The Virginia Applied Behavior Analysis Consortium: Preparing Behavior Analysts Using a Collaborative Model

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Abstract The development and the evolution of the Virginia Applied Behavior Analysis Consortium, a collaborative project between four institutions of higher education in the state of Virginia, are described. The main goal of the program is to address the shortage of certified behavior analysts by preparing special education teachers and autism specialists to implement effective behavior-analytic interventions in natural environments. In this article, we briefly discuss the history and the purpose of the program, its components, the evolution of the program, the advantages and outcomes of a collaborative model, and future directions for improvement.

Keywords Behavior analysis · Collaborative program · Training · Special education · Higher education

The field of applied behavior analysis (ABA) has rapidly evolved since initial discussions on credentialing first began at the University of Kansas in 1972 (Normand & Kohn, 2013; Shook, Johnston, & Mellichamp, 2004). For example, the number of Board Certified Behavior Analysts® (BCBAs®) has steadily increased from approximately 200 in 2000 to nearly 23,000 in 2016 (BACB, n.d.; Zangrillo et al., 2016). Two of the contributing factors to the dramatic increase in the

number of BCBAs® are (a) the effectiveness of behavioral interventions for individuals with autism spectrum disorder (ASD) and (b) the advocacy on health reform laws (LeBlanc, Heinicke, & Baker, 2012; Normand & Kohn, 2013). However, ABA services and behavioral interventions are not limited to individuals with ASD. These services and interventions are beneficial for other populations, such as individuals with traumatic brain injury (TBI) and the elderly, and are applicable to other domains, including health and fitness, health care, child care, animal behavior, and management and business (LeBlanc et al., 2012; Normand & Kohn, 2013).

Although data suggest that the field of ABA has grown dramatically since its inception and the number of BCBAs® continues to show an increasing trend, the demand for behavior-analytic services exceeds the current supply of well-trained and certified behavior analysts (Granpeesheh et al., 2010; Shook, Ala'IRosales, & Glenn, 2002; Weiss & Shook, 2010). To address the shortage of certified behavior analysts in the field of behavior analysis, numerous Behavior Analyst Certification Board (BACB®) training programs have been created across the USA. These programs utilize various approaches to train behavior analysts, including short courses supplemented by videotaped lectures and readings, computer-based courses and on-site learning situations, or graduate program courses offered in a cohort model via video conferencing or in a face-to-face format (Johnston, 2016; Martinez-Diaz & Wilder, 2016; Shook et al., 2002; Warkomski, 1999). However, there is no empirical data to demonstrate that one method is better than another (Shook et al., 2002).

Four aspects of the BACB® training programs preparing BCBAs® merit further discussion. One aspect relates to the collaborative nature of the programs. Although the majority of the BACB® training programs are offered by a single institution, some institutions have adopted a collaborative approach.

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For example, the University of North Texas offered the first master's degree program to be accredited by the Association of Behavior Analysis in 1993 (Glenn & Ala'I-Rosales, 2001). The program was initially offered at the University of Texas, but it quickly became a distance learning program as a result of a collaborative partnership with the Connecticut Center for Child Development (Glenn & Ala'I-Rosales, 2001). The collaborative nature of the BACB® training programs is also illustrated in the master's program offered by the Department of Psychology at the University of Maryland, Baltimore County in conjunction with the Kennedy Krieger Institute of the John Hopkins University of Medicine (Catania, DeLeon, & Cataldo, 2000).

A second aspect of BACB® training programs refers to the length of the program. The duration of the majority of the BACB® programs offered at institutions of higher education (IHEs) across the USA is at least two academic years. However, some IHEs have examined the feasibility of offering BACB® programs over a shorter period of time (i.e., 1 year). The implementation of 1-year BACB® programs was the result of many factors, including the shortage of behavior analysts, the necessity to secure funding, and the need to maximize the use of available faculty qualified to teach courses. For example, Auburn University in Alabama began offering a 1-year Master of Science program in behavior analysis in 1999 (Johnson, 2016). The program accommodated approximately 15 students every year and consisted of nine courses with a concurrent schedule of practicum meetings over three consecutive semesters. Although the program had many benefits and met its goal of preparing qualified and competent practitioners, one of the challenges noted by faculty and administrators was that the high intensity and rapid pace of the program did not allow students to engage in extracurricular activities and required good organizational and time-management skills (Johnson, 2016).

A third aspect of the BACB® training programs is the focus of the program. The BACB® programs offered across the USA are usually housed by various departments, such as psychology or education. Therefore, the focus of the BACB® program may be influenced by the department's goal and mission. For example, the program offered at West Virginia University has been created from a preexisting program (i.e., the Experimental Psychology program) and it has a more balanced approach by focusing on both the basic and the applied science of behavior analysis (Hawkins, Chase, & Scotti, 1993). Other programs are more concerned with the applied aspect of behavior analysis, and their goal is to prepare practitioners who can deliver behavior-analytic services to clients in natural environments. One such program is offered at the Gonzaga University in Spokane, Washington (Williams, McLaughlin, Williams, & Howard, 1991). Training in behavior analysis is embedded within a Master in Special Education with a focus on functional analysis. One of the goals of this

program is to prepare practitioners to use evidence-based practices rooted in behavior analysis (e.g., assessment, function-based interventions to address challenging behaviors) with the ultimate goal of improving the academic and behavioral outcomes of all students.

A fourth aspect relates to the specialized academic content addressed by the training programs preparing BCBAs®. Although training programs may vary in regard to their format, duration, or focus, they are all required by the BACB® to address a specific content and to allocate a particular number of graduate-level instructional hours in behavior-analytic skills. For example, training programs preparing BCBAs® under the Fourth Edition Task List must provide instruction in three domains consisting of basic behavior-analytic skills (e.g., measurement, design, and behavior-change procedures), client-centered responsibilities (e.g., assessment, intervention, implementation, management, and supervision), and foundational knowledge (e.g., philosophical assumptions, verbal operants, and measurement concepts). Moreover, the BACB® requires that a specific number of instructional hours is allocated to each of the skills included in the domains listed above (e.g., 25 h in measurement, 20 h in design, and 45 h in ethics) for a total of 270 h of graduate coursework (BACB®, n.d.).

Developing programs that have the main goal to train special education teachers and other professionals, such as autism specialists, to implement effective behavior-analytic interventions for students is critical. Due to its emphasis on measurement, evaluation, and the single-subject research design that accompanies its application, ABA instructional strategies comprise many of those that have been recognized as evidence-based practices (Horner, Carr, Halle, McGee, & Wolery, 2005). Moreover, these instructional strategies increase the likelihood of improved academic, social, and behavioral performance of students with disabilities, especially in a time of declining educational performance (Bordieri, Kellum, & Wilson, 2012).

Taking into account the variability in the format, duration, and focus of BACB® programs across the USA, the shortage of BCBAs, and the need for high academic, behavioral, and social performance of all students, it is extremely important to continue to join efforts in an attempt to identify the most effective and feasible type of ABA programs that have the potential to prepare highly qualified and competent professionals in the field of behavior analysis. Therefore, our purpose in this paper is to provide a detailed description of a collaborative program, the Virginia Applied Behavior Analysis (VA-ABA) Consortium. The program intends to address the shortage of trained ABA specialists in Virginia, and it is housed in the special education departments at four participating IHEs: George Mason University (GMU), Old Dominion University (ODU), Virginia Commonwealth University (VCU), and Lynchburg College. We begin with a brief discussion of the history and the purpose of the program.

We then provide a detailed description of the program's components. Next, we present the evolution of the program since its inception in 2012. We end by discussing advantages of a collaborative training model and possible future directions.

History and Purpose

The VA-ABA Consortium was developed in response to a conversation between the Director of the Division of Special Education and Disability at GMU and the Virginia Department of Education (VDOE) Director of Special Education. Two factors contributed to this conversation. The first factor was the report released in 2009 by the Joint Legislative Audit and Review Commission (JLARC), a component of the legislative oversight in the state of Virginia (VDOE, 2009). The JLARC examined the services provided to individuals with ASD residing in Virginia and concluded that (a) early intervention services did not provide intense and high-quality services necessary to maximize individual academic, behavioral, and social outcomes; (b) teachers and staff in nearly half of the schools did not implement scientifically based interventions when working with students with ASD; (c) and the shortage of highly qualified and competent professionals influenced the amount and quality of services provided to students enrolled in Virginia schools. The second factor was the increasing number of parental complaints submitted to the VDOE in regard to the qualifications of the school personnel, the provision of compensatory services including behavior-analytic interventions, or the implementation of appropriate special education and related services. The outcome of the conversation between the Director of the Division of Special Education and Disability at GMU and the VDOE Director of Special Education was the need to increase the number of practitioners trained in behavior analysis qualified in providing effective, scientifically-based interventions to students in Virginia by offering a collaborative program (i.e., Consortium) between several IHEs in Virginia.

A collaborative program was preferred over a program offered by a single IHE for two reasons. First, at the time when this conversation occurred, other consortia were in place, throughout the state, to train teachers to work with children with low-incidence disabilities such as vision impairment and significant cognitive disabilities. These consortia were coordinated through GMU, an IHE that was well equipped to provide the content and the technology required to insure the success of such collaborative programs. Therefore, the existing consortia served as a model for the development of a new collaborative program in the area of behavior analysis. Moreover, GMU had the human and technology resources needed to support and facilitate the implementation of such a program. Second, at that time, the only BACB[®]-approved program in Virginia was through GMU. However, it did not

as of yet offer fully online coursework, which limited both the scope and the reach the program could have. Specifically, the majority of practitioners enrolled in the BACB[®] program offered at GMU resided and worked with students in Northern Virginia, whereas the other parts of the state struggled to find specialized personnel with expertise in behavior analysis. For example, in 2012, prior to the development of the VA-ABA Consortium, the number of BCBAs[®] in Southeastern Virginia (e.g., Hampton Roads) was approximately 100 which represented less than 25% of the behavior analysts in Virginia at that time (BACB[®], 2012).

After a careful examination and analysis of the challenges in serving students in need of specialized services and the existing resources, the VDOE agreed to the development of the collaborative BCBA[®] program and played a critical role in its implementation. Specifically, the VDOE was interested in providing funding for a BCBA[®] program aimed at preparing practitioners to better serve the students in Virginia schools and to address the shortage of behavior analysts in the state. VDOE funding was a significant aspect of the proposed collaborative program because, unlike other consortia in place at the time, the funding for a BACB[®]-approved program was scarce. Only a small sum of money was allocated to schools willing to fund a part-time facilitator role for one faculty member or staff member. The VDOE funding was allocated to the VA-ABA Consortium on an annual basis, and the total amount was divided equally between the participating IHEs. The funding provided by VDOE was designed to cover the administrative costs associated with the program rather than being used for student tuition. However, some of the IHEs were able to offer a discounted tuition rate (i.e., 25%) to students enrolled in the program in an attempt to ease the burden of financial costs.

The final agreements took approximately a year to complete and involved three other IHEs in addition to GMU. The participating IHEs were as follows: ODU, Lynchburg College, and VCU. Three of these IHEs (i.e., GMU, ODU, and Lynchburg) administered their programs through their special education programs; whereas, the fourth IHE (i.e., VCU) administered its program through the VCU Autism Center for Excellence, a center under the Department of Special Education and Disability Policy. The VA-ABA Consortium has been offered in a cohort model in which the same group of students enrolls in academic courses offered in a predetermined temporal sequence. The first cohort was recruited and began classes in 2012.

Components of the Program

The main components of the VA-ABA Consortium consist of administration and division of responsibilities, curriculum, and technology. Figure 1 displays the program's components.

Fig. 1 Components of the program; VA-ABA Virginia Applied Behavior Analysis, IHE institution of higher education, BACB® Behavior Analyst Certification Board

Administration and Division of Responsibilities

We determined the administration and division of responsibilities between the four participating IHEs based on the model provided by the existing consortia that were in place at the time when the VA-ABA Consortium was created. The process of determining the responsibilities of each IHE consisted of several phases. First, all members responsible for the development and implementation of this program at each of the four IHEs attended several face-to-face meetings to (a) analyze the model provided by the existing consortia throughout the state and (b) evaluate the feasibility of using the same model to delineate the responsibilities and the structure of the VA-ABA Consortium. The outcome of these meetings was a proposed memorandum of understanding (MOU). The MOU outlined the responsibilities and the procedures related to (a) the selection of an executive committee composed of an identified faculty member at each IHE to serve on the committee and be the university designee; (b) the responsibilities of the home institution (i.e., the IHE where the students pay tuition); (c) the responsibilities of the offering institution (i.e., the IHE where a course is offered in any given semester); (d) the shared responsibilities related to student application and admission to the program, tuition, and fees; and (e) the curriculum offered in the program, including scheduling and delivery format. Second, the proposed MOU was approved by each IHE's administration. For example, each IHE's provost signed the MOU and, thus, committed to the project in terms of human resources, physical space, financial resources, technology, and corresponding supports. Finally, the executive committee created an administrative manual highlighting the

program's structure and organization, the procedures and policies guiding the decision-making process, and one's eligibility for admission to the program.

The VA-ABA Consortium is managed by an executive committee composed of one or more full-time faculty members and administrators from each of the four IHEs. The main responsibility of the executive committee is to make decisions about the program's policies and procedures, curriculum, technology, and budget. The executive committee meets bi-monthly via video or call conferences and bi-annually in a face-to-face format to discuss the above aspects and to make programmatic decisions with the goal of providing high-quality services to students enrolled in the program. During the bi-monthly meetings, the committee discusses student issues, teaching practices, classroom management, program logistics, and other topics as appropriate. The bi-annual meetings allow for more strategic planning and more in-depth conversations related to the effectiveness of the program in meeting students' needs and preparing highly-qualified practitioners in the field of behavior analysis. Furthermore, these face-to-face meetings facilitate the development of professional relationships between faculty and administrators from the four IHEs which increase the likelihood of effective and positive collaborations.

Both the bi-monthly and the bi-annual meetings have been critical to the effective functioning of the VA-ABA Consortium because they ensure communication on a regular basis and allow administrators and faculty to adopt a proactive approach to prevent potential barriers and to address any challenges that may arise throughout the academic year. The commitment of the administrators and faculty to attend these

meetings shows the dedication to the VA-ABA Consortium, and it is an indicator of a successful collaborative partnership between the participating IHEs.

Home IHE Responsibilities The home IHE is responsible for many of the administrative pieces, including setting tuition rates, housing student and program documents, recruiting and admitting students, procuring student accommodations, and billing for tuition. Although the way that these responsibilities are completed and the allocation of human resources to the program vary across the four IHEs, there are some common characteristics related to program administration, tuition, and student application. First, each IHE designates a program coordinator who is responsible for managing the responsibilities listed previously. Second, the VA-ABA Consortium sets a policy that students have to register and attend courses at the IHE nearest to their home or work, and therefore pay the tuition rate set by that IHE. The tuition rate is set by each IHE; however, the MOU specifies that the four IHEs can offer a discounted tuition rate (i.e., 25%) to students.

Third, the VA-ABA Consortium developed a common application for prospective students that serves as a screening device (available upon request from the first author). The application is reviewed by the program coordinator of the IHE to which the student applies to determine if it meets the basic admissions requirements, such as degree status and GPA, and is a good “fit” for the program. Specifically, the application consists of open-ended questions intended to provide a good understanding of the applicant’s interest in the program, his or her career goals, and other relevant areas related to the probability of successfully completing the program. After the program coordinator determines that the applicant met the above criteria, he or she is required to complete the application at the home IHE and must meet the institution’s requirements for admission.

Fourth, the VA-ABA Consortium developed a policy regarding student registration after admission to the program. Registration consists of two phases. In the first phase, students enroll in a course at the home IHE using the online registration tools available to students. In the second phase, students enroll in what is unofficially called “a shadow” section of the course at one of the designated IHEs for the purpose of utilizing one course management system and the reporting of grades. Finally, each IHE appoints a full-time faculty member (i.e., BCBA-D) to serve as the approved course sequence (ACS) coordinator. The ACS coordinator is the liaison person between the BACB® and the IHE and is responsible for submitting applications for approval related to the academic coursework, practicum, and other full-time or adjunct faculty or instructors involved in the program. At some IHEs, the program coordinator may serve as the ACS coordinator, whereas at other IHEs, different individuals may perform the

responsibilities listed previously. This is determined by each IHE based on their resources and available faculty.

Offering IHE Responsibilities Each offering IHE also has designated responsibilities. The offering IHE changes each semester as the teaching responsibilities for each course rotate between the participating IHEs. Each offering IHE has one or more full-time faculty members responsible for teaching one or multiple academic courses to students enrolled in the program. The faculty member is responsible for teaching the course, designing the course content, advising students regarding course content and assignments, and assigning grades. The faculty member is also responsible for communicating with the program coordinator at the students’ home IHE as soon as any student-related concerns arise.

Shared Responsibilities All participating IHEs are responsible for addressing issues related to at least three aspects of the program. One aspect requiring shared responsibility is the assignment of an “incomplete” grade to a student. Specifically, when a faculty member at the offering IHE assigns an incomplete grade to a student, the MOU states that the student has the lesser amount of time required by either the offering IHE or the home IHE to complete the work, for example, if the offering IHE has a policy that allows the student 60 days into the following semester; whereas the home IHE grants the student one additional semester to complete the work, the MOU clarifies which deadline the student should meet to complete his or her work when an incomplete grade is assigned. However, the VA-ABA Consortium has some flexibilities to work with students to create an appropriate plan for meeting a completion deadline that would work for both IHEs. Therefore, the responsibility of determining the completion deadline and identifying the conditions for completion is shared between faculty members at both the home IHE and the offering IHE.

A second aspect requiring shared responsibility is technology. The MOU states that if a student lives a significant distance from any of the four participating universities and his or her travel time is longer than 90 min, the student is allowed to connect to the course session from home. Therefore, it is critical for faculty members from different IHEs to communicate not only to ensure that the student is aware of the policy and the procedures for being allowed to connect from home but also to ensure that there is no loophole where the student asks permission from the faculty member at the offering IHE but not from the faculty member at the home IHE. Additionally, when students have difficulty with the course management system at their home IHE, they typically contact the technical support at that institution. Because the students utilize only the course management system at one designated IHE, they may encounter difficulties in obtaining technical support at the home IHE. Therefore, the VA-ABA Consortium faculty

shares the responsibility of ensuring that appropriate technical support is available to students.

A third aspect requiring shared responsibility relates to marketing and recruitment. Specifically, the executive committee is responsible for brainstorming, developing, and distributing marketing materials across the state to promote the program and to increase the pool of eligible applicants. Although the shared responsibility is more evident during the brainstorming and development stages of the marketing materials, all IHEs involved in the VA-ABA Consortium follow the same recruitment strategy consisting of distributing the marketing materials to local public and private educational agencies across the state. For example, one IHE may distribute marketing materials to all directors of special education in Virginia, whereas another IHE may distribute the same materials to all autism specialists in the state.

Curriculum

The curriculum offered by the VA-ABA Consortium consists of two subcomponents: academic coursework and supervision. The first subcomponent, academic coursework, is common across the four participating IHEs and consists of six academic courses (see Table 1). The six academic courses are offered in a cohort model and are designed to meet the two coursework requirements set forth by the BACB[®]. First, the curriculum offered in the program covers a predetermined number of hours (i.e., 270) of graduate-level instruction. Second, the curriculum targets a specific set of behavior-analytic skills across several content areas including ethical and professional conduct, concepts and principles of ABA, research methods in behavior analysis, and elements related to assessments and behavior-change procedures and interventions at both the individual and the system level.

One of the defining characteristics of the academic coursework is its spiraling nature. The VA-ABA Consortium offers the six academic courses in a predetermined temporal sequence beginning with content covering low-complexity skills and then progressing to content addressing high-complexity level skills. For example, during the first semester in the program, students are introduced to the fundamental concepts and principles used in behavior analysis while emphasizing the philosophy and values that guide the field. After the students become fluent in using the newly acquired behavior-analytic terminology, they are exposed to more complex skills related to data collection including measurement, data interpretation, and experimental design within the context of behavior-analytic research. Next, the students learn about the ethical and professional compliance code guiding the field of behavior analysis and the state guidelines that regulate the profession of behavior analysis in Virginia.

As students advance through the program, the complexity of the skills taught increases gradually. During the first year of

Table 1 Description of the six academic courses offered by the VA-ABA Consortium

Course name	Course description
Principles, Procedures, and Philosophy	The purpose of this course is to introduce students to basic principles and procedures of ABA by teaching them to identify factors that contribute to problem behaviors and improved performance and by discussing procedures that can be used to minimize problem behavior, teach new behaviors, and increase the probability of behaviors occurring under appropriate circumstances.
Empirical Bases	The purpose of this course is twofold. First, it introduces students to data collection and measurement systems. Second, it teaches students to graphically represent data and to use visual analysis to analyze and interpret data collection and to make data-based programmatic decisions when implementing behavior-analytic programs for students.
Ethical and Professional Conduct	The purpose of this course is to provide students a basis in Virginia Behavior Analyst Licensure law and the <i>Professional and Ethical Compliance Code for Behavior Analysts</i> .
Applications	The purpose of this course is to provide students the opportunity to apply behavior analytic knowledge and skills across numerous domains, including organizational management, sport and fitness, health care, and related disorders.
Assessments and Interventions	The purpose of this course is to further expand on basic content of applied behavior analysis by teaching students to develop and conduct a variety of assessments and to develop behavioral programs for students with fundamental behavioral needs.
Verbal Behavior	The purpose of this course is to provide students with knowledge and skills required to address more complex behavioral situations and to enable them to relate to more sophisticated professional issues, especially in the areas of language and communication.

the program, the students acquire knowledge and skills related to various behavior-analytic principles and procedures, whereas during the second year of the program, they are required to demonstrate proficiency in applying these skills across various domains. For example, they are required to apply the newly acquired skills to (a) conduct functional behavioral assessments, (b) design behavior-change programs (e.g., behavior intervention support or communication intervention plans), and (c) implement behavior-analytic procedures with a wide variety of populations across a multitude of domains (e.g., sport, health and nutrition, gambling, or organizational management).

The second subcomponent, supervision, has three defining characteristics. First, the supervision is in compliance with the experience standards and supervision requirements established by the BACB®. This characteristic is common across the four IHEs involved in the VA-ABA Consortium. Specifically, each IHE offers supervision to students enrolled in the program which follows the experience standard requirements outlined by the BACB®. These standards include guidelines related to the required number of supervision hours, the onset of supervision, the type of behavior-analytic activities counting toward supervision, the qualifications of the supervisor, and the nature of instructional practices implemented by supervisors throughout the supervision process.

Second, the organization of supervision varies across the four IHEs participating in the VA-ABA Consortium. Each IHE has the flexibility of organizing and providing supervision to students enrolled in the program in a format that matches the unique characteristics of its institution. For example, three of the four IHE (i.e., GMU, ODU, and Lynchburg) offer practicum courses within their BACB® approved course sequence. Students at these institutions have the opportunity to enroll in a practicum course in which they may earn up to 3 or 6 credits per semester for a total of 15 credits (or 750 to 1000 h) throughout the duration of the entire program depending on the type and intensity of the practicum course.

One of the four IHEs (i.e., VCU) offers supervision in a supervised independent fieldwork format in which students may accrue a total of 1500 h. To complete the supervision requirements, students at VCU enroll in a non-credit course and complete a variable number of hours each semester depending on the semester when the course is offered (i.e., spring, summer, or fall). For example, during spring and fall semesters, a student may elect to enroll in a 200-h program or in a 400-h program, whereas during the summer semester, a student can enroll in a 300-h program.

Third, regardless of the home IHE, students have the flexibility to meet the supervision standards set by the BACB® by combining hours completed in various supervision formats. For example, students enrolled at any of the four IHEs participating in the program have the opportunity to (a) enroll in a credit or non-credit supervision course each semester while in the program, (b) complete the supervision independent of the home IHE, or (c) meet the supervision requirements by combining (a) and (b) above. However, students can only acquire supervision hours to meet the requirements established by the BACB® within only one of the formats listed previously within the same supervisory period.

Technology

Technology is one of the critical aspects of the VA-ABA Consortium and consists of several systems: academic coursework delivery, learning management, and other

resources. Although the technology systems listed previously are available at each of the four IHEs, all students enrolled in the program and the faculty teaching the academic coursework have access to and use the technology systems at the coordinating IHE (i.e., GMU).

The first technology system relates to the academic coursework delivery. The VA-ABA Consortium offers the academic coursework in a distance learning format. Distance learning consists of delivering course content via interactive television broadcast from one of the four participating IHEs to the partner sites across Virginia. Specifically, all distance learning sites at each of the four IHEs connect at the same time via interactive television during course sessions. All students enrolled in the program are required to physically attend each course session at their home IHE distance learning site with the exception of designated home students. Home students attend the course session by video streaming from their home. The faculty member teaching the course is physically present at one of the distance learning sites depending on his or her IHE affiliation.

Although interactive television is the main format of course delivery, faculty in the VA-ABA Consortium may choose to use alternative collaboration technology tools available for course delivery. For example, in the case of inclement weather, faculty may deliver the course content in a synchronous or asynchronous online format. In a synchronous online format, a faculty member has the opportunity to deliver the course content by conducting live meetings and presentations over the Internet with all students enrolled in the program by using various web conferencing tools (e.g., Adobe Connect, Blackboard Collaborate, or Zoom). In an asynchronous online format, faculty can use various learning management systems (e.g., Blackboard) to make content available to students who can access it at their convenience from home.

The second technology system refers to the learning management system, namely Blackboard Learning System (i.e., Blackboard). Blackboard provides faculty the opportunity to initiate and maintain collaborations with and between students, access documents, create assignments, administer tests, provide feedback, and manage grades. Blackboard also incorporates recording tools (e.g., Kaltura) that enable faculty to record presentations that can be later accessed by students. In addition, Blackboard offers a variety of security tools (e.g., Respondus LockDown Browser, and SafeAssign) that allow faculty to prevent plagiarism.

The third technology system consists of other resources. This category includes additional services available to students and faculty. For example, all students enrolled in the VA-ABA Consortium have access to both the GMU library and the home IHE library that provide a variety of services. Examples of such services include but are not limited to accessing books, articles published in scholarly journals, videos, course guides, and borrowing services. Students also

have access to additional technology systems including, but not limited to, course registration, schedule management, storing, and collaboration tools.

Evolution of the Program

The VA-ABA Consortium is currently in its fourth year of existence and has continued to evolve since its inception in 2012. This evolution has been the result of the programmatic changes required by the BACB® and the program evaluation data collected by the VA-ABA Consortium. Although the changes related to the format, duration, and length of our training program are characteristic to other BACB® programs across the country, the consortium model may be unique. To illustrate the evolution of the program within the context of a consortium model, we first describe the program evaluation process. Next, we discuss how the outcomes of the program evaluation informed the programmatic changes related to curriculum modifications, length of the program and course duration, and orientation sessions.

Program Evaluation

The program evaluation consisted of two parts. The first part was the overall evaluation of the program at the end of each cohort of students. The main purpose of this evaluation was to determine the effectiveness of the program in preparing highly qualified practitioners in the field of behavior analysis. To achieve this purpose, the executive committee created a questionnaire (available upon request from the first author) consisting of five sections: consortium support staff, technical support staff, instructional staff, course content, and additional comments. The first four sections consisted of five or six items on a 5-point Likert scale ranging from poor (1) to excellent (5). The last section consisted of four open-ended questions. The executive committee distributed the questionnaire to each cohort of graduates via an email that contained an encrypted link to the questionnaire. The responses were anonymous and were reported in aggregate format for evaluation purposes. The executive committee analyzed the results of the questionnaire and made data-based programmatic decisions in an attempt to improve the quality of training provided to future cohorts of students with the ultimate goal of preparing competent professionals in the field of behavior analysis. The outcomes of the program evaluation served as a basis for making programmatic changes related to the length of the program and course duration and the addition of orientation sessions.

Overall, the results of the program evaluation revealed that the VA-ABA Consortium was effective in training highly qualified and competent practitioners in an attempt to alleviate the shortage of behavior analysts in Virginia. For example, program evaluation data from the first three cohorts of students who graduated the program showed that the students

ranked the program as very effective and relevant as illustrated by the high average ranking received on the questionnaire items (e.g., quality of instruction = 4.29; overall learning experience = 4.57; usefulness of the content in daily applications = 4.71; overall consortium effectiveness = 4.43).

The effectiveness and relevance of the consortium were also supported by the student comments to the open-ended questions. For example, students indicated the factors that contributed the most to their learning within a consortium model that included the following: access to a variety of professors, materials, and peers across the state; interactions with other consortium members during and outside the class while listening to different perspectives on the same content; and the combination of instructors teaching remotely, and physically in the room where the students were. When asked what changes could be made to the consortium model to increase its benefit for students, the first cohort of students emphasized the intensity of a 1-year program, the length of the course durations (4 h 30 min), the difficulty in balancing full-time work positions, course work, and family life, and the challenges in acquiring the supervised experience hours within 1 year. The feedback received from the first cohort served as a basis for revising the structure and organization of the program beginning with 2014 (see the “[Programmatic Changes](#)” section below). The other two cohorts did not suggest any changes but emphasized the limited amount of time needed to digest the large volume of information presented. Other comments related to consortium program included its effectiveness in achieving the goal to increase the number of trained ABA professionals and the students’ positive experience in participating and benefiting from such an exposure.

The second part was the course evaluation administered by GMU at the end of each of the six courses. The purpose of this evaluation was to assess the quality and relevance of the instruction provided by the faculty member teaching a specific course. Data were collected using an online survey consisting of 16 general questions (e.g., course requirements, instructor feedback, instructor effectiveness) and 11 additional questions pertaining to online courses (e.g., course website, online resources, collaboration with peers). Each answer was rated on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The results of this evaluation were available to the course instructor who had the flexibility to share the results with the executive committee. However, the instructor was not required to share the results and it was up to him or her to use the feedback provided by students to make instructional changes to better meet the needs of a diverse student population and to enhance the acquisition of the course content.

Programmatic Changes

Curriculum Modifications One of the most important aspects of the VA-ABA Consortium was compliance with the

BACB[®] requirements related to the academic content and the number of hours of graduate-level instruction provided to students enrolled in the program. These requirements have been updated by the BACB[®] on a regular basis (e.g., every 3 or 4 years) and outlined in two documents: the task list and the course content allocation. The task list specifies the type of skills a student should master during enrollment in the program and consists of basic behavior-analytic skills, client-centered responsibilities, and foundational knowledge, whereas the course content allocation describes the number of hours and the academic content to be offered across various behavior-analytic areas.

When the first group of students began the program in 2012, the VA-ABA Consortium offered five academic courses. The five courses provided 225 h of graduate-level instruction and covered the behavior-analytic skills listed in the Third Edition Task List. In 2013, the BACB[®] required IHEs to adjust their curriculum and comply with a new task list (i.e., the Fourth Edition Task List) and an updated course content allocation. Accordingly, the VA-ABA Consortium modified and aligned the curriculum to comply with the new BACB[®] requirements. The new curriculum consists of six academic courses and provides 270 h of graduate-level instruction covering the behavior-analytic skills outlined in the Fourth Edition Task List.

In addition to the curriculum modifications required by the BACB[®], each faculty member teaching academic courses in the VA-ABA Consortium has revised and updated the content taught on a regular basis. The main purpose of these ongoing revisions and modifications was to ensure that students have access to the most recent information in the field of behavior analysis, information that is supported by empirical evidence and increases the likelihood of promoting effective instructional programming and data-based decision making, two fundamental characteristics of the field of behavior analysis.

Length of Program and Course Duration Another programmatic change in the organization of the VA-ABA Consortium consisted of extending the length of the program and the course duration. Specifically, during the first 2 years of its existence, the duration of the program was one academic year. In this format, students completed the academic coursework sequence within 14 months. The duration of each course was 9 weeks, whereas the duration of one course session was 4 h and 30 min. Faculty made the decision regarding the length of the program and the course duration based on the results of a survey administered to applicants prior to offering the program.

At the end of program completion, the executive committee administered the program evaluation questionnaire to graduates to assess the program effectiveness. Taking into account the feedback received from the program graduates, the length of the VA-ABA Consortium was extended to two academic

years beginning with the third year of its existence. In this format, students completed the six-course academic sequence within 2 years, including summers, for a total of 22 months. The duration of each course was 12 weeks, and the duration of one course session was 2 h and 30 min. Extending the length of the program to two academic years was important for two reasons. First, a shorter duration of course sessions (i.e., 2 h and 30 min) and a longer duration of the academic semesters (i.e., 12 weeks) allowed students and faculty the opportunity to discuss the concepts taught in much more detail while providing multiple opportunities for practice, and consequently increasing the probability of acquisition and fluency.

Second, extending the length of the program has also influenced the provision of supervision by allowing students to meet the supervision requirements during their enrollment in the program. For example, a student may choose to enroll in a three-credit practicum course every semester in addition to the three-credit academic course. In this format, a student could complete the 15 credit hours required for supervision within five semesters, thus meeting the supervision requirements by the time of graduation. However, it is important to note that the students have the flexibility to enroll in a practicum course at their home IHE or complete the required hours within the context of a supervised independent fieldwork independent of the university.

Orientation Sessions One significant programmatic change implemented at the beginning of the third year of the program's existence consisted of orientation sessions. Orientation sessions had two purposes. First, it allowed the executive committee to meet with applicants and make a more informed decision regarding admission to the program. Second, it provided the committee the opportunity to share relevant information related to the organization and the structure of the program, costs, and technology requirements with the applicants with the purpose of assisting them to decide whether the program is a good match for their needs and career goals.

Two orientation sessions were scheduled prior to the beginning of the program. Each orientation session was delivered in a distance learning format, lasted 2 h and 30 min, and it was scheduled at the time when academic courses were delivered. For example, for one cohort, the orientation session was scheduled from 7:30 p.m. to 10:00 p.m., whereas for another cohort, the orientation session was scheduled from 4:30 p.m. to 7:00 p.m. The purpose of organizing orientation sessions in a distance learning format at specific times and for a predetermined duration was to offer students the opportunity to experience the format in which academic courses were delivered during each semester throughout the program after their acceptance into the VA-ABA Consortium.

The first orientation session was scheduled prior to the acceptance into the program. During this session, applicants

received general information on the organization and the structure of the program, the academic coursework, the supervision opportunities, the program costs, and the technology requirements. At the same time, applicants had the opportunity to meet the faculty members and the administrators of the VA-ABA Consortium, to ask questions, or to express concerns. The second orientation session was scheduled after acceptance into the program and prior to the beginning of the first academic course. The information provided to students during this session is more specific and relates to accessing and using student emails, Blackboard, and other resources available at both GMU and their home IHE.

Advantages and Outcomes of the VA-ABA Consortium

Using a collaborative training model, such as the VA-ABA Consortium, has several advantages for the participating IHEs, for faculty members, and for students as illustrated by the program outcomes. Figure 2 summarizes the main advantages of the program.

First, the IHEs have the opportunity to join their efforts in providing a competitive BACB® training program to alleviate the shortage of behavior analysts in the state of Virginia. Specifically, 21 of the 50 students who graduated from the VA-ABA Consortium between 2012 and 2016 passed the BACB® national certification exam, and thus contributed to an increase in the number of behavior analysts in our state. In 2012, the number of BCBAs® was approximately 400, whereas the number of BCBAs® was approximately 710 in 2016 (BACB®, 2016). Unfortunately, we do have quantitative data on the status of the remaining 29 students. Anecdotal data revealed that some students who chose to complete a supervised independent fieldwork did not acquire the supervision hours at the time of their graduation from the program, and therefore were not eligible to apply to the certification exam. Although we do not have data to support this statement, it is also possible that some students passed the BACB® certification exam but

did not share this information with the executive committee or did not pass the exam. In addition to the number of graduates, 21 more students are currently enrolled in the program. The contribution of the VA-ABA Consortium to the increased number of behavior analysts has to be considered within the context of multiple variables, such as the growth of the field as a whole, the development of other BACBs® training program in Virginia, or the relocation of behavior analysts across the USA.

Second, the effectiveness of the consortium in preparing highly qualified practitioners in behavior analysis is illustrated by the competencies acquired by the students throughout the program. For example, the first course in the program addresses concepts and principles used in behavior analysis while emphasizing the philosophy and values that guide the field. At the end of this course, students should acquire competencies in the area of specific behavior change procedures (e.g., Premack principle, discrimination training, errorless learning) and foundational knowledge (e.g., reinforcement, extinction, stimulus control). To assess whether the students acquired the targeted competencies, we developed a comprehensive key assessment and an evaluation rubric. According to this rubric, a student's progress is rated as follows: (a) does not meet standards (overall performance below 80%), (b) meets standards (overall performance between 81 and 99%), and (c) exceeds standards (overall performance 100%). Data for competencies related to behavior change procedures indicated that 20% (5 of 24) of the students in cohort 4 and 13% (1 of 15) of the students in cohort 5 did not meet expectations and 80% (19 of 24) of the students in cohort 4 and 87% (13 of 15) of the students in cohort 5 met expectations. Data for the competencies related to foundation knowledge reveal that 20% (5 of 24) of the students in cohort 4 and 13% (2 of 15) of the students in cohort 5 did not meet expectations; 63% (15 of 24) of the students in cohort 4 and 74% (11 of 15) of the students in cohort 5 met expectations; and 17% (4 of 24) of the students in cohort 4 and 13% (2 of 15) of the students in cohort 5 exceeded expectations. These competencies are readdressed by multiple instructors throughout the entire program and, thus, increase the likelihood of acquisition by students who

Fig. 2 Advantages of the program; VA-ABA Virginia Applied Behavior Analysis, IHE institution of higher education, BCBA® Board Certified Behavior Analyst

did not meet standards at the end of the first course as well as fluency by those students who met or exceeded the standards.

Third, the likelihood of securing state funding to support the implementation of a BACB® training program is greatly increased within the context of a collaborative model compared to a traditional model in which a single IHE offers the program. Specifically, the VDOE was willing to provide financial support only for a collaborative program intended to prepare practitioners across Virginia to better serve the students rather than providing funding to a single IHE in the state. As we mentioned previously, the funding was divided between the four IHEs and used for administrative costs rather than student tuition. A significant aspect of securing funding is the opportunity to collect data on the program's effectiveness in the initial implementation phases of such a model, data that can be used to apply for competitive personnel preparation grants awarded by federal agencies.

Fourth, the collaboration between the participating IHEs may facilitate the implementation of similar programs in the future. For example, the four IHEs have the opportunity to (a) become familiar with each other's policies and procedures, (b) create and use strategies that address differences in policies and procedures while accommodating each IHE's requirements, (c) continuously evaluate and monitor the implementation of these strategies, and (d) make data-based programmatic decisions to improve the quality of services provided and the structure and organization of the VA-ABA Consortium. The development of a model that encompasses the complexity of policies and procedures across various IHEs sets the stage for implementing additional collaborative programs to train practitioners in other domains. One such program is the Virginia Consortium for Teacher Preparation in Special Education Adapted Curriculum (ACSE), a collaborative effort between six IHEs in Virginia.

Fifth, the VA-ABA Consortium addresses the shortage of behavior analysts across the entire state of Virginia rather than increasing the number of specialists in one area of the state. Each of the four participating IHEs is located in a different region of Virginia and it has the opportunity to advertise the program and recruit potential students by reaching a different pool of applicants. For example, before the implementation of the VA-ABA Consortium in 2012, the only BACB®-approved program was offered at GMU in Northern Virginia. None of the other 3 IHEs offered a training program in behavior analysis. At the end of 2016, from the 21 graduates who passed the BACB® national examination, four were in Southeastern Virginia, 10 in Eastern Virginia, five in Central Virginia, and two in Northern Virginia. Training practitioners specialized in behavior analysis at various IHEs across the state is one of the most relevant outcomes of the consortium taking into account that before 2012 training BCBAs® in regions other than Northern Virginia was not possible.

Sixth, faculty members at the participating IHEs are able to develop collaborative relationships in the areas of teaching, scholarship, and service. Examples of collaborative relationships include, but are not limited to, sharing resources related to instructional tools and strategies, brainstorming potential research projects, submitting proposals to funding competitions, and networking by attending advisory board meetings for local and state-level organizations. For example, sharing instructional tools and classroom management strategies is a significant aspect of high-quality and effective instruction aimed at addressing the needs of a wide variety of students.

Seventh, students enrolled in the VA-ABA Consortium have the opportunity to collaborate with peers across the state during the program and to extend their collaboration beyond the scope of the program. During the program, faculty members foster collaborative partnerships between students by involving them in group projects. Students are required to exchange ideas, share personal and professional experiences related to various course topics, and contribute to the development of effective behavior-analytic programs. After graduation, the students can choose to continue their collaboration with peers by sharing resources or by exchanging ideas related to the development and the implementation of specific programs.

Finally, the VA-ABA Consortium offers the BACB® training in a distance learning format in an attempt to accommodate the needs of a large number of students across the state. For example, many of the students enrolled in the program live in remote locations of the state and it would be difficult for them to attend a BACB® program in a face-to-face format. Videostreaming from home when a student meets the eligibility criteria for being a home student is an important advantage for many of our students who otherwise would not be able to access and enroll in a BACB® program.

Future Directions

Despite the success of the VA-ABA Consortium, a few aspects may need to be addressed for continued growth and improvement of the program. One aspect is the identification and recruitment of doctoral-level faculty. Currently, the program coordinators at each IHE are doctoral-level professors and full-time faculty. However, should the need arise to add or replace faculty, finding doctoral-level faculty may be a challenge. One contributing factor to this challenge is the new BACB® requirement for all ACS coordinators to be doctoral, full-time faculty at their IHEs beginning January 1, 2017. Furthermore, three of the four IHEs have only one person who meets these criteria; therefore, should a replacement be needed, the VA-ABA Consortium may have difficulties continuing in the interim between the current and the new faculty.

A second aspect relates to possible bureaucratic issues within each of the participating IHEs that may impact the functioning of the VA-ABA Consortium. To date, the ACS coordinators from each IHE have collaborated well together and no major bureaucratic issues have been encountered. However, each IHE has different policies and expectations for their faculty, including faculty teaching loads, compensation, and expectations for non-tenured and tenured faculty in the areas of research and service. Therefore, it is paramount that any changes at the individual IHEs that may impact the VA-ABA Consortium be brought to the attention of the executive committee and analyzed for solutions. To this end, the MOU is reviewed on a regular basis and revised as needed.

A third aspect is the stability of both the administration at the participating IHEs and the ABA teaching faculty. Contingency plans need to be developed should administration at the IHEs change or support be withdrawn for the VA-ABA Consortium. This is highly unlikely given the current support from the leaders at each of the IHEs as well as the VDOE and the significant need for BCBAs[®] in Virginia. Therefore, there is a need to use not only analytic skills but also interpersonal communication, networking, negotiating, persuasion, and influence to continue to be the trusted professionals on our campuses and to promote an ethical and professional conduct for both our students and our colleagues.

It is critical for the faculty members comprising the VA-ABA Consortium to continue to educate others about the field of behavior analysis, the need for well-trained professionals who are qualified to provide effective behavior analytic services to students with the ultimate goal of improving their effective functioning in natural environments, and the importance of programs such as the VA-ABA Consortium in addressing the shortage of behavior analysts in the state of Virginia. It is also important for faculty at the participating IHEs to become and maintain active membership in their campus community by participating in opportunities, such as delivering lectures as guest speakers, serving on thesis and dissertation committees, and developing interdisciplinary partnerships in the area of research and teaching.

A fourth aspect relates to funding, practicum placement, and student retention. Applicants to the VA-ABA Consortium and students enrolled in the program have consistently asked for funding opportunities to complete their academic coursework. In an effort to address this challenge, the VA-ABA Consortium administrators and faculty have submitted proposals to state and federal funding competitions and will continue to actively search for funding opportunities to support students enrolled in the program. Securing funding for student tuition is an important aspect of any program that increases the likelihood of student retention and completion.

Securing funding may also contribute to the quality of supervision provided to students enrolled in the VA-ABA Consortium. Providing high-quality supervision is sometimes

challenging in regard to identifying qualified supervisors and providing compensation for their services. For example, supervising a student in practicum is much more demanding in terms of the amount of hours and the type of training and feedback required to master the targeted behavior-analytic skills than is typically required for a supervisor of student teachers. In addition, BCBA[®] supervisors have the option to provide individual supervision to BCBA[®] candidates without necessarily being affiliated to an IHE, and consequently, set their own compensation rate for these services. Therefore, it is critical for programs such as the VA-ABA Consortium to offer a competitive compensation rate for supervisors to attract and to maintain highly qualified and experienced individuals who are committed to the program and assist in accomplishing its goals.

Identifying and securing practicum placement sites for students enrolled in the VA-ABA Consortium is an important aspect of the program that needs to be considered and further explored. It is sometimes challenging to locate new placement sites both within and outside of the school districts, especially in the rural areas where there are few or no BCBAs[®]. Networking and collaborating with local public and private educational agencies through professional development meetings, workshops, and social events are potential avenues that may lead to the development of successful collaborative partnerships between the IHE and community agencies that will ultimately provide practicum opportunities for students enrolled in the program.

Student retention is an area that has been and continues to be addressed by the VA-ABA Consortium. In some cases, applicants do not fully understand the rigor of the academic coursework and the supervision requirements when first applying to the program. Despite the best efforts of faculty members, some of the applicants are surprised by the number of hours and by the cost necessary to complete the supervision component of the program. Therefore, some of them withdraw prior to or after acceptance into the program because of financial reasons. To address this aspect of the program, the two orientation sessions described previously are intended to offer applicants a better understanding of the rigor of the program, the expectations, and the cost associated with the program. The implementation of the orientation sessions has partially alleviated the challenge of student retention by assisting applicants to make an informed decision prior to joining the program. However, faculty members continue to explore additional avenues to promote student retention in the program.

A fifth aspect is the need to continually evaluate the program by administering surveys both to current students and to graduates of the VA-ABA Consortium with the purpose of identifying strengths of the program and areas that need further improvement. Student feedback is a critical element in making informed decisions related to the quality of services provided and the successful achievement of the program's

goal. Thus, faculty members will continue to explore avenues for increasing students' and graduates' participation in the evaluation surveys to obtain useful feedback that would guide our modifications to improve the program and increase its relevance for current and potential future students interested in pursuing a certification in behavior analysis.

Finally, a very important aspect that has not yet been examined in our program relates to employment. We have not collected employment data due to the characteristics of our students. Specifically, nearly all of the students enrolled in the VA-ABA Consortium were full-time teachers or autism specialists at the time of their admission to the program. Their main purpose for completing the program, in addition to obtaining the BACB® certification, was to acquire the skills necessary to better serve the student population they were already working with. However, as new cohorts of students are accepted into the program and their demographics may change, it would be interesting to collect data on aspects related to employment, such as performance data related to the quality of services provided to students and the implementation of scientifically based interventions, changes in job responsibilities, or shift to a new career (e.g., BCBA versus classroom teacher).

Conclusion

The faculty and administrators at GMU, VCU, ODU, and Lynchburg College have forged new territory in creating the VA-ABA Consortium and have successfully collaborated to develop policies and to address areas of potential concern. One of the advantages of creating and implementing a collaborative program in the area of ABA is the fact that all participating IHEs can afford to offer a comprehensive program by sharing human and material resources and by joining their efforts in accomplishing the program's goals while meeting the requirements set by each IHE and by the BACB®. The VA-ABA Consortium has been and continues to be a relevant and successful learning experience both for faculty and for students. For faculty, the program has offered an avenue for support and collaboration with the ultimate goal of preparing well-trained professionals in the field of behavior analysis. For students, the program provided the opportunity to learn about the numerous applications of behavior analysis and to form professional networks with classmates across the state that will continue after graduation. As the demand for well-trained behavior analysts shows an increasing trend in Virginia, the main goal of the VA-ABA Consortium is to provide a competitive program. Faculty members will continue to evaluate the program's effectiveness in preparing well-trained professionals by assessing and monitoring the quality of the instructional and organizational procedures and by making

data-based programmatic decisions to prevent or address any challenges that may impede its successful implementation.

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