions which could lead to increases in instructor performance and improvements in student learning outcomes.

Performance Diagnostic Checklists

Researchers within the field of organizational behavior management (OBM) had a similar problem in how to identify interventions for improving important employee performance behaviors which led to the development of functional assessment approaches (Austin et al., 1999). Because there was a lack of OBM-based assessments to address this concern, Austin (2000) created the Performance Diagnostic Checklist (PDC). The field of OBM has been using and adapting this assessment tool with organizations for almost 20 years and finding great success in improving a variety of employee behaviors (Doll et al., 2007; Gravina et al., 2008; Pampino, et al., 2003; Rodriguez et al., 2008). The purpose of the PDC is to help pinpoint variables contributing to subpar performance of employees and develop interventions that match the areas needed for improvement. Austin developed the PDC by interviewing OBM experts on ways they were currently assessing performance-based problems and then developed a questionnaire that included the different areas of performance described (Rodriguez et al., 2008). The original PDC consisted of 20 questions broken into four categories: Antecedents and Information, Equipment and Processes, Knowledge and Skills, and Consequences. All PDC questions are asked in a yes/no format. After the employee has answered all the questions, researchers then use this information to create interventions to improve performance. The interventions focus on the category that the PDC showed significant deficits. However, it is not uncommon for interventions to focus on more than one category, should the information gathered from the PDC show deficits in multiple categories.

The PDC has been studied and demonstrated successful outcomes in a variety of service industry settings. For example, Rodriguez et al. (2008) used the PDC to design an intervention to increase the percentage of opportunities an employee offered a promotional stamp to customers

across two restaurant settings. An opportunity to offer the promotional stamp was considered to have occurred when a customer entered the store and ordered. This dependent variable was socially significant to the managers, as well as the business, because the stamps had the potential to increase the percentage of returning customers. Data sheets were used to collect whether employees offered the promotional stamp by the cashier. Both individual and group data were collected. Following a baseline period, the PDC was administered with one manager and employee in each store. Interventions were designed to pinpoint the areas that the PDC suggested needed improvement. Store 1's PDC results identified that both the Antecedent and Information category and Equipment and Processes category were 'somewhat' problematic for both employee and manager responses. The manager responses also identified that the Consequence category was 'very' problematic. Researchers suggested that a consequence-based intervention be implemented along with antecedent and equipment-based interventions. Store 2's PDC showed similar results. The Equipment and Processes category was noted as problematic, the Antecedent and Information category was 'somewhat' problematic, and the Consequence category was 'highly' problematic. This store also did not already have programmed consequences and researchers suggested these be implemented along with antecedent based strategies. A treatment package was introduced during intervention, consisting of task clarification, self-monitoring, equipment modification, goal setting, and graphical feedback. During baseline, Store 1 offered stamps an average of 26% of opportunities. During intervention, this percent increased to 72%. Store 2 had a baseline average of 11% and increased to an average of 81% during intervention. This study suggests that the PDC can be an effective and efficient assessment tool when developing interventions.

Another study that used the PDC in a restaurant type setting was conducted by Pampino et al. (2003). In this study, the PDC was used to help select an effective intervention in a local coffee shop. Researchers administered the PDC to the owner and four employees. Prior to the assessment, the owner expressed she was satisfied with the customer service but was not satisfied with the maintenance that was supposed to be completed each day before closing. After the assessment, experimenters agreed that the dependent variable would be percentage of closing tasks completed. They then developed a 95-item 'closing duties' checklist. This was then divided into two task groups. Group 1 consisted of items such as stocking duties and the store's appearance. Group 2 consisted of cleaning duties such as sweeping, mopping, and cleaning equipment. The independent variable in the study was task clarification, training on the 95-item checklist, a lottery for employees, and daily public posting the number of tickets employees earned for the lottery. When employees completed 90-99% of the tasks, they received a lottery ticket after their shift. If they completed 100% of the tasks, they received two tickets. Data sheets, showing the amount of lottery tickets each employee had earned, were publicly posted in the employee common area. Percentage of tasks completed during baseline averaged 44% for Group 1 and 32% for Group 2. The package intervention was then introduced and was staggered across tasks groups. During intervention, the average percent of tasks completed was 86% for Group 1 and 67% for Group 2. Results of this study suggest that the PDC can be an effective tool for assessing areas for improvement within an organization.

Several other studies were conducted using the PDC within other types of businesses including medical centers and retail stores (Doll et al., 2007; Gravina et al., 2008). Gravina et al. (2008) used the PDC to assess appropriate interventions to use at a physical therapy center. In this study, participants included two full-time and four part-time workers at a university clinic

that offered physical and occupational therapy. The dependent variable chosen was the percentage of checklist items completed for each area where therapy was implemented, and the checklist was developed with the help of a supervisor. Tasks on the checklist were aimed towards proper set up of therapy equipment and proper hygiene regimens. Following baseline, researchers conducted a functional assessment by using the PDC with the manager and employees. Due to the information gathered from the PDC, the interventions chosen included: task clarification, equipment manipulations, and graphical feedback. These interventions were implemented as a package and employees were trained on each item on the checklist. The checklist was then posted for employees to see, with graphical feedback posted above, on a bi-weekly basis. An ABC multiple baseline design across behaviors was conducted. Following a six-week baseline, the intervention package was introduced in the first therapy room. It was introduced in the hygienic activity area three weeks later. One week later, in the therapy room, graphical feedback was replaced with verbal feedback. One week after that, the same change was made in the hygienic activity room.

Results of this study indicated improvement during intervention phases. During baseline, the therapy room had an average of 18.4% of the checklist tasks completed. During the first package (with graphical feedback), the average checklist items completed increased to 82.1%. During the second package (with verbal feedback), the average checklist items completed dropped slightly to 75.6%. In the hygienic activity area, the baseline average was 56.5%. During the first treatment package, the average number of completed items increased to 90.3%. This number increased again during the second package to 100%, indicating that the PDC was successful in determining areas of improvement to target.

Within the retail industry, Doll et al. (2007), used the PDC to inform intervention within a ski shop that sold skis, ski boots, and outerwear. Three weeks prior to the onset of the study, researchers met with the shop's manager and conducted the PDC. The following three areas were found to "be in need of improvement" based on the results of the PDC: cash register documentation, suggestive selling at checkout, and store cleaning. The manager and researcher chose "store cleaning" as the target behavior. An ABC design was implemented and included a two-week baseline phase. Following baseline, an intervention package was implemented that consisted of task clarification, performance checklists, and graphical feedback. During baseline, the average cleaning behaviors ranged from 13-60% and increased to a range of 79-83% during the first intervention. During the second intervention, all but one behavior increased to 100%. Though this was a brief study and utilized an ABC design, which lacks sufficient experimental control, it added to the PDC literature and is another example of a successful intervention, following the use of the PDC as an assessment tool.

Given the success of the PDC, both modified and adapted versions have been created (Amigo et al., 2008; Carr et al., 2005; Martinez-Onstott et al., 2016). Amigo et al. (2008) used a modified version of the PDC to help with ABC data collection, prior to intervention. This study was conducted at a pizza restaurant, and participants were female lunchtime waitresses and a male manager. Aside from serving customers, servers were expected to bus tables once customers left. Busing duties included clearing off any remaining dishes, spraying the tables and chairs with cleaning solution, wiping down the tables and chairs, and taking the dirty dishes to the washroom. Then, servers were expected to wash their own dishes. The PDC was used to help researchers select both an appropriate dependent variable and the intervention(s). Following the assessment, researchers found it appropriate to implement both antecedent and consequent

strategies. Busing time was selected, based on the PDC results, as the dependent variable and was defined as the amount of time it took a server to correctly bus a table. An ABC design was conducted to evaluate the intervention that consisted of task clarification and goal setting memos. At the onset of this phase, a memo was given to all employees that gave detailed steps of how to correctly bus a table. This memo also stated the management team's new busing table goal of 3 min or less. Employees all signed the memo, indicating that they reviewed and understood it. Staff members were given no other feedback. Following the memo phase, verbal and graphical feedback was introduced. Managers delivered weekly individual feedback and group feedback was provided weekly in the form of a graph that showed the average bus time across servers. Additionally, the graph listed the name of the server with the 'best' bus time for the week. Before intervention, bus times averaged over 5 min and following intervention phases, bus time decreased to an average of 2.5 min. Unfortunately, the authors did not specify what exact changes or modifications they made to the PDC for this study.

In addition to minor revisions to the PDC, researchers have also adapted the PDC to other settings and populations. The two most well-known adaptations of the PDC are the PDC-Human Services (Carr et al., 2005) and the PDC-Safety (Martinez-Onstott et al., 2016). The PDC-Human Services (PDC-HS) was created to assess variables in the employee's environment that may be causing problems with performance for organizations that provide care for others. However, the section titles and questions were altered, along with their order, in order to better fit the human services setting. This assessment also consists of four categories and a total of 20 questions. The categories are Training, Task Clarification & Prompting, Resources, Materials & Processes, and Performance Consequences, Effort, and Competition. Aside from the authors, 11

other behavior analysts provided input on the questions after reviewing and pilot testing the assessment.

Carr et al.'s study using the PDC-HS was conducted at an early intensive behavior intervention (EIBI) clinic that served young children. The participants in the study were 15 clinic staff members that worked one-on-one with clients providing EIBI treatment. They were also responsible for cleaning the treatment rooms at the conclusion of their sessions. Participants were properly trained on how to clean the therapy rooms, approximately one month before the study began. During this training, they were shown the checklist that would be used when scoring their performance. The percentage of tasks correctly completed on a "treatment room cleaning checklist" was the dependent measure. For both baseline and intervention sessions, data was collected by observers for 10-15 min after the session had ended and participants were not in the room when the observations were conducted. Following a baseline period, a researcher used the PDC-HS to interview three supervisors in reference to the treatment room cleanliness. After completing the interviews, researchers reviewed the results and identified two interventions to implement. A multiple baseline design across treatment rooms was used for experimental control. The first intervention was a combination of training and posted/graphed feedback. The rationale for this intervention was that the results of the Training and Performance Consequence sections in the PDC-HS, lead researchers to believe that these would be the most beneficial areas to target. During the training and graphical feedback phase, an experimenter entered the room before a session started and described the items on the checklist to the participant, making sure that they understood what was expected of them after their session. The checklist was posted on a wall of the room and available for participants to reference. The experimenter also informed the participants that graphed data would be posted on a regular basis.

The second intervention consisted of task clarification and moving the materials necessary for cleaning to a more convenient location. These interventions were based on the Task Clarification and Prompting and Resources, Materials, and Processes sections. These sections were not identified as being ‘problematic.’ The purpose of the second intervention was to examine the effects on an intervention in an area that was not indicated as problematic on the PDC-HS. In terms of task clarification, experimenters did not speak to the participants about the checklist, but it was posted so that it was directly in front of the participants when they entered the classroom. Additionally, materials necessary for completing the task were arranged near the checklist but no information was given on what to do with the materials. Also, no feedback was provided on performance. During baseline, levels ranged from 12-47% across rooms. During the PDC-HS identified treatment, levels drastically increased and ranged from 80-100%. During the non-identified treatment, which was only used in two rooms, behaviors increased by 11% for one and decreased by 6% in the other. Results of this study show that the interventions implemented, based on the problem areas identified in the PDC-HS, were substantially more effective than those that were not identified as problem areas.

Another version of the PDC that indicates favorable results is the PDC-Safety (PDC-S) (Martinez-Onstott et al., 2016). Before using the PDC-S, authors sent a draft of the assessment tool to six experts in the field of behavioral safety and requested that they provide feedback. All experts provided suggestions that were then considered when the tool was modified. When the PDC-S was first published, it was published alongside a study that authors conducted with three maintenance employees at a university in the United States. Prior to starting the study, authors reviewed the organization’s injury data and safety practices. After this, appropriate personal protective equipment (PPE) usage was agreed upon to be the target performance measure. More

specifically, the PPE included participants wearing gloves when working with flora or tools and wearing earplugs when working with motorized equipment. This information could be found in their employee handbook and was described as expected behavior when hired. Furthermore, employees were reminded of these safety expectations at their annual meeting a few months prior to the start of data collection. Prior to data collection, employees agreed to be a part of a safety study but were not informed of which behavior(s) would be targeted. Data were collected at least twice a week, for a minimum of 1-hour each observation period. Participants never met the data collectors and observations were done unobtrusively (via the researchers hiding out of the participant's site). The experimental design was a nonconcurrent multiple baseline design across participants. After baseline, the PDC-S was administered in order to identify potential variables related to the target performance and guide researchers into creating an effective intervention. Results indicated a lack of effective consequences as a possible contributing factor to the lack of PPE's being used. After reviewing these results, the agreed upon intervention implemented was graphical and oral feedback. After every three sessions, individual graphical feedback was delivered to participants. During baseline phases, PPE usage was at 0%. During intervention phases, PPE usage rose to a range of 75-100%. This study suggested that the adaptation of the PDC to safety was effective in developing appropriate and efficient interventions to use in the workplace to improve safety which could result in less employee injuries.

With education settings and human service settings having some similarities, along with the proven success of OBM in the human services settings, there is currently a push to incorporate more OBM in education settings. Starling et al. (2020), called for researchers to use the PDC-HS when conducting research in the education setting. The authors explain that only

25% of PDC and PDC-HS results showed that knowledge and skills were where the most deficits were found. In other words, the PDC-HS shows that training is only appropriate for about 25% of human service interventions and that 75% of the time, different intervention types such as using task clarification and prompting, providing additional resources or materials, improving different processes that might reduce employee effort, and implementing consequences based on performance should be used. As noted earlier, most higher education literature related to instructors is centered around training. University's now offer (and sometimes require) that instructors complete training programs before they are allowed to teach their first course (e.g. University of South Florida, Arizona State University, University of Massachusetts). These training programs consist of a variety of components. For example, Meyer and Murrell (2012) conducted a national study of higher education institutions and found that institutions most commonly trained their online instructors on assessment of student learning and creating a classroom community. They also found that these trainings were most often conducted via workshops and short (under two hours) one on one sessions.

OBM has been quite helpful in many different fields and would likely help supervisors of instructors to improve important teaching behaviors using a variety of on-going techniques instead of only short training programs. Rather than funneling funds to train/re-train instructors, it might be more appropriate and beneficial to put time and resources into assessment tools that could point supervisors in the direction of an intervention that is best suited for the specific instructor and teaching behavior of interest. Although the PDC-HS may be more effective than not using a PDC at all when working with educators, we believe it would be most beneficial to gear a PDC specifically targeted towards instructors themselves and ensure that the tool asks questions appropriate to their specific profession.

Therefore, the purpose of study one was to adapt the original PDC to make it applicable to the college education environment. The purpose of study two was to evaluate the use of the PDC-I with three college level instructors to determine if interventions developed based on the results of the PDC-I, would result in improved performance in responding to student discussion board posts.

CHAPTER 2:

STUDY 1 METHOD

Participants

Four individuals who were considered either experts within the fields of OBM or instructor training reviewed the PDC-I for content validity. In order to have been considered an expert in OBM, individuals had to have a graduate level degree in ABA and completed at least three OBM research studies, presented OBM research at international conferences, and led OBM research labs at the graduate school level. A total of two OBM experts reviewed the PDC-I. Both experts were current ABA doctoral students, and their main area of interest and research was in OBM. In order to have been considered an expert in instructor training, participants were to have trained and supervised instructors for a minimum of three years. A total of two instructor training experts reviewed the PDC-I. One instructor training expert was a University Psychology professor who taught a class each year to doctoral students in Psychology who were instructing their first class. She then continued to mentor these students throughout their doctoral program. The second instructor training expert was the program coordinator for a University based online ABA Master's program. Her responsibilities included developing and facilitating trainings for ABA doctoral students who were instructing their first class in an online master's degree program. This instructor was also the supervisor who participated in study two.

Procedures

The primary investigator revised the original PDC and modified the questions so that they pertained to educator behaviors. The four main categories on the original PDC remained roughly the same however some questions were removed as they were not necessary for studying instructor behaviors. In addition, the wording on some questions was revised to more laymen terms that supervisors and instructors would be more likely to understand.

The first version of the PDC-I (Appendix A) was emailed to four experts, the experts had a week to complete their review. The email included instructions to review the assessment tool and note any places where they could indicate room for improvement in order to ensure content validity. Specifically, the experts were asked to provide feedback on the clarity and comprehensiveness of each question and the tool in general. A comment box was also provided to the side of each question for the experts to leave remarks for how they might alter or add to a question.

It should be noted that one instructor training expert was from outside the field of ABA and was in their University's Psychology department. The purpose of using an expert from outside of ABA was to assist in face validity and to ensure that all items were understandable and clear to individuals outside the field of ABA.

CHAPTER THREE:

STUDY 1 RESULTS

Researchers reviewed all responses prior to finalizing the PDC-I. Based on the expert reviews, changes were made on the assessment tool (See Appendix B for revised PDC-I). Experts agreed on most items, including which questions should stay, change, or be removed. Most changes made consisted of changing the wording of questions, in order to make them more easily understandable to non-behavior analysts, as well as versatile across disciplines. For example, under knowledge and skills the first version of the PDC-I said, “Have they mastered the task? (Fluency)”. This was changed to “Have they mastered the task? -Previously met the criteria of the definition without assistance”. Also, the first PDC-I said, “Does the instructor have the capacity to learn how to complete the job?” which was change to “Can the instructor demonstrate completion of the task?”. The word “equipment” was changed to “materials” in the name of the category. The question, “Does the instructor have the capacity to learn how to complete the job?” was changed to, “Can the instructor tell you how to do it?”. Additionally, the question “Is the supervisor present during the task completion” was removed as the reviewers indicated this did not pertain to most of the college instruction.

CHAPTER 4

STUDY 2 METHOD

Participants and Setting

Three instructors who were teaching master level coursework within an online ABA program at a public state university participated in this study. All three instructors were also doctoral students at the same University in which they were teaching. All instructors were assigned a pseudonym, in order to keep their data confidential. Leslie was a third-year female doctoral student who had over two years of teaching experience in both online and in classroom instruction. During this study, she taught a course titled “Behavior Analysis and Developmental Disabilities” with a total of 20 students enrolled in the course. Ann was a second-year female doctoral student who had over one year of teaching experience in both online and in classroom instruction. She was teaching a course titled “Single Subject Experimental Design” which had 23 students enrolled in the course. Ron was a third-year male doctoral student with over two years of teaching experience in both online and in classroom instruction. He was teaching “Ethics in Applied Behavior Analysis” and 23 students were enrolled in this course. Additionally, all three instructor participants had the same supervisor. The supervisor completed the PDC-I, as well as a social validity questionnaire. The online courses that the participants were teaching were all broken into weekly modules that students were expected to complete. Weekly modules included various assignments, quizzes, and weekly discussion boards. The instructors were expected to

grade student assignments, provide feedback, and facilitate conversation on discussion boards.

Please refer to Table 1 for a summary of the instructors' demographic information.

Table 1. Instructor Demographic Information

Participant	Sex	Race / Ethnicity	Academic Year	Teaching Experience
Leslie	Female	White	3 rd year	2 years
Ann	Female	Hispanic	2 nd year	1 year
Ron	Male	White	3 rd year	2 years

Materials

Materials included the PDC-I and access to a computer.

Response Measurement and Reliability

Data were collected on instructor online weekly discussion board responses. Instructor discussion board responses were defined as individualized public responses to student posts developed to facilitate dialogue between students and the instructor as well as between students. Criteria for correct weekly instructor discussion board responses included the following: Provided a positive feedback statement, specifically addressed at least one detail discussed by a student, prompted a reply from the student, asked a question related to the student's post, and responses were expected to show professionalism (e.g., included student's name and used proper punctuation). Each week, the lead researcher viewed each participant's discussion board and scored the discussion board replies using a 0-3 scale. A score of 0 meant that the instructor responded fewer than two times that week on the discussion board. A score of a 1 meant that the instructor responded at least two times that week on the discussion board but none of their posts met the definition of a correct response. A score of a 2 meant that the instructor responded at least two times on the discussion board and at least one post met the definition of a correct

response. A score of a 3 meant that the instructor posted at least two times to the discussion board that week and at least two of their posts met the definition of a correct response.

A second observer had access to the instructor's class and independently reviewed the weekly discussion board posts, scored the posts, and then reported their score back to the primary researcher. An agreement was when the primary observer scored the exact same number (on the scale) for each week as the second observer and a disagreement was when the primary observer scored a different number than the second observer. Interobserver agreement was calculated for 50% of both baseline and intervention weeks for Leslie, 33% of baseline and intervention weeks for Ann, and 43% of baseline and 33% of intervention weeks for Ron. Interobserver agreement was 100% across all participants and phases as the primary observer and the secondary observer always reported the same score.

Treatment Integrity

The primary researcher assessed treatment integrity for 100% of weeks. The supervisor sent a picture of each intervention email that was sent to each instructor to the lead researcher, who then read it and assessed for treatment integrity, to determine if emails included the appropriate instructor's name and the content of the email was based on the appropriate score. Additionally, all emails were checked to ensure that they included praise and/or feedback on the instructor's performance and the correct definition of the behavior of interest. Treatment integrity was scored at 100% accuracy for all weeks for all three participants.

Experimental Design

A nonconcurrent multiple baseline across participants was used in this study to demonstrate experimental control.

Procedures

Prior to meeting with the instructor participants, the primary investigator met with the instructor's supervisor to determine the target behavior. The behavior chosen was discussion board responses. This behavior was one that the supervisor indicated was an important part of instruction in the online master's program because it was a way for instructors to continuously show their presence in the online course and facilitate conversations amongst students.

Previously, studies have shown that virtual correspondence (such as emails or discussion boards), are connected to both student performance in an online class and their satisfaction (Dickinson, 2017; Gunawardena & Zittle, 1997). Instructors were aware of how they were supposed to respond to discussion boards as this was part of the instructor handbook and training. It should be noted that instructors were given the handbook to review, as well as training specific to teaching online, prior to teaching in the ABA online program. Therefore, all participants had previously been instructed to respond to their student's discussion board posts. Per their handbook, instructors were expected to publicly reply to as least two student's discussion board posts per week. Additionally, those replies were to facilitate conversation. Per the handbook, instructor's "role as a discussion facilitator is critical to ensuring active and accurate discussion develops".

Prior to the instructor participants completing the PDC-I assessment tool, the lead researcher administered the tool to the instructor's supervisor. This was conducted in order to later compare the PDC-I results of the instructors to their supervisor's results. Once the researcher had the results, they met with each instructor participant to discuss the study. These meetings were held virtually through Microsoft Teams. The researcher emailed the instructors the PDC-I. She then met with each instructor virtually through Microsoft Teams to discuss the

target behavior and complete the PDC-I. The researcher stayed on the Teams meeting, in case any of the instructors had any questions about the assessment. Upon completion of the assessment, the instructors emailed the assessment to the lead researcher. At this time, they were told that the researcher was going to examine the PDC-I results and that they would be contacted later that day about next steps.

Baseline

Baseline data were collected prior to the implementation of the PDC-I. Instructors taught online classes as they normally would. The researcher reviewed the discussion posts each week during baseline and collected data on how the instructors responded to discussion boards. No feedback was provided to instructors. Instructors were not aware that data were collected on the discussion board posts throughout this phase of the study. Due to the nature of this study, the institutional review board determined that this study was exempt and considered a program evaluation. Therefore, consent was not obtained from the instructors or supervisor. It should be noted that their supervisor always had access to their courses and therefore to their discussion board posts.

Intervention

Interventions were developed based on the results of the PDC-I. The supervisor's PDC-I results suggested that 'knowledge and skills' was where interventions would be most effective. Meaning that interventions would be based around teaching the participants what was expected of them and making sure they were able to complete the task. However, the PDC-I results of all three instructors suggested that consequences would be the most appropriate area to pinpoint. All participants received the same consequence-based intervention that also included a reminder for

what was expected of the instructor for discussion board posts. Please see Table 2 for a summary of the instructors' consequence results.

Table 2. Performance Diagnostic Checklist for Instructors Consequence Results

PDCI- Question	Instructor		
	Leslie	Ann	Ron
Are consequences provided to the instructor for completing the skill?	No	Yes	No
If so, are these consequences directly tied to their employment status?	N/A	Yes	N/A
Are consequences provided to the instructor when the skill is not completed?	No	Yes	No
If so, are these consequences directly tied to their employment status?	N/A	Yes	N/A
Does the instructor know the reasoning behind completing the behavior (who the behavior directly impacts and how e.g., students, instructor themselves, department, university, etc.)?	Yes	Yes	Yes
Does the instructor see the effects of performance?	No	No	No
If so, are effects immediate?	N/A	N/A	N/A
Is there performance monitoring?	No	No	Yes
If yes, how, when, and by whom?	N/A	N/A	Peer & Self
Is there currently feedback in place, related to the completion (or lack of completion) of the behavior?	No	No	No
If yes, how, when, and by whom?	N/A	N/A	N/A
Are there other behaviors competing with the desired performance?	No	Yes	Yes
Is there a high level of effort needed to complete the skill?	No	Yes	No

On Mondays, instructors received an email from their supervisor. This email was based on the score that they received for the previous week's discussion board responses. The emails praised instructors for their responses and/or reminded them to please complete the expected

responses. All emails reminded instructors of the definition of an appropriate response. The following is an example of an email sent after an instructor scored a three:

“Hi Leslie, I wanted to reach out as I had the chance to look at your discussion board responses from last week and see you responded multiple times to your students using the criteria we are looking for. Really great work! Keep doing what you are doing! As a reminder, the criteria include providing a positive feedback statement, specifically addressing at least one detail discussed by the student, prompting a reply from the student (i.e., ask them a question) and, of course, demonstrate professionalism (e.g., include the student’s name, use proper punctuation). Should you have any questions please email me. Thank you for all the work you do in teaching ABA in DD and have a great week!”

Following three low intervention data points, researchers had Ron’s supervisor add to the Monday email’s that he was expected to email her when he completed his 2+ discussion board responses.

Social Validity

After the study was complete all three instructors and the supervisor were asked to complete a social validity questionnaire. The purpose of the social validity questionnaires was to assess the likeability and understandability of the PDC-I. Additionally the supervisor’s social validity questionnaire assessed whether the intervention selection was appropriate and how likely the supervisor would be to use the PDC-I in the future. The instructor social validity questionnaire (Appendix C) was comprised of four Likert-like type scale questions and two open-ended questions. The supervisor social validity (Appendix D) questionnaire was comprised of six Likert-like type scale questions and two open ended questions. Results from the instructor social validity questionnaires indicated that all three instructors ‘highly agreed’ that the PDC-I

was simple to understand. Additionally, all instructors 'agreed' or 'highly agreed' that the intervention used was appropriate for the behavior being targeted. Results from the supervisor questionnaire indicate that the supervisor 'highly agreed' that she believed the use of the PDC-I helped her to better understand why the target behavior was/was not happening before intervention began. Results also indicated that the supervisor 'highly agreed' that the intervention used was appropriate for the behavior being targeted and that she is likely to both use and recommend other supervisors use the PDC-I in the future.

CHAPTER 5

STUDY 2 RESULTS

Figure 1 depicts data collected during baseline and intervention for all three participants. In baseline, none of the participants scored a 3. In general, the instructors most common errors included not replying to at least two students and not asking a question in pursuit of facilitating conversation.

During baseline Leslie's scores ranged from 0-1 out of 3. After intervention her score increased immediately to a 3 and maintained at 3 for four consecutive weeks. Ann's baseline scores ranged from 0-2 out of 3 and were variable across weeks. In week 5 she scored a 2 but then saw a decrease in responding to a 1 during week 6. Once the intervention was implemented Ann scored a 3 and maintained at 3 for three consecutive weeks. All data points for Ron's baseline were 0 out of 3 since he never replied to any student discussion posts during baseline. His initial intervention data points were 1, 0, and 0. Once the additional prompt in the email was added in which he was asked to email his supervisor once he completed the discussion board posts, his score improved to a 3 and remained at 3 for the last two weeks of his course.

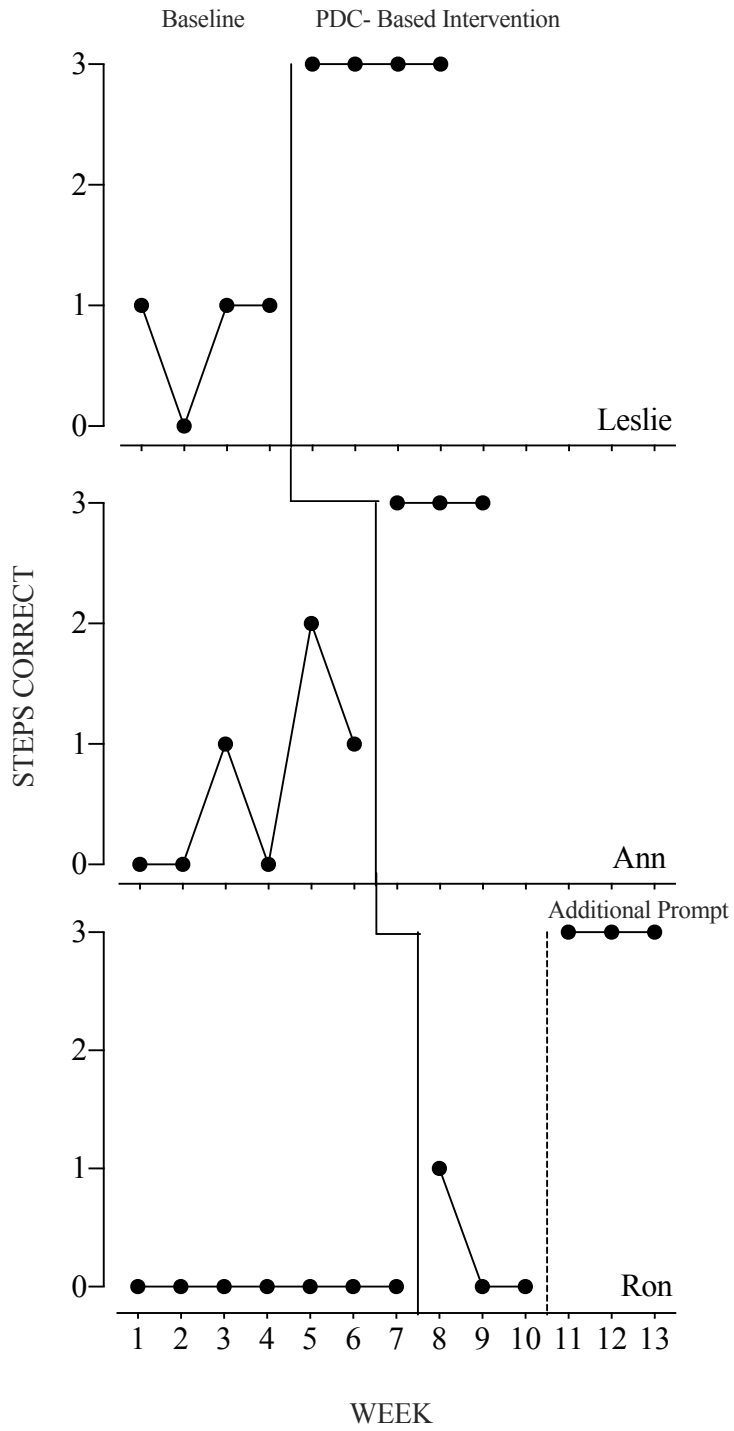


Figure 1. Baseline and intervention data collected across instructors.

CHAPTER 6

DISCUSSION

Results from the current study found that the PDC-I was an effective assessment tool for guiding intervention selection. After each instructor completed the assessment, their supervisor implemented an intervention informed by the PDC-I resulting in improved performance across participants. As a reminder, an immediate increase in level was observed for both Leslie and Ann once the intervention was implemented. However, Ron required an additional consequence procedure in the form of a prompt. Once this additional prompt was added, an immediate change in level was observed. With only three participants and with the same intervention for all participants, this study represents preliminary evidence of the value of the PDC-I. More research is needed before more firm conclusions can be drawn about its value in selecting interventions to improve teaching.

One of the benefits of implementing an intervention informed by the PDC-I is that the intervention can be personalized for everyone. Implementing a personalized intervention may lead to swifter behavior change and allow for supervisors to save time and use less resources. This is especially true in situations where the supervisor believes there is an issue related to training, when in fact a simple consequence-based intervention (such as an email) could be implemented. The results of this study were similar to prior studies that used other versions of the PDC including Amigo et al. (2008) that also utilized consequence-based interventions

including individual and group feedback which resulted in improved busing table times for restaurant employees. In addition, Martinez-Onstott et al. (2016) conducted the PDC-S and found feedback to be successful for increasing PPE usage. For other studies that used different variations of the PDC, interventions contained several components, including task clarification, equipment manipulations, checklists, and feedback (Doll et al., 2007; Gravina et al., 2008). Fortunately, for the current study, feedback resulted in substantial improvement for all participants without the need for additional components.

This study sought to extend the current PDC literature by having the supervisor complete the PDC-I prior to the instructors completing it. Results from the supervisor's PDC-I suggested that the area of knowledge and skills should be targeted with the instructors. The supervisor's PDC-I results differed from all of the instructors. Each instructor's PDC-I results indicated that a consequence-based intervention would be most effective. The differing PDC-I results are important because without understanding why the target behavior was not occurring properly the supervisor may have spent time and resources developing training, when in fact all of the instructors likely knew how to engage in the behavior. Of course, it is possible that providing more training may have eventually led to behavior change but implementing the consequence-based intervention worked immediately for two of the three instructors. Anecdotally, the supervisor mentioned that implementing the intervention took roughly 10 min out of her Monday each week. This was certainly a lot less time consuming than the supervisor developing a training, or for the instructors attending said training.

As with all research, the current study does not go without its limitations. The instructors who participated in this study, as well as the primary researcher were all students within the same ABA program at a public university. Although the supervisor implemented the

intervention, the primary researcher completed the PDC-I with each instructor. It's unknown whether knowing the primary researcher influenced the behavior of the instructors in any way. Additionally, because the instructors all came from the same program, they likely attended the same trainings and may have had similar learning histories. Having similar learning histories may have been why the PDC-I indicated that a consequence-based intervention would be most effective for all three instructors. Although implementing the same intervention across instructors likely decreased response effort for the supervisor in this study, it may not have allowed for the PDC-I to be fully validated. It would be beneficial for future research to evaluate the PDC-I with individuals from varying disciplines.

Upon completion of this study, researchers suggest another study be conducted under similar circumstances. The authors suggest that the PDC-I be sent out again to instructor training experts, this time in disciplines that previous training experts were not working in. This would allow for even further content and face validity to be evaluated. Authors suggest asking these experts for comments and critiques on the assessment tool before finalizing it and administering it to new participants. Additionally, the authors suggest that the appropriate edits be made to the assessment tool and that it be sent out to multiple OBM experts to review for a final round of edits, prior to administering the assessment tool to new participants. One major edit that researchers suggest is related to the wording of the questions and the scoring of the questions. Although all questions were written in a yes/no format, not all yes's and not all no's were scored the same way. For example, in the consequence section, a 'no' for the question, "Is there performance monitoring?", would be scored in a way that this question counted as a point for the consequence section. However, a 'no' answer for the question, "Is there a high level of effort needed to complete the skill?", would not count as a point but rather a 'yes' to this question

would. Authors suggest that changes to the assessment tool be made so that the scoring system is that all no's are a point and all yes's are no points. This would allow for those scoring the completed PDC-I's, especially non-behavior analysts and those unfamiliar with PDC's, to have a much easier time when scoring. Additionally, authors suggest that the new participants be individuals from various disciplines, in order to ensure that the assessment tool is specific enough to work for educators yet broad enough to work for educators in any/all disciplines. This would make it more likely that participants' PDC answers would vary and therefore point researchers in different directions for interventions, rather than all participants' PDC's calling for the same type of intervention.

Finally, this study was conducted with online instructors who were graduate students. Future studies should be conducted with instructors teaching in person classes and also with educators in varying levels of their careers (e.g., graduate teaching assistants, adjunct professors, instructors, assistant professors, etc.). This might provide further information on the needs of instructors and how best to support instructors and other teaching faculty in improving instruction. Furthermore, future research should consider comparing results of interventions based on PDC-I results to those arbitrarily chosen. If the results are promising, it would further validate the use of the PDC-I which may lead to increases in buy-in across academic disciplines and further dissemination to fields outside of ABA. Additionally, future studies might evaluate the effects of improved instruction on student learning outcomes and performance. Although the researchers recommend further examination and evaluation of the PDC-I, the results from the current assessment tool yielded an effective intervention for all three instructor participants and both instructors and their supervisor found the assessment tool easy to use and effective in developing successful interventions.

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APPENDICIES

Appendix A: Initial Performance Diagnostic Checklist for Instructors

	Training	For reviewers: please provide any comments you have on the questions provided in this column. Should you need more room, please feel free to add more comments at the bottom of the page! Thank you!
Have the instructors previously received formal instruction and/or training about <u>how</u> to perform this behavior?	Yes No	
If they are teaching a new class this semester and therefore the behavior should be done differently than in previous semesters, are they aware of this <u>expectation change</u> ?	Yes No	
Have the instructors previously received formal instruction and/or training about <u>when</u> to perform this behavior?	Yes No	
If they are teaching a new class this semester and therefore the behavior should be done at different times than in previous semesters, are they aware of this <u>expectation change</u> ?	Yes No	
Do instructors know who to contact if they have questions about the behavior of interest?	Yes No	
Is there evidence that the instructor has accurately completed the behavior in the past?	Yes No	
	Antecedent and Information	
Is there a written job description telling exactly what is expected of the instructor?	Yes No	
Are there task aids/prompts in the instructor's immediate environment? -Visible while completing the task	Yes No	
Is the supervisor present during the task completion?	Yes No	
Are goals set for this behavior challenging and attainable?	Yes No	
Do the instructors feel that the goals are fair/reasonable?	Yes No	
	Equipment	
If equipment is required, is it reliable? In good working order?	Yes No	
If not, can they easily acquire it?	Yes No	
If equipment is not required, would it help?	Yes No	
If so, can they easily acquire it?	Yes No	
Are larger processes suffering from the behavior of interest lacking?	Yes No	
Are there any other obstacles that are keeping the instructor from completing the task?	Yes No	
	Knowledge and Skills	
Can the instructor tell you what he/she is supposed to be doing and how to do it?	Yes No	
Have they mastered the task? (Fluency)	Yes No	

Can the instructor physically demonstrate completion of the task?	Yes No	
Does the instructor have the capacity to learn how to complete the job?	Yes No	
	Consequences	
Does the instructor face consequences for completing the skill?	Yes No	Frequent Good Consistent Immediately Immediate Bad Inconsistent Future (example: when semester is over)
If so, are these consequences directly tied to their employment status?	Yes No	
Does the instructor face consequences for failure to complete the skill?	Yes No	Frequent Good Consistent Immediately Immediate Bad Inconsistent Future (example: when semester is over)
If so, are these consequences directly tied to their employment status?	Yes No	
Does the instructor know the reasoning behind completing the behavior? -Who the behavior directly impacts and how (ex: students, instructor themselves, department, university, etc.)	Yes No	
Does the instructor see the effects of performance?	Yes No	
If so, are effects immediate?	Yes No	
Is there currently feedback in place, related to the completion (or lack of completion) of the behavior?	Yes No	
If yes, how, when, and by whom?	Written Immediately Verbal Delayed Supervisor(s) Peer(s)	
Is there performance monitoring?	Yes No	
If yes, how, when, and by whom?	Written Immediately Verbal Delayed Supervisor(s) Peer(s)	
Are there other behaviors competing with the desired performance?	Yes No	
Is there a high level of effort needed to complete the skill?	Yes No	

Appendix B: Revised Performance Diagnostic Checklist for Instructors

Behavior of Interest: Discussion Board Responses

Respondent / Instructor: _____ Date: _____

	Training	
Have the instructors previously received formal instruction and / or training about <u>how</u> to perform this behavior?	Yes No	
If they are teaching a new class this semester and therefore the behavior should be done differently than in previous semesters, are they aware of this expectation change?	Yes No	
Have the instructors previously received formal instruction and / or training about <u>when</u> to perform this behavior?	Yes No	
If they are teaching a new class this semester and therefore the behavior should be done differently than in previous semesters, are they aware of this expectation change?	Yes No	
Do instructors know who to contact if they have questions about the behavior of interest?	Yes No	
Is there evidence that instructor has accurately completed the behavior in the past?	Yes No	
	Antecedent and Information	
Is there a written job description describing exactly what is expected of the instructor?	Yes No	
Are task aids / prompts readily available in the instructor's immediate environment?	Yes No	
If so, are they visible while completing the task?	Yes No	
Are goals set for this behavior attainable?	Yes No	
Do the instructors feel that the expectations of the behavior of interest are fair / reasonable?	Yes No	
	Materials	
If materials are required, is it reliable? In good working order (e.g., computer, PowerPoints, video platforms, etc.)	Yes No	
If not, can they easily acquire it?	Yes No	
If materials are not required, would it help?	Yes No	
If so, can they easily acquire it?	Yes No	
Are larger processes suffering from the behavior of interest lacking?	Yes No	
Are there any other obstacles that are keeping the instructor from completing the task?	Yes No	
	Knowledge and Skills	
Can the instructor tell you what he / she is supposed to be doing?	Yes No	
Can the instructor tell you how to do it?	Yes No	
Have they mastered the task (previously met the criteria of the definition without assistance)?	Yes No	
Can the instructor demonstrate completion of the task?	Yes No	

	Consequences		
Are consequences provided to the instructor for completing the skill? If so, are these consequences directly tied to their employment status?	Yes	No	Frequent Bad Immediate Consistent Good Inconsistent Immediately Future (example: when semester is over)
Are consequences provided to the instructor when the skill is not completed? If so, are these consequences directly tied to their employment status?	Yes	No	Frequent Bad Immediate Consistent Good Inconsistent Immediately Future (example: when semester is over)
Does the instructor know the reasoning behind completing the behavior (who the behavior directly impacts and how (e.g., students, instructor themselves, department, university, etc.)?)	Yes	No	
Does the instructor see the effects of performance? If so, are effects immediate?	Yes	No	
Is there performance monitoring? If yes, how, when, and by whom?	Yes	No	
Is there currently feedback in place, related to the completion (or lack of completion) of the behavior? If yes, how, when, and by whom?	Yes	No	
Are there other behaviors competing with the desired performance?	Yes	No	
Is there a high level of effort needed to complete the skill?	Yes	No	

Appendix C: Instructor Social Validity Questionnaire

Answer the following questions as honestly as you can. Your data is anonymous and will remain so. 1 represents highly disagree and 6 represents highly agree.

1. I enjoyed participating in this study.

1 2 3 4 5 6

2. The PDC-I was simple to understand.

1 2 3 4 5 6

3. I enjoyed the use of the PDC-I in this study.

1 2 3 4 5 6

4. The intervention used was appropriate for the behavior being targeted.

1 2 3 4 5 6

5. What did you like about the study?

6. What did you not like about the study and/or what would you change if we were to conduct it again?

Appendix D: Supervisor Social Validity Questionnaire

Answer the following questions as honestly as you can. Your data is anonymous and will remain so. 1 represents highly disagree and 6 represents highly agree.

1. I enjoyed the use of the PDC-I in this study.

1 2 3 4 5 6

2. I believe the use of the PDC-I helped me better understand why the target behavior was/wasn't happening before intervention began.

1 2 3 4 5 6

3. The intervention used was appropriate for the behavior being targeted.

1 2 3 4 5 6

4. I am likely to use the PDC-I when developing a strategy to change behavior(s) of my instructor(s) in the future.

1 2 3 4 5 6

5. I would recommend other supervisors use the PDC-I when developing a strategy to change behaviors of their instructor(s).

1 2 3 4 5 6

6. I saw an improvement in the target behavior of my instructors.

1 2 3 4 5 6

7. What did you like about the study?

8. What did you not like about the study and/or what would you change if we were to conduct it again?