Effects of a Self-Instructional Manual (SIM) and Web-Based Computer-Aided Personalized System of Instruction (WebCAPSI) on Teaching Knowledge and Implementation of the Assessment of Basic Learning Abilities (ABLA)

by

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Abstract

Learning the knowledge and procedures of the Assessment of Basic Learning Abilities (ABLA) is a major practical priority for direct-care service providers who work with individuals with intellectual disabilities (IDs) and autism spectrum disorders (ASDs). The present study compared the effects of two training conditions involving a self-instructional manual (SIM) alone and its combination with a Web-based computer-aided personalized system of instruction (WebCAPSI) program (SIM plus WebCAPSI) on teaching knowledge and implementation of the ABLA to university students. A multiple-baseline design across training conditions was used. The results indicate that the SIM combined with passing unit tests delivered via WebCAPSI was beneficial for knowledge acquisition while viewing demonstration videos was beneficial for conducting the ABLA. The findings suggest that a combination of a SIM combined with unit tests delivered via WebCAPSI and videos provides an effective approach to teach both knowledge and application of behavioural procedures to potential knowledge users.

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Effects of a Self-Instructional Manual (SIM) and Web-Based Computer-Aided Personalized System of Instruction (WebCAPSI) on Teaching Knowledge and Implementation of the Assessment of Basic Learning Abilities (ABLA)

Introduction

In the fields of intellectual disabilities (IDs) and autism spectrum disorders (ASDs), direct-care service providers frequently encounter difficulty in selecting types of training and work tasks that are appropriate to their clients' developmental levels and could lead to successful rehabilitation (DeWiele & Martin, 1998; Martin & Yu, 2000). For example, a child with severe autism might be able to learn to reliably follow the instruction to put a block into a container that remains in the same position over a number of trials, yet is unable to do so even after hundreds of attempts when the container's position is changed. An effective and reliable tool is therefore required to assess client's learning abilities. However, precisely administering the assessment tool can be very challenging, as it needs a considerable amount of expertise. Effectively training the direct-care service providers to administer the tool becomes a major practical priority.

Autism spectrum disorders (ASDs)

ASDs are a broad group of neurodevelopmental disorders characterized by core deficits in reciprocal social interactions and communication skills, as well as by restricted, repetitive patterns of behaviours and interests (American Psychiatric Association, 2000). IDs, as the most common co-occurring disorders with ASDs, are characterized by significant limitations both in intellectual functioning and in adaptive behaviours (American Association on Intellectual and Developmental Disabilities, 2011) and are about 50 to 70% of all ASD cases (Fombonne, 2003). Children diagnosed with ASDs differ in terms of age of onset prior to age three, manifestation of symptoms, and severity of symptoms, which can include symptoms of IDs. Today, ASDs are the second most common types of disorder after IDs among developmental disabilities, being one of the fastest growing diagnosis. The latest studies indicate that approximately one in 165 children in Canada (Fombonne, Zakarian, Bennett, Meng, & MacLean, 2006) and one in 88 children in the United States (Centers for Disease Control and Prevention [CDC], 2012) are diagnosed with an ASD.

With a rapid increase in prevalence during the last two decades, ASDs have received much more media attention and public awareness than ever before. A large number of research grants funded by both public and private sponsors have been widely distributed across many projects that are concentrated in basic science and clinical and translational research (Singh, Illes, Lazzeroni, & Hallmayer, 2009). Although there is a growing body of research at an ever-increasing pace devoted to understanding ASDs, the causal mechanisms underlying these complex disorders still remain unclear (Newschaffer et al., 2007). This hampers the development of scientifically supported treatments.

Although there are some evidence-based practices available (e.g., picture exchange communication system [PECS], pivotal response therapy [PRT]), the early intensive behavioural intervention (EIBI) based on Applied Behaviour Analysis (ABA) is considered by researchers and practitioners to be the most effective therapeutic intervention demonstrated to date for children with ASDs (Remington et al., 2009; Perry & Condillac, 2003; Perry & Weiss, 2007; Weiss, Fiske, & Ferraioli, 2008; New York State Department of Health, Early Intervention Program, 1999). ABA utilizes behavioural procedures derived from the principles of operant and respondent learning to improve academic skills, adaptive living skills, socially significant behaviours, and vocational skills and to establish appropriate behaviours and reduce inappropriate behaviours. ABA typically uses single-organism designs (Horner et al., 2005) to examine the effects of behavioural interventions across children, service providers, times, and settings. The interventions frequently use well-designed behaviour-specific programs that contain a variety of training and work tasks to extend children's repertoires and facilitate rehabilitation of the intellectual, language, and adaptive deficits associated with ASDs. Behaviour-specific programs with appropriate training and work tasks are typically delivered by direct-care providers (e.g., ABA tutors) using a common form of teaching, called discrete-trials teaching (DTT), in which there are clear and concise instructions, repetition of trials or opportunities to practice the desired behaviour, behaviour-specific praise statements and/or other contingent reinforcement, and error correction following incorrect responses. However, because children with ASDs display a variety of symptoms and demonstrate learning abilities at different levels, programs with well-designed tasks need to be tailored to reflect their individualities. That is, the programs should not be "one size fits all." This raises the question: How should a behaviour analyst design a training program that best fits a given child? One practical solution is to use the Assessment of Basic Learning Abilities (ABLA) test to assess the child's current learning repertoire before any program is implemented.

Assessment of Basic Learning Abilities (ABLA)

To address the problem of determining what tasks should be taught to whom, Kerr, Meyerson, and Flora (1977) developed a direct assessment tool – originally known as the Auditory Visual Combined Discrimination test, now referred to as the ABLA test – by using standard prompting and reinforcement procedures to teach basic and complex position, visual, and auditory discrimination tasks to an individual. The tasks are hierarchically ordered in difficulty. The test measures the ease or difficulty with which the individual is able to learn the tasks. According to this test, a child such as the one described above may be experiencing difficulty in learning visual discrimination tasks.

Table 1
A Description of the ABLA Levels, Discrimination Skills Required, and Examples of Everyday Behaviours Requiring the Discrimination Skills

ABLA Levels	Discrimination Skills	Examples of Everyday Behaviours
Level 1: Imitation. A tester puts an object into a container and asks the testee to do likewise.	A simple imitation.	1). Rolling a ball from one person to other. 2). Children playing Follow-the Leader.
Level 2: Position Discrimination. When a red box and a yellow can are presented in a fixed position, a testee is required to consistently place a piece of foam in the container on the left.	A simultaneous visual discrimination with position, colour, shape, and size as relevant visual cues.	1). Turning on the cold (vs. the hot) water tap. 2). Placing a fork on the left side of a plate when setting a table.
Level 3: Visual Discrimination. When a red box and a yellow can are randomly presented in left-right positions, a testee is required to consistently place a piece of foam in the yellow can.	A simultaneous visual discrimination with colour, shape, and size as relevant visual cues.	1). Locating own printed name on the blackboard. 2). Locating one's coat from among other coats hung in a closet, with the coat in no fixed position.
Level 4: Visual Identity Match-to-Sample Discrimination. When a yellow can and a red box are presented in random left-right positions and a testee is presented with a yellow cylinder or a red cube, he or she consistently places the cylinder in the yellow can and the cube in the red box.	A conditional visual-visual quasi-identity discrimination with colour, shape, and size as relevant visual cues.	1). Filling container that are partly full. 2). Restocking a partially emptied salad bar.
Level 5: Visual Non-Identity Match-to-Sample Discrimination. When a yellow can and a red box are presented in random left-right positions, a testee consistently places a purple-coloured piece of wood shaped like the word *Can* into the can and a piece of silver-coloured wood shaped like the word *BOX* into the box.	A conditional visual-visual non-identity discrimination with colour, shape, and size as relevant visual cues	1). Putting a pencil with a piece of paper. 2). Matching the printed word CAT to a picture of a cat.
Level 6: Auditory-Visual Combined Discrimination. When presented with a yellow can and a red box in random left-right positions, a testee consistently place foam into the correct container when the tester requests either "red box" or "yellow can".	A conditional auditory-visual nonidentity discrimination with pitch, pronunciation, and duration as relevant auditory cues and with colour, shape, and size as relevant visual cues	1). Responding appropriately to the spoken words "Stop" and "Go". 2). Responding to requests such as "Stand up" vs. "Sit down".

Source: Reprinted with permission from Martin and Yu (2000).

The ABLA test is a dynamic test used to assess a testee's ability to learn some basic behavioural functions. As a direct behavioural assessment, it is widely used to help therapists in selecting and sequencing appropriate training tasks for children with IDs and ASDs. In order to provide a precise assessment, the ABLA has to be administered by testers who have been trained effectively.

Six different tasks included in the ABLA test are hierarchical in difficulty from level 1 (the least difficult) to level 6 (the most difficult). The levels are generally regarded to consist of a simple imitation, a position discrimination, a visual discrimination, a match-to-sample discrimination, a non-identity match-to-sample discrimination, and an auditory-visual combined discrimination (see Table 1).

Testing materials for the ABLA test are readily available or easily constructed from daily household items, including a yellow can, a red box, a piece of foam, a yellow cylinder, a red cube, a piece of wood that has upper-case letters spelling the word "BOX", and a piece of wood that has upper- and lower-case letters spelling the word "Can". The ABLA is a dynamic test administered by an experienced tester who is typically seated at a table directly across from and facing a testee in a distraction-free room. There is one task for each level of the ABLA test and each task is a standardized exemplar of a discrimination skill (see column 2 in Table 1).

According to Kerr et al.'s (1977) description, a task begins with a three-step prompting sequence, consisting of a demonstration, a guided trial, and an opportunity for the testee to respond independently. Testing trials for the task begins with the completion of the initial prompting sequence in which the testee needs to make a correct, independent response. For each testing trial, a correct response is reinforced immediately with praise and a primary reinforcer (e.g., a piece of candy). An incorrect response, on the other hand, is followed by an error correction procedure, which is identical to the initial three-step prompting sequence described above. The mastery criterion for each level is eight consecutive correct responses. Failure at each level is defined as the occurrence of eight cumulative incorrect responses. The test is usually conducted for all six levels, in a sequential order from the first to the sixth level, within approximately 30 minutes.

Kerr et al. (1977) chose the six tasks for the ABLA test because they are commonly found in a variety of tasks in daily life. ABLA research during the past two decades indicates that it is a robust and reliable tool for use by direct-care providers for selecting and sequencing training and work tasks to match the learning abilities of individuals with various levels of developmental disabilities (Yu, Martin, & Williams, 1989; Martin & Yu, 2000; Martin, Thorsteinsson, Yu, Martin, & Vause, 2008). For example, children with ASDs who passed ABLA Level 6 (auditory-visual combined discrimination) are more likely to learn to name objects with fewer training trials than those who failed Level 6 (Viel et al., 2011). Moreover, matching tasks to individuals' ABLA levels results in fewer aberrant behaviours compared to the tasks that are not matched to individuals' ABLA levels (Vause et al., 2000).

In spite of its clinical effectiveness, practitioners frequently report that the ABLA test can be challenging to administer because it requires a considerable amount of expertise. Therefore, learning by direct-care service providers to administer the ABLA in the field of IDs and ASDs is a major practical priority to ensure that the test is accurately administered. To teach trainees to administer the ABLA, trainers typically employ a complex direct training process in which they convey basic concepts and principles, model behavioural procedures, enact role-playing sessions with the trainees, and provide feedback.

Although direct training of administering the ABLA test can be highly effective, it can also be rather labour intensive and difficult to carry out within a stable teaching structure (e.g., a highly experienced trainer needs to reliably deliver the knowledge and procedures of the test to different trainees). With a rapidly rising demand of direct-care staff following an increasing trend in prevalence of ASD diagnoses (Matson & Kozlowski, 2011) and a high employee turnover in this field (Larson & Lakin, 1999; Test, Flowers, Hewitt, Solow, & Taylor, 2003), direct instruction is becoming more costly. An effective alternative training method is needed.

Self-Instructional Manuals (SIMs) as an Alternative to Direct Teaching of Behavioural Techniques

In recent years, researchers (e.g., Fazzio & Martin, 2006; DeWiele & Martin, 1998) at the University of Manitoba have been applying learning principles to develop self-instructional manuals (SIMs) for behavioural techniques to facilitate training procedures for direct-care staff. Their research has shown that the training effects could be substantial when the SIMs are used appropriately and combined with other training components (e.g., video modeling; practice with trainers playing the role of children with IDs or ASDs; feedback based on trainees' performance on role-playing sessions).

The salient features of the SIMs developed by researchers such as Fazzio & Martin (2006) and DeWiele & Martin (1998) at the University of Manitoba include the following: (1) selected study materials are presented in small portions; (2) each unit of material is accompanied by study questions; and (3) SIM users are instructed to proceed to each successive portion only after mastering the current one. Recent studies regarding the evaluation of SIMs suggest that the SIMs are effective in both promoting knowledge development and increasing accuracy of performing behavioral techniques.

For example, Arnal et al. (2007) evaluated the effectiveness of a SIM for discrete-trial teaching (DTT; Fazzio & Martin, 2006) in training university students to conduct DTT sessions based on a 19-item checklist. In the first experiment, Arnal et al. asked four students to study a 21-page abbreviated SIM and answer study questions in the SIM. A closed-book test consisting of randomly sampled study questions drawn from the SIM was used to determine the students' mastery of DTT. Those students who did not achieve 100% accuracy were asked to restudy the material the questions were on until 100% accuracy occurred. Results showed that all students improved their performance in conducting DTT from a mean of 44% during baseline to a mean of 67% after studying the SIM. Subsequently, the authors then conducted an experiment using a multiple-baseline design across three students. They investigated the effectiveness of a training package that included studying the SIM combined with watching and scoring a video demonstration of DTT and receiving feedback on the accuracy of their scoring. Results indicated that, compared to those who only studied the SIM, the students who engaged in training with multiple components produced superior performance, suggesting that the SIM combined with other training components may be even more promising.

In another study, DeWiele, Martin, and Garinger (2000) compared the effectiveness of a SIM for the ABLA test (DeWiele & Martin, 1998) with providing its original description (Kerr, Meyerson, & Flora, 1977), which was the best available information package at the time. In DeWiele et al.'s first experiment, 21 undergraduate psychology students were randomly assigned to learn either the SIM or the original description and then provided with an opportunity to practice what they had learned with confederates playing the role of an individual with a developmental disability. The authors found that participants who studied the SIM produced better performances than those who studied the original description, in terms of accurately completing a comprehension exam on procedure-specific knowledge about the ABLA test, a speed exam to gauge speed and accuracy of responding to questions about conducting the ABLA test, and a classification exam to assess ability to clarify training tasks in accordance with hierarchical levels of the ABLA test.

In a subsequent experiment, DeWiele et al. (2000) evaluated a revised SIM for the ABLA test in an environment in which the participants (1) were direct-care service providers in a residential training facility for individuals with developmental disabilities and (2) administered the ABLA test to assigned clients from the facility. The participants were asked to study the SIM and to attempt to achieve mastery (90% accuracy) on the comprehension, speed, and classification exams specified in the prior experiment. Failure to reach the criterion led to restudying the SIM and retaking the exams. The participants then were required to practice administering the ABLA test to each other, with one of them role-playing a client with a developmental disability. Results indicated that, compared to those who studied the original description in the preceding experiment, direct-care staff who were trained with the SIM as described above achieved better results on administering the ABLA test to real clients in a relatively shorter period of time. In addition, based on experts' judgments, important clinically significant differences favouring the use of the SIM on the length of study, practice time of participants, and results obtained on the exams were observed.

Personalized System of Instruction (PSI)

Pedagogical research on higher education prior to the 1950s indicated that there were no significant differences in academic achievement favouring any of available instructional methods and, thus, suggested that new models of the teaching-learning situation should be developed (Dubin & Taveggia, 1968). Fred S. Keller, an American behaviourist, noticed that adequate reinforcement was sometimes lacking in education. During Word War II, he attempted to systematically apply behavioural techniques, especially the principle of immediate reinforcement, to teach Morse code to Signal Corps personnel in a military training centre. The behavioural instruction was characterized by the following core features: (1) a course content was unitized into small portions; (2) students learned through the units in sequence at their own speed; (3) the units were perfection- or mastery-based; (4) repeated tests, without penalty, for a unit were required until perfection or mastery occurred; (5) student assistants, called proctors, were used to provide immediate scoring and incidental tutoring to less advanced students; (6) the use of lectures and demonstrations to provide information was minimized. The attempts to apply the novel behavioural instruction with reinforcement thinking to the teaching process have evolved under the name of the Keller Plan or personalized system of instruction (PSI; Keller, 1968).

Based on his experience in teaching Morse code, Keller (1968) applied PSI to teach some basic psychology courses at several universities. He found that compared to the grades obtained by students instructed by more conventional methods, the probability distribution of the grades for the same course taught through PSI is more likely to be “skewed to the left” (i.e., the mean and mode moved toward the right), suggesting that the students in PSI courses performed significantly better. Under the influence of Keller’s original study, the acceptance or adoption of PSI rapidly extended to a large number of courses in psychology and other disciplines in many countries (Keller, 1974). Three reviews of PSI research concluded that it is superior to conventional methods commonly used at the postsecondary level in terms of academic achievement, retention of learning, and student participation (Kulik, Kulik, & Carmichael, 1974; Kulik, Kulik, & Cohen, 1979; Robin, 1976). Keller (1968) believed that the effectiveness of PSI is mainly due to providing the right contingencies of reinforcement and the minimization of punishment.

Although PSI has proved its superiority in academic gains, its popularity gradually declined. Pear and Martin (2004) suggested that the perceived need of a large investment of effort and time is one of the major reasons responsible for the decline of PSI applications and research. Fortunately, the advent of computers and the Internet provide a solution to this problem. As a variation of PSI with respect to technological breakthroughs, a computer-programmed version of PSI called computer-aided personalized system of instruction (CAPSI; Pear & Kinsner, 1988) was developed by Drs. Joseph J. Pear and Witold Kinsner.

Computer-Aided Personalized System of Instruction (CAPSI)

CAPSI is conceptualized as a teaching-learning process that involves the use of computers in the mediation of student-student/proctor and student-instructor interactions and the evaluation of learning quality in a virtual classroom (Kinsner & Pear, 1990). Pear and Kinsner (1988) reported that CAPSI is demonstrated to be highly versatile, robust, and well received by students, as it has been implemented to be an independent educational tool at the University of Manitoba since 1983 (Pear, Schnerch, Silva, Svenningsen, & Lambert, 2011).

CAPSI incorporates core features from Keller’s PSI. Like PSI, CAPSI allows students to progress through a course at their own pace within the prescribed deadline (although, according to Keller, in a pure PSI course there would be no deadline); the course material is broken down into small units with corresponding mastery-based tests so that frequent (preferably immediate) reinforcement in the form of feedback is delivered on each unit test; the behaviour to be learned is specified as answering questions or solving problems for each study unit; students may experience mild punishment for unsuccessful attempts on a unit test, as they need to rewrite the test and do not receive course credit for that unit until mastery occurs; students who have passed a unit that others are still being tested on can be peer-reviewers (i.e., equivalent to proctors in PSI, except that they are in the same course as the students whose unit tests they provide feedback on) for that unit; the peer-reviewers have an opportunity to be reinforced immediately with bonus points for peer-reviewing; supervised examinations (i.e., mid-term and final exams) that closely follow the format and structure of unit tests are optional (Kinsner & Pear, 1988).

CAPSI is viewed as a dynamic educational system that facilitates teaching and learning through a network-based environment (Pear & Crone-Todd, 1999) where the spatial and temporal limitations of a classroom vanish. Moreover, as with PSI, study questions delivered via CAPSI can be compatible with Bloom's taxonomy (Bloom, 1956; Crone-Todd & Pear, 2001; Crone-Todd, Pear, & Read, 2000), a hierarchical classification of thinking processes based on six cognitive levels (viz., knowledge, comprehension, application, analysis, synthesis, and evaluation). Thus, CAPSI can be versatile in developing thinking in all cognitive levels. In addition, CAPSI's use of peer reviewers reduces an instructor's work in marking tests while offering opportunities for students to review the questions on preceding units from the perspectives of other students. Finally, CAPSI is a self-recording system in which students' performance is automatically collected as data throughout the duration of a course for current monitoring and later analysis.

CAPSI research in the past two decades suggests that: (1) the system has demonstrated its robustness and effectiveness for on-campus (short-distance) and off-campus (long-distance) education in a variety of courses across disciplines (Kinsner & Pear, 1988; Pear & Kinsner, 1988); (2) students have expressed satisfaction (depending on levels of comfort with computers) with the flexibility CAPSI provides (Pear & Novak, 1996); (3) students who have rapidly progressed over a CAPSI-taught course produce higher levels of performance with respect to mid-term and final exam scores (Springer & Pear, 2008; Lambert, Schnerch, & Pear, 2009); (4) being based on PSI, CAPSI also has demonstrated its superiority over a lecture-based method (Sevenningsen & Pear, 2011); and (5) students' critical thinking skills regarding course content have been improved by completion of a CAPSI-taught course (Sevenningsen & Pear, 2011; Hu, Sevenningsen, & Pear, 2011).

Early work on CAPSI was done using a mainframe computer and a local network. With the advent of technological breakthroughs, a web-based version of CAPSI (WebCAPSI; Pear et al., 2011) has evolved. In recent years, WebCAPSI has not only been administered regularly to teach academic courses offered on- and off-campus but also has shown promise in actively training direct-care service providers for professional development (e.g., Scherman, 2010; Hu, Pear, & Yu, 2012). That is, it can be combined with SIMs and offers an online behavioural instruction method in which study questions included in the SIMs can be imported into the WebCAPSI program to set up mastery-based unit tests in accordance with topics or chapters covered in the SIMs. In addition, instructional videos related to the topics can be uploaded to WebCAPSI and allow SIM users to view.

More recently, a version of WebCAPSI in which unit test answers are marked automatically, by the computer rather than by the instructor or peer reviewers, has been developed. In this version, students write fill-in-the-blank type answers (i.e., single words or short phrases) instead of essay-type answers. In all respects, except whether unit tests are marked by the computer and the amount of writing required in the answers, the computer-marked version of WebCAPSI is identical to the human-marked version.

Training Behavioural Techniques with WebCAPSI

Practitioners who work closely with children with IDs and ASDs need to be trained to achieve a high degree of accuracy in implementing behavioural procedures and assessments. As described previously, SIMs for behavioural techniques have been developed to fill the need to train practitioners effectively and efficiently. A potential limitation of the effectiveness of SIMs is the reliance on the assumption that learners will adhere to the mastery-before-proceeding-to-the-next-unit contingency. WebCAPSI may offer a practical solution to this problem because of its requirement that students adhere to a mastery criterion.

Scherman (2010) investigated the effectiveness of a SIM (Fazzio & Martin, 2009) combined with WebCAPSI in teaching five university students to conduct DTT. The training procedure consisted of reading the SIM, studying questions associated with each chapter included in the SIM, taking 12 mastery-based unit tests corresponding to the chapters in the SIM, reviewing other students' answers, and doing role-playing exercises with a confederate playing the role of a child with an ASD. Students were asked to read each chapter and demonstrate mastery of a unit test on WebCAPSI before proceeding to the next chapter and unit test. As with the use of WebCAPSI in academic courses, students who had passed a test on the current unit were provided with a chance to review others' answers on the current or preceding units. Students who attempted unsuccessfully to pass a unit test were required to restudy the material for that unit and rewrite a new test on the unit. This continued until the mastery criterion was met. Role-playing exercises on three pre-determined tasks were provided after students had successfully passed unit tests for those tasks. Results indicated that performance on the pre-determined tasks improved from a mean of 54.9% during baseline to 84.7% after training, suggesting that the SIM combined with WebCAPSI is an effective method to teach the students accurately implementing DTT.

Hu et al. (2012) evaluated the use of a training package to teach students knowledge about and procedural application of the ABLA test. The training package included a SIM for the ABLA (DeWiele & Martin, 1998), five mastery-based unit tests corresponding to five levels of the ABLA, and five demonstration videos (one video for each level, which was accessible after passing a test for that level). The package also included WebCAPSI, in which, for each level, students had to sequentially read a unit from the SIM, write randomly selected study questions on a mastery basis (i.e., at least 9 out of 10 correct), and watch a demonstration video after passing the test for that level. The computer-marked version of WebCAPSI was used in this study. That is, the study questions delivered via WebCAPSI require short answers that were automatically marked by the system. Unsuccessful attempts led to restudying the unit and rewriting the test. The training intervention was evaluated in a multiple-baseline design across three university students. Results showed that the training package consisting of the SIM combined with WebCAPSI and demonstration videos was effective in developing knowledge and in teaching individuals to accurately administer all levels of the ABLA to a person role-playing an individual with an ASD.

In summary, participants in both the Scherman (2010) and Hu et al. (2012) studies substantially improved their performance, suggesting that a training procedure involving the use of WebCAPSI could be effective. It should be noted that, along with studying materials and passing unit tests, participants in Scherman's (2010) study peer-reviewed unit tests and practiced with a confederate the three tasks to be trained; and participants in Hu et al.'s (2012) study watched demonstration videos related to five levels of the ABLA. Thus, the effect of using a

SIM combined with only passing mastery-based unit tests delivered via WebCAPSI to teach knowledge about and application of a particular behavioural technique still remains unclear. Moreover, the effect of studying a SIM, along with study questions, has never been compared with a SIM combined with WebCAPSI. Finally, the effect of using videos with a SIM combined with WebCAPSI has not been studied.

The primary purpose of the present study was to compare the effects of a SIM alone and the SIM combined with WebCAPSI on students' performance regarding knowledge acquisition and procedural implementation. Another purpose of the study was to determine whether students could improve their performance further by viewing demonstration videos (Catania, Almeida, Liu-Constant, & DiGennaro Reed, 2009). A revised version of the ABLA SIM (DeWiele, Martin, Martin, Yu, & Thomson, 2010) was chosen for the comparison because of its utility as a reliable screening tool in the clinical setting for individuals with IDs or ASDs (DeWiele et al., 2000) and of its difficulty in being accurately administered. Considering that WebCAPSI is highly efficient with regard to the utilization of human resources, it was expected that the results of this study would be highly promising in training potential SIM users effectively and efficiently.

Statement of the Problem

This study evaluated the following hypotheses: (1) the SIM in combination with WebCAPSI would produce better performance on the knowledge-based test about the ABLA than the SIM alone; and (2) videos demonstrating correct procedures and common mistakes in the administration of all levels of the ABLA would help participants to further improve their performance on the application test. This research was approved by the Psychology/Sociology Research Ethics Board of the University of Manitoba.

Method

Participants

Participants were students recruited from the University of Manitoba via a recruitment poster (Appendix A), which were posted at several locations at the Fort Garry Campus. Potential participants, who emailed or called the researcher in response to the poster, were provided with more details about the study and their potential participation via a recruitment letter (Appendix B) or a script for callers (Appendix C). Written informed consent (Appendix D) to participate in the study was obtained from each participant during a pre-study visit.

Participants consisted of 12 students (six males and six females). They had not previously read any content related to the ABLA, had not had previous experience working in a behavioural intervention program with individuals with IDs or ASDs, and had Internet access. The 12 participants had very diverse academic backgrounds, and half of them took psychology courses before and the other half did not. None of them used WebCAPSI before. All of them demonstrated a degree of familiarity with computers and computer technologies from neither familiar nor unfamiliar with to very familiar with. Because direct-care providers for children with IDs and ASDs could be hired from different disciplines, the diversity of recruited participants may be an advantage for this study. Table 2 shows the demographic information of all participants.

Monetary compensation was used for participation. Specifically, each participant received $5 for the pre-study visit regardless of willingness to participate in the rest of the study and $15 for each of four phases of the study that he or she began regardless of performance. A total of $65 was received by each participant for all phases.

Table 2
Participants' Demographic Information

ID	Gender	Age range	Highest level of education	University majors	University minors	Took any psychology course before	Ever used WebCAPSI before	Length of time spent on computers/tablets each day	Familiarity with computers and computer technologies
P1	F	26-30	2nd year Master's	Family social sciences	N/A	Yes	No	More than 4 hours	Very familiar with
P2	M	16-20	3rd year undergraduate	Psychology	N/A	Yes	No	More than 4 hours	Somewhat familiar with
P3	F	21-25	2nd year undergraduate	Psychology	N/A	Yes	No	More than 4 hours	Somewhat familiar with
P4	M	16-20	3rd year undergraduate	Psychology	Spanish	Yes	No	More than 4 hours	Neither familiar nor unfamiliar with
P5	M	26-30	2nd year Master's	City planning	N/A	No	No	More than 4 hours	Somewhat familiar with
P6	M	16-20	2nd year undergraduate	Microbiology	N/A	No	No	More than 4 hours	Very familiar with
P7	M	21-25	1st year undergraduate	Not decided yet	N/A	No	No	More than 4 hours	Very familiar with
P8	F	21-25	1st year undergraduate	Engineering	N/A	No	No	Less than 1 hour	Somewhat familiar with
P9	M	21-25	2nd year undergraduate	Engineering	N/A	No	No	At Least 1 hour	Somewhat familiar with
P10	F	Above 36	Postgraduate	Nursing/ Psychology/ Philosophy	English/ Sociology	Yes	No	Less than 1 hour	Somewhat familiar with
P11	F	16-20	1st year undergraduate	Biochemistry	N/A	Yes	No	More than 4 hours	Somewhat familiar with
P12	F	16-20	1st year undergraduate	Not decided yet	N/A	No	No	More than 4 hours	Somewhat familiar with

Note: N/A = Not Applicable

Materials

The training materials consisted of the ABLA SIM (2nd edition; DeWiele et al., 2010), the WebCAPSI program containing software for presenting unit tests and for automatically marking answers on the unit tests, and demonstration videos.

In order to have novel levels to be learned for each training phase, the six levels of the

ABLA SIM were combined into three sets with approximately equal length in the SIM. Each set of contents to be taught included an introduction, which described basic concepts and general guidelines for using the ABLA, and two levels of the ABLA that are 3 levels apart (although the ABLA levels are presented in order of difficulty in the SIM from levels 1 to 6, there is no research evidence indicating any difference in difficulty for testers to administer). The systematic selection of the contents tended to average any difference in difficulty in administering the ABLA across the three sets. Set A consisted of an introduction, the ABLA simple imitation task (Level 1), and the ABLA visual identity match-to-sample discrimination (Level 4); Set B consisted of an introduction, the ABLA position discrimination (Level 2), and the ABLA visual non-identity match-to-sample discrimination (Level 5); Set C consisted of an introduction, the ABLA visual discrimination (Level 3), and the ABLA auditory-visual combined discrimination (Level 6). The introduction section was similar to all three sets of contents and was used to provide general information and guidance for the two levels that were learned.

Materials for administrating the ABLA included two containers (viz., a yellow can and a red box) and five manipulanda (viz., a piece of foam, a cube, a cylinder, a purple piece of wood with the word "Can" carved on it, and a sliver piece of wood with the word "BOX" carved on it). A video camera and a tripod were used to record testing sessions for later scoring.

A written test with 10 fill-in-the-blank questions was used to measure the changes in performance on knowledge acquisition about the ABLA. A cumulative version of the tests is presented in Appendix E. An application test on conducting 12 trials was used to measure how accurately participants were able to implement the ABLA test on two pre-determined levels. A full list of six levels with 36 trials (6 trials for each level) is presented in Appendix F. For each trial, a 20- to 33-component checklist, called the ABLA tester evaluation form (Martin, Martin, Yu, Thomson, & DeWiele, 2011), was used to evaluate accuracy with which participants implemented the ABLA test. A training feedback and evaluation survey, presented in Appendix G consisting of 11 items, was given to participants to measure their judgments about training methods and components.

Setting

The training setting of the first three phases could be anywhere the participants chose (e.g., home). When participants were asked to use WebCAPSI, they were required to have a computer connecting to the Internet. The training setting of the last phase occurred in a research office equipped with an Internet enabled computer at the University of Manitoba so that the participants could access demonstration videos. The knowledge-based tests and application tests of each phase were conducted in a testing room at the university.

Independent Variables

The instructional methods to be compared, consisting of either the SIM (alone) or the SIM plus WebCAPSI, constituted the independent variables. Both conditions involved the participant reading designated sets of contents from the SIM and responding to study questions corresponding to three units (i.e., a unit for an introduction section and two units for detailed information covering two pre-determined levels of the ABLA) of each set. Moreover, in the last phase of the experiment, the participants viewed videos demonstrating correct procedures and common mistakes made in the administration of the ABLA. The contents of the videos for all 6 levels of the ABLA are described in Appendix H.

In the SIM condition, participants were required to study a designated set of contents from the SIM, answer study questions corresponding to three units, and check their responses against answer keys included in the set of contents. In the SIM plus WebCAPSI condition, participants were required to study a set of contents from the same SIM and study questions included in the set, with the omission of the answer keys, and write three mastery-based unit tests delivered by WebCAPSI. Each mastery-based test consisted of 10 study questions, with the answers being marked automatically by the WebCAPSI program. That is, the computer-marked version of WebCAPSI was used in the present study. Two post-training measurements consisting of (1) a knowledge-based test and (2) an application test occurred after participants complete the last unit of a given set. Note that the questions included in the knowledge test were different from, but were closely followed the format and structure of the study questions the participants answered for the set. In the last phase, the participants were given two post-video measurements that were identical to the post-training measurements in the first three phases except that the post-video measurements covered all levels of the ABLA.

The study questions were randomly drawn from a pool of questions for each unit. The total of all units consisted of 190 questions, including 122 fill-in-the-blank and 68 single-choice (including true-or-false) questions. In addition to 98 questions included in the SIM, 92 compatible questions covering the introduction and all six ABLA levels developed by the researcher of this study. Evaluated in accordance with Bloom's cognitive taxonomy, 62% of all questions were categorized in level 1 (knowledge), 16% in level 2 (comprehension), and 22% in level 3 (application), suggesting that the questions tended to emphasize recognition of learned materials, translation of the materials from one form to another, and application of the materials in concrete and practical situations.

Dependent Variables and Data Collection

The dependent variables were (a) knowledge of the ABLA, (b) accuracy of conducting the ABLA with the researcher played the role of a simulated client with an ASD, and (c) the participants' subjective judgments of the training components and methods. The first two variables were measured in all phases. The third was measured only at the last (post-video) phase.

Knowledge of the ABLA was assessed by written tests (described previously), which were marked by a research assistant using a standardized answer key. The research assistant was blind to the experimental condition the participant was in. The ABLA tester evaluation form (Martin et al., 2011), consisting of 20- to 33-component behavioural checklists (the number of components varied at levels being tested), was used to evaluate the performance of conducting the ABLA with the researcher. During each session, data were collected for 12 trials on two levels of the ABLA.

Research Design

A multiple-baseline design across two training conditions was used. Each participant was exposed to all three sets of contents, one set for each phase with three phases in total. Different orders of the sets were used to counterbalance any order effect across the participants. Considering that participants were to learn the entire SIM by studying all three sets (A, B, and C), there were six possible orders in which they could experience these sets: ABC, ACB, BAC, BCA, CAB, and CBA. Twelve participants were randomly assigned to two groups, six participants in each group, and each order was randomly assigned to one of the participants in each condition. Participants in one group received training under the SIM condition once followed by training under the SIM plus WebCAPSI condition, and participants in the other group received training under the SIM condition twice followed by training under the SIM plus WebCAPSI condition. Finally, all participants from both groups watched demonstration videos. The methodology is illustrated in Table 3.

Table 3
Research Design

ID	Phase I	Phase II	Phase III	Phase IV
P1	SIM (Set A)	SIM + WebCAPSI (Set B)	SIM + WebCAPSI (Set C)	Videos (All levels)
P2	SIM (Set A)	SIM + WebCAPSI (Set C)	SIM + WebCAPSI (Set B)	Videos (All levels)
P3	SIM (Set B)	SIM + WebCAPSI (Set A)	SIM + WebCAPSI (Set C)	Videos (All levels)
P4	SIM (Set B)	SIM + WebCAPSI (Set C)	SIM + WebCAPSI (Set A)	Videos (All levels)
P5	SIM (Set C)	SIM + WebCAPSI (Set A)	SIM + WebCAPSI (Set B)	Videos (All levels)
P6	SIM (Set C)	SIM + WebCAPSI (Set B)	SIM + WebCAPSI (Set A)	Videos (All levels)
P7	SIM (Set A)	SIM (Set B)	SIM + WebCAPSI (Set C)	Videos (All levels)
P8	SIM (Set A)	SIM (Set C)	SIM + WebCAPSI (Set B)	Videos (All levels)
P9	SIM (Set B)	SIM (Set A)	SIM + WebCAPSI (Set C)	Videos (All levels)
P10	SIM (Set B)	SIM (Set C)	SIM + WebCAPSI (Set A)	Videos (All levels)
P11	SIM (Set C)	SIM (Set A)	SIM + WebCAPSI (Set B)	Videos (All levels)
P12	SIM (Set C)	SIM (Set B)	SIM + WebCAPSI (Set A)	Videos (All levels)

Research design: Multiple baseline design across training conditions in which two groups of six participants move across conditions in a semi-staggered manner, and three sets of contents (A, B, and C) from the SIM counterbalance any order effect across participants.

Procedure

Phase I: Training under the SIM condition. Participants were asked to learn from the SIM a set of contents consisting of one introduction section and two sections covering two pre-determined levels of the ABLA. Three sets of contents were randomly assigned to participants without replacement, and the process was repeated four times so that every participant received a set of contents to learn. Participants were told to read the set of contents, answer study questions, and check their responses against answer keys included in the set. When they felt ready to be tested, participants were required to make an appointment with the researcher to take a knowledge-based test and to administer the two ABLA levels they studied. Based on the participants' self-report, the training process took a mean of 2 hours (range: 1.75 to 3 hours).

Phase I: Post-training measurements. The post-training measurements, which consisted of (1) a knowledge-based test and (2) an application test, was conducted on average 6.6 days (range: 2 to 8 days) after the commencement of training in Phase I. The knowledge-based test, including 10 fill-in-the-blank questions, had a 10-minute limit. The questions in the test were new to the participants, but closely followed the format and difficulty of the study questions from the set of contents. The knowledge-based tests were only on material from the relevant section of the SIM, not on the introduction that included in each set. During the application test, in which the researcher played the role of a child with an ASD, each participant was asked to conduct 12 trials of the ABLA on the two levels that they studied (6 trials for each level), which were administered in a hierarchical order, with a brief break (30 seconds) between levels. Each participant was asked to let the researcher know when he or she finished a trial and was going to move on to the next trial. The application test was completed on average 8.5 minutes (range: 5.5 to 21 minutes). All sessions were videotaped for later scoring. Participants did not receive any further training or feedback on their performance during and after the knowledge-based and application test.

Phase II: Training under either the SIM or the SIM plus WebCAPSI condition. Two of four participants who had studied set A, two of four participants who had studied set B, and two of four participants who had studied set C were randomly assigned to the SIM condition, and the other six participants were assigned to the SIM plus WebCAPSI condition to work on either set B or C, either set A or C, and either set A or B, respectively. That is, in accordance with the multiple-baseline design across training conditions, six participants remained in the SIM condition while the others commenced training under the SIM plus WebCAPSI condition (as shown in Table 3).

Thus, under phase II, all participants in each condition started out studying a different set of contents from the SIM. The participants in the SIM condition received the training process described previously. The participants in the SIM plus WebCAPSI condition were asked to read the assigned set of contents sequentially on a unit-by-unit basis and to access a mastery-based unit test. For each set, three tests corresponded to the three units mentioned previously: an introduction, a level selected from levels 1 to 3, and another level selected from levels 4 to 6 of the ABLA. The mastery criterion for each test was 90% accuracy. That is, in order to proceed to the next unit, the participant was required to correctly respond to at least nine out of 10 fill-in-the-blank and single-choice questions within 15 minutes.

The WebCAPSI program automatically marked the test and immediately provided feedback to all questions. Each correct answer was followed by a praise statement (e.g., “well done” “excellent” “good work”) on the computer screen, and each incorrect answer was followed with a presentation of all acceptable answers. If a participant met the mastery criterion, he or she would be complimented (e.g., “congratulations”) with a result of a “pass” and could proceed to the next unit. If a participant scored below 90% correct, the program would notify the participant with the statement that he or she was required to restudy the material and write another test on the unit no sooner than 15 minutes after the failed attempt. The training under the SIM plus WebCAPSI condition for phase II ended after the participant successfully passed all three tests in that phase. Based on the participants’ self-report, the training process with the involvement of

WebCAPSI took a mean of 2.5 hours (range: 2 to 3.5 hours).

Phase II: Post-training measurements. The post-training measurements were conducted on average 7.3 days (range: 3 to 12 days) after the commencement of training in Phase II. The participants were asked to write a knowledge-based test with a novel set of 10 questions and conduct an assessment with 12 trials of the ABLA on the two levels that they just studied. Both the knowledge and the application test were administered in the same manner as described above.

Phase III: Training under the SIM plus WebCAPSI condition. All participants studied the remaining set of contents specific to them and accessed the WebCAPSI program for testing as described above for Phase II. The participants reported that the training process in this phase took a mean of 2 hours (range: 1.5 to 3.5 hours).

Phase III: Post-training measurements. The post-training measurements were conducted on average 6.3 days (range: 2 to 9 days) after the commencement of training in Phase III. Identical to the measurements in the Phases I and II, the participants were, again, asked to write a knowledge-based test on a novel set of questions and to conduct 12 trials of the ABLA on two levels they studied.

Phase IV: Watching demonstration videos. After participants completed the post-training measurements in the previous phase, they were asked to make an appointment to meet the researcher to watch six demonstration videos. The videos were stored in a laptop and were played by media player software installed on the computer. Six videos showed actors (psychology graduate students in the field of ABA) demonstrating the correct procedures and common errors for assessing the administration of the ABLA levels, one video per level. All videos took approximately 40 minutes to watch.

Phase IV: Post-video measurements. The post-video measurements were conducted on average 3.8 days (range: 1 to 9 days) after the completion of the measurement in Phase III. Like the measurements conducted in the previous phases, a knowledge-based and an application test were given. However, these measurements were cumulative. That is, a novel set of 10 questions was used to test knowledge covered by the entire SIM and 12 trials of the assessment selected from all six levels of the ABLA test (2 trials per level), without replacement, were used to test application of procedures. Finally, each participant completed a brief survey to rate their preference of the training methods and the usefulness of the SIM, the mastery-based unit tests, and the demonstration videos, and to comment their training experience.

Interobserver Agreement and Procedure Integrity Checks

Interobserver agreement (IOA) on the application measurements was assessed by having an independent observer – a graduate student who was familiar with the ABLA – randomly view a mean of 45% (range: 35% to 50%) of all videotaped application sessions across all participants. The researcher and observer were both blind to the participant's experimental condition and independently recorded either the occurrence or nonoccurrence of the participant's behaviours on each trial on a component-by-component basis using the checklist (described above). An agreement was defined as both the researcher and the observer scoring a component on the checklist as correct, incorrect, or not applicable for the level being tested. A disagreement was defined as a discrepancy between the researcher and observer in scoring a component on the checklist. IOA per session was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by100%. IOA was considered acceptable when scored above 80% (Martin & Pear, 2011). Mean agreements across sessions were 94% (range: 85% to 99%), 94% (range: 89% to 99%), 92% (range: 88% to 95%), 100%, 100%, 96%

(range: 89% to 98%), 98% (range: 96% to 99%), 96% (range: 94% to 98%), 95% (range: 89% to 100%), 97% (range: 92% to 100%), 89% (range: 75% to 96%), and 86% (range: 80% to 96%).

For procedure integrity, when scoring the sessions the observer also recorded whether or not the researcher's behaviours were performed in accordance with a script on a trial-by-trial basis. The script described the researcher's planned response to each correct or incorrect response on each trial of the application measurements. It was to ensure that all of participants encountered the same response across trials. The mean accuracy of the researcher's responses was 95% (range: 83% to 100%) based on 65% randomly sampled sessions across all participants.

Results

Accuracy (% Correct Answers) on ABLA Knowledge-Based Tests

Accuracy for each participant across phases. Table 4 and Figure 1 show the percentage correct performance on knowledge-based tests for each participant across phases.

Table 4
Accuracy (% Correct Answers) on Knowledge-Based Tests for Each Participant across Phases

Participants	Phase I	Phase II	Phase III	Phase IV
	SIM alone	SIM + WebCAPSI	SIM + WebCAPSI	Demo videos
P1	41.7 (Set A)	85 (Set B)	100 (Set C)	77.2
P2	13.3 (Set A)	76.7 (Set C)	67.5 (Set B)	48.3
P3	61.7 (Set B)	52.5 (Set A)	90 (Set C)	82.2
P4	82.5 (Set B)	100 (Set C)	100 (Set A)	88.3
P5	90 (Set C)	100 (Set A)	90 (Set B)	89
P6	42 (Set C)	67.5 (Set B)	87.5 (Set A)	85.6
	SIM alone	SIM alone	SIM + WebCAPSI	Demo videos
P7	23.3 (Set A)	85 (Set B)	86.7 (Set C)	68.1
P8	51.7 (Set A)	68.4 (Set C)	85 (Set B)	75.6
P9	80 (Set B)	87.5 (Set A)	100 (Set C)	90
P10	72.5 (Set B)	77.5 (Set C)	94.2 (Set A)	87.5
P11	68.3 (Set C)	72 (Set A)	92.5 (Set B)	82.5
P12	30 (Set C)	70 (Set B)	97.5 (Set A)	62.2

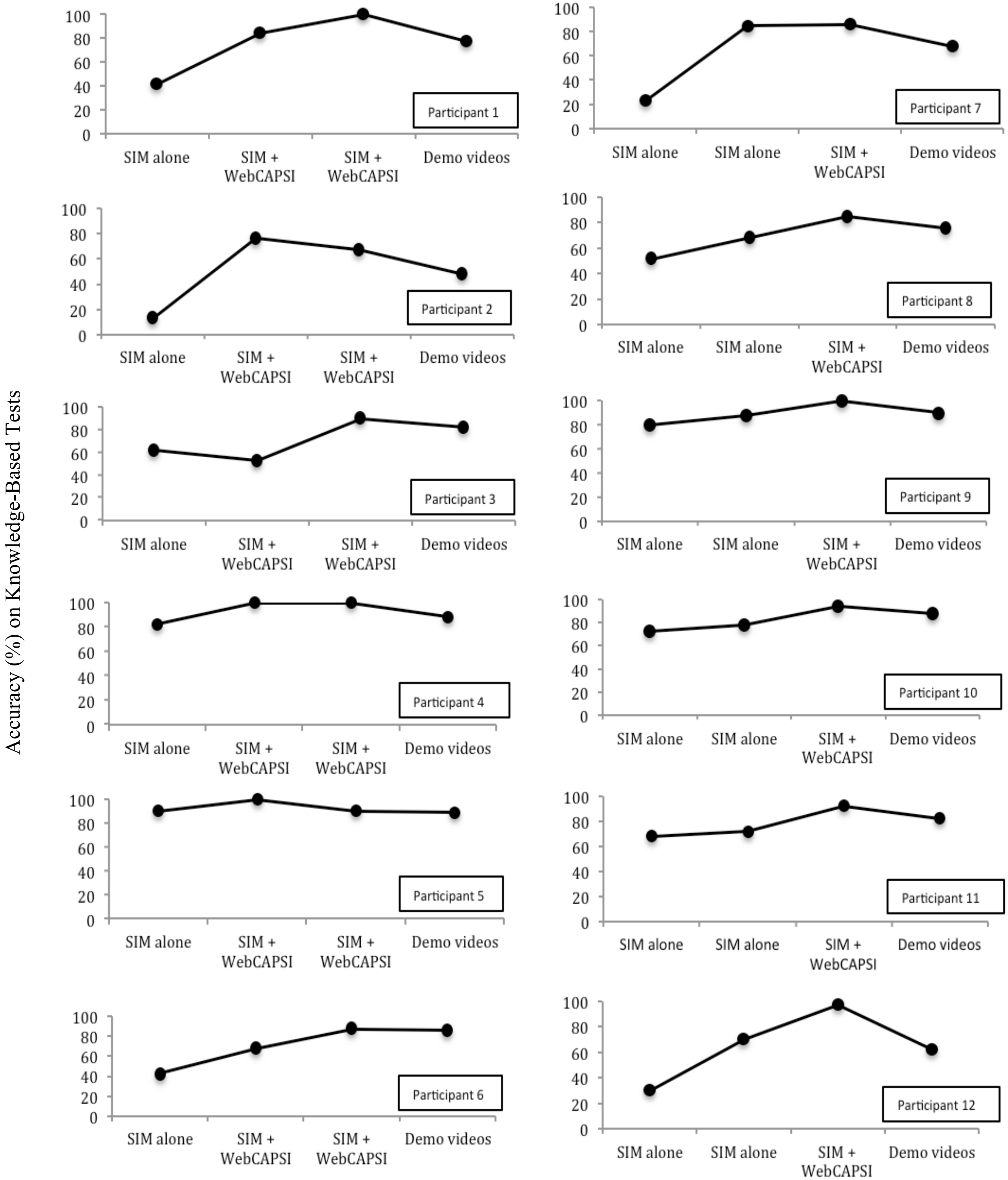

Figure 1. Accuracy (% correct answers) on knowledge-based tests for each participant across phases

Note that, for Participants 1 to 6, all six participants optimized their performance (i.e., reached their highest scores) on the knowledge-based tests after studying the SIM combined with WebCAPSI in either Phase II or III. Five of the six participants (Participants 1, 2, 4, 5, and 6) increased accuracy immediately after training in Phase II, in which four participants (Participants 1, 2, 4, and 6) improved more than 15%, compared to their performance after training in Phase I. Although Participant 3 decreased in accuracy by 9% in Phase II, her performance was maximized after training in Phase III. Finally, compared to their performance in Phase III, the six participants decreased in accuracy after viewing the videos in Phase IV by a mean of 14% (range: 2% to 28%). It should be noted, of course, that this test was not comparable to the previous knowledge-based tests because it covered material from the entire SIM.

For Participants 7 to 12, all six participants optimized their performance on the knowledge-based tests after studying the SIM combined with WebCAPSI in Phase III. Compared to their performance after the second training phase of the SIM (Phase II), the six participants increased their mean accuracy of 16% (range: 2% to 28%) after training in Phase III. In addition, the improvement in the SIM alone condition from Phases I to II for Participants 7 to 12 was subtle (< 10%) for three of the six participants (Participants 9, 10, and 11). However, even though trained in the same SIM condition, two of the six participants (Participants 7 and 12) increased performance substantially (with 62% and 40% improvement, respectively). Finally, compared to their performance on the knowledge-based test in Phase III, the six participants decreased in accuracy on the test after viewing the videos in Phase IV by a mean of 15% (range: 7% to 35%).

Mean accuracy for two groups of participants across phases. Table 5 and Figure 2 show the mean percentage of correct performance on knowledge-based tests for two groups of participants across phases. As described previously, the first six participants were categorized in the first group in which they received training under the SIM alone (in Phase I) once and the SIM plus WebCAPSI (in Phases II and III) twice while the remaining six participants were categorized in the second group in which they received training under the SIM alone (in Phases I and II) twice and the SIM plus WebCAPSI (in Phase III). All participants from both groups viewed demonstration videos in Phase IV.

Table 5
Mean accuracy (% Correct Answers) on Knowledge-Based Tests for Two Groups of Participants across Phases

Groups	Phase I		Phase II		Phase III		Phase IV	
	SIM alone		**SIM + WebCAPSI**		**SIM + WebCAPSI**		**Demo videos**	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Group 1	55.2	28.7	80.3	18.7	89.2	11.9	78.4	15.4
	SIM alone		**SIM alone**		**SIM + WebCAPSI**		**Demo videos**	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Group 2	54.3	23.4	76.7	8.0	92.7	5.9	77.7	11.0

Note that mean performance for the two groups was approximately equal after studying the SIM in Phase I, substantially increased (25.1% versus 22.4% improvement) in Phase II regardless of the training conditions (SIM plus WebCAPSI versus SIM alone) they received, then maximized after studying the SIM combined with WebCAPSI in Phase III, and slightly decreased after viewing the videos in Phase IV. Although there was a mean of 3.6% difference between the two groups of participants in Phase II, the superiority over training in the SIM plus WebCAPSI condition was not statistically significant, $t(10) = 0.43$, $p > .05$ (two-tailed).

Moreover, compared to the improvement (8.9%) for those in the first group who continued training in the SIM plus WebCAPSI condition in Phase III, participants in the second group who just commenced training in this condition produced a better performance (16% improvement). Finally, participants' performance after viewing videos in Phase IV both decreased on the knowledge-based test. As mentioned, it should be noted that this test was not comparable to the previous knowledge-based tests because it covered material from the entire SIM.

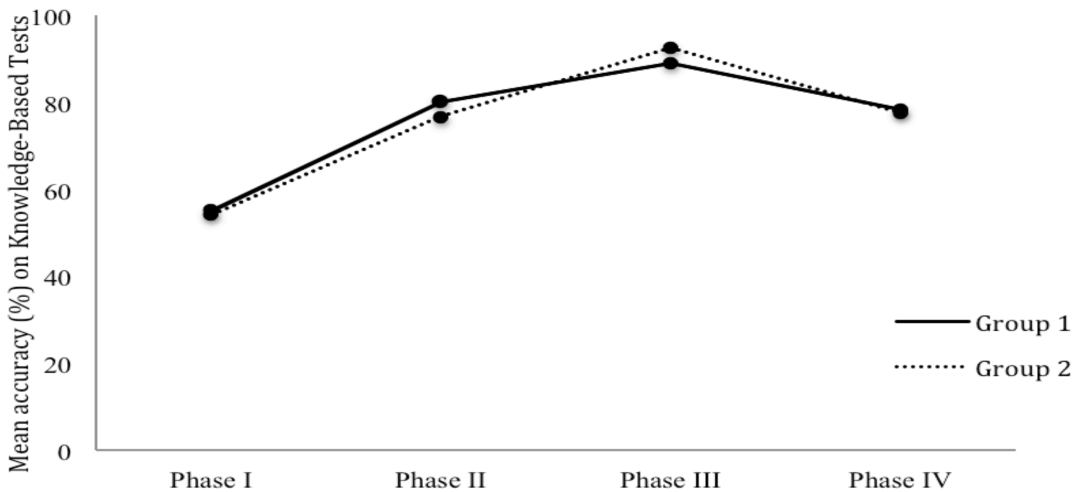

Figure 2. Mean accuracy (% correct answers) on knowledge-based tests for two groups of participants across phases.

Accuracy for each participant across training conditions. Figure 3 shows the percentage correct performance on the knowledge-based tests for each participant across the SIM, SIM plus WebCAPSI, and videos conditions. Note that the scores for participants who wrote the tests twice after studying the SIM or after studying the SIM combined with WebCAPSI were averaged.

The results indicate that (1) compared to their performance after studying the SIM, all participants showed some degrees of improvement (M = 28% SD = 17; range: 5% to 51%) on writing the knowledge-based tests after studying the SIM combined with WebCAPSI (t[11] = 5.8, *p* < .01 [two-tailed]); (2) In the SIM plus WebCAPSI condition, nine of the 12 participants scored ≥ 85%, which was considered a good accuracy of the tests; (3) 10 of the 12 participants maximized their performance in the SIM plus WebCAPSI condition although the remaining two (Participants 3 and 6) further improved their performance after watching the videos, and (4) three participants (Participants 4, 5, and 9) scored ≥ 80% accuracy after studying the SIM, indicating that the manual itself can be effective in knowledge acquisition.

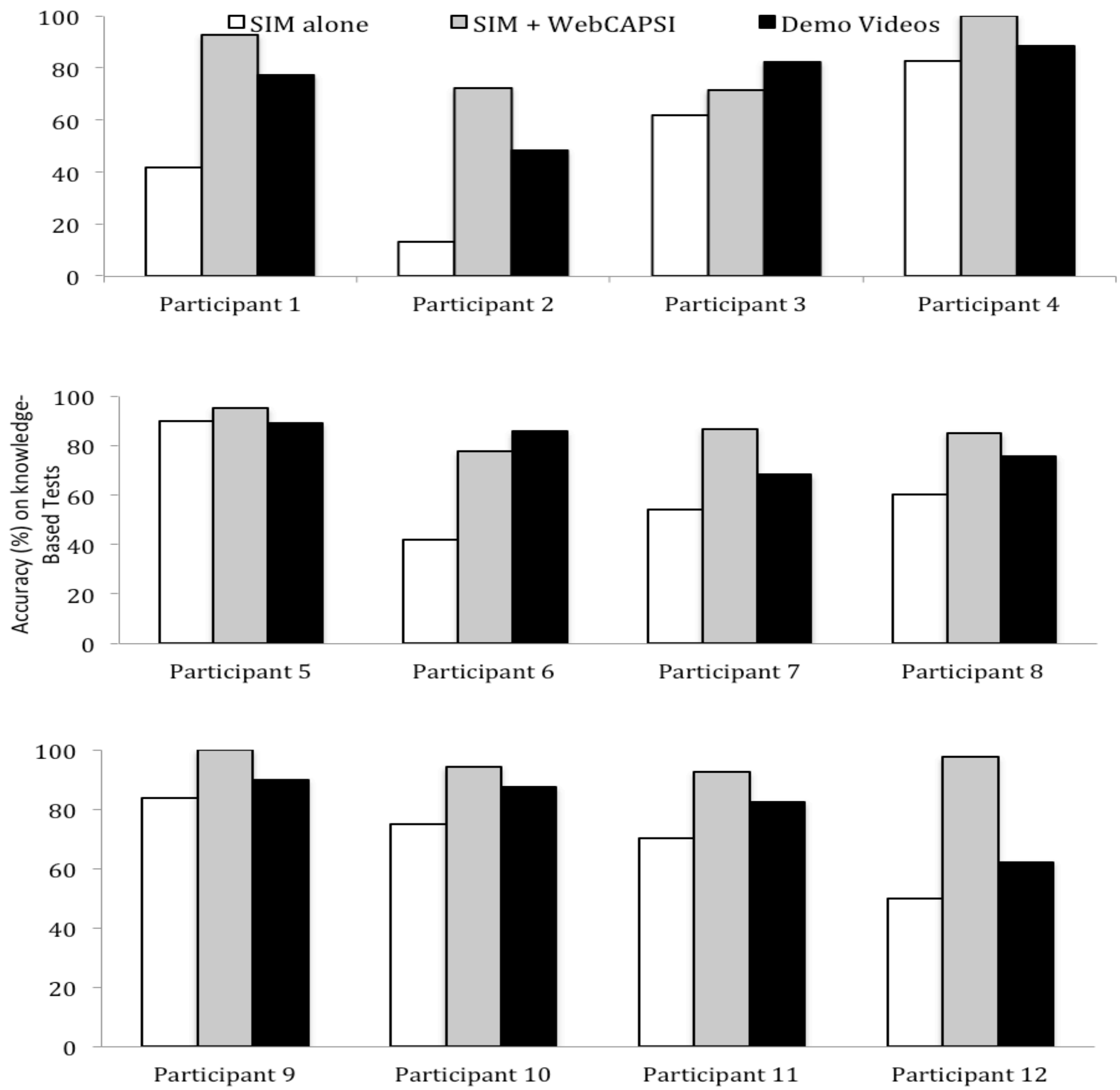

Figure 3. Accuracy (% of correct answers) on knowledge-based tests for each participant across the SIM, SIM plus WebCAPSI, and videos conditions.

Mean accuracy for all participants across training conditions. Figure 4 shows the mean percentage of correct performance on the knowledge-based tests for all participants across the SIM, SIM plus WebCAPSI, and videos conditions. The mean accuracy increased from 60% after studying the SIM to 89% after studying the SIM combined with WebCAPSI, and then declined to 78% after viewing the videos (although recall that this last knowledge-based test was based on material from the entire SIM). Thus, participants who were trained with the SIM combined with WebCAPSI scored, on average, higher on knowledge-based tests than those who were trained in any other condition (29% higher than the SIM alone and 11% higher than the videos condition).

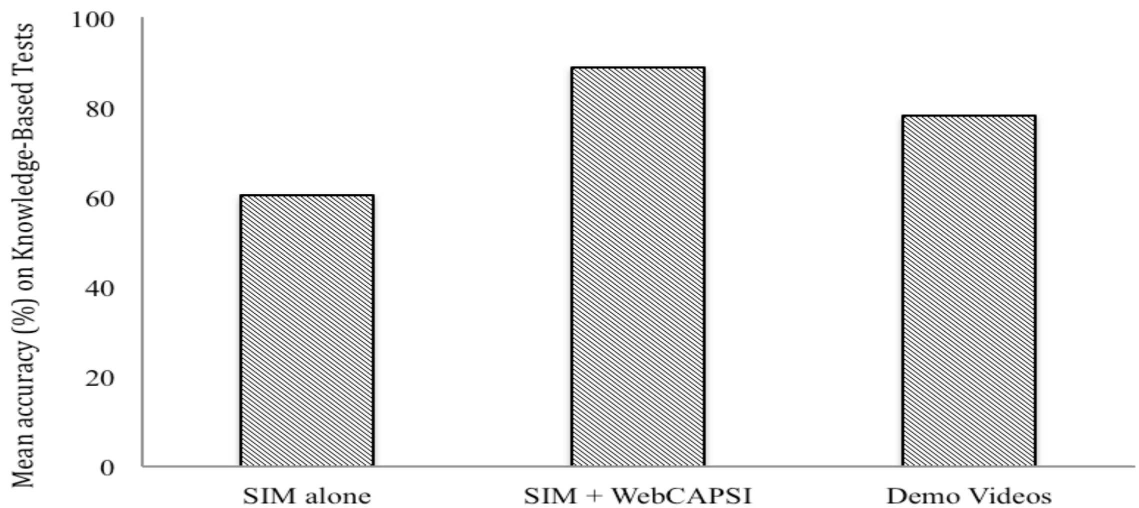

Figure 4. Mean accuracy (% of correct answers) on knowledge-based tests for all participants across the SIM, SIM plus WebCAPSI, and videos conditions.

Accuracy (% Correct) on Conducting ABLA Application Tests

Accuracy for each participant across phases. Table 6 and Figure 5 show the percentage correct performance on conducting ABLA application tests with the researcher (played the role of a child with an ASD) across phases.

Note that, for Participants 1 to 6, four of the six participants (Participants 2, 3, 4, and 6) maximized their performance (i.e., reached their highest scores) on the application tests after viewing the videos in Phase IV. The remaining two participants (Participants 1 and 5) reached their best performance (99% of accuracy) after the completion of the second phase of the SIM plus WebCAPSI condition in Phase III, and therefore had limited room for further improvement after viewing the videos. Moreover, the mean improvement (22%; range: 1% to 41%) from Phases I (SIM alone) to II (SIM plus WebCAPSI) was much greater than the mean improvement (7%; range: 1% to 15%) in the same condition (SIM plus WebCAPSI) from Phases II to III. For Participants 7 to 12, all six participants maximized their performance in Phase IV. The mean improvement (10%; range: -9% to 28%) in the same condition (SIM alone) from Phases I to II was much less than the mean improvement (20%; range: 6% to 36%) from Phases II to III (SIM plus WebCAPSI). Thus, these data indicate that the videos may have improved the application performance on 10 out of the 12 participants.

Table 6
Accuracy (% Correct) on Conducting ABLA Application Tests for Each Participant across Phases

Participants	Phase I	Phase II	Phase III	Phase IV
	SIM alone	SIM + WebCAPSI	SIM + WebCAPSI	Demo videos
P1	51 (Set A)	91.6 (Set B)	99 (Set C)	89
P2	11.7 (Set A)	23.3 (Set C)	38.4 (Set B)	76
P3	36.6 (Set B)	37.9 (Set A)	45.3 (Set C)	80
P4	34.6 (Set B)	87.6 (Set C)	90 (Set A)	94
P5	80.3 (Set C)	97.2 (Set A)	98.6 (Set B)	96
P6	35.1 (Set C)	46.3 (Set B)	52.8 (Set A)	82
	SIM alone	**SIM alone**	**SIM + WebCAPSI**	**Demo videos**
P7	30.5 (Set A)	58.2 (Set B)	82.7 (Set C)	94
P8	13 (Set A)	32.2 (Set C)	48.4 (Set B)	89
P9	74.7 (Set B)	65.3 (Set A)	95.6 (Set C)	99
P10	76.1 (Set B)	84.9 (Set C)	91 (Set A)	97
P11	49.5 (Set C)	67.7 (Set A)	75.7 (Set B)	88
P12	43.7 (Set C)	42.6 (Set B)	78.5 (Set A)	83

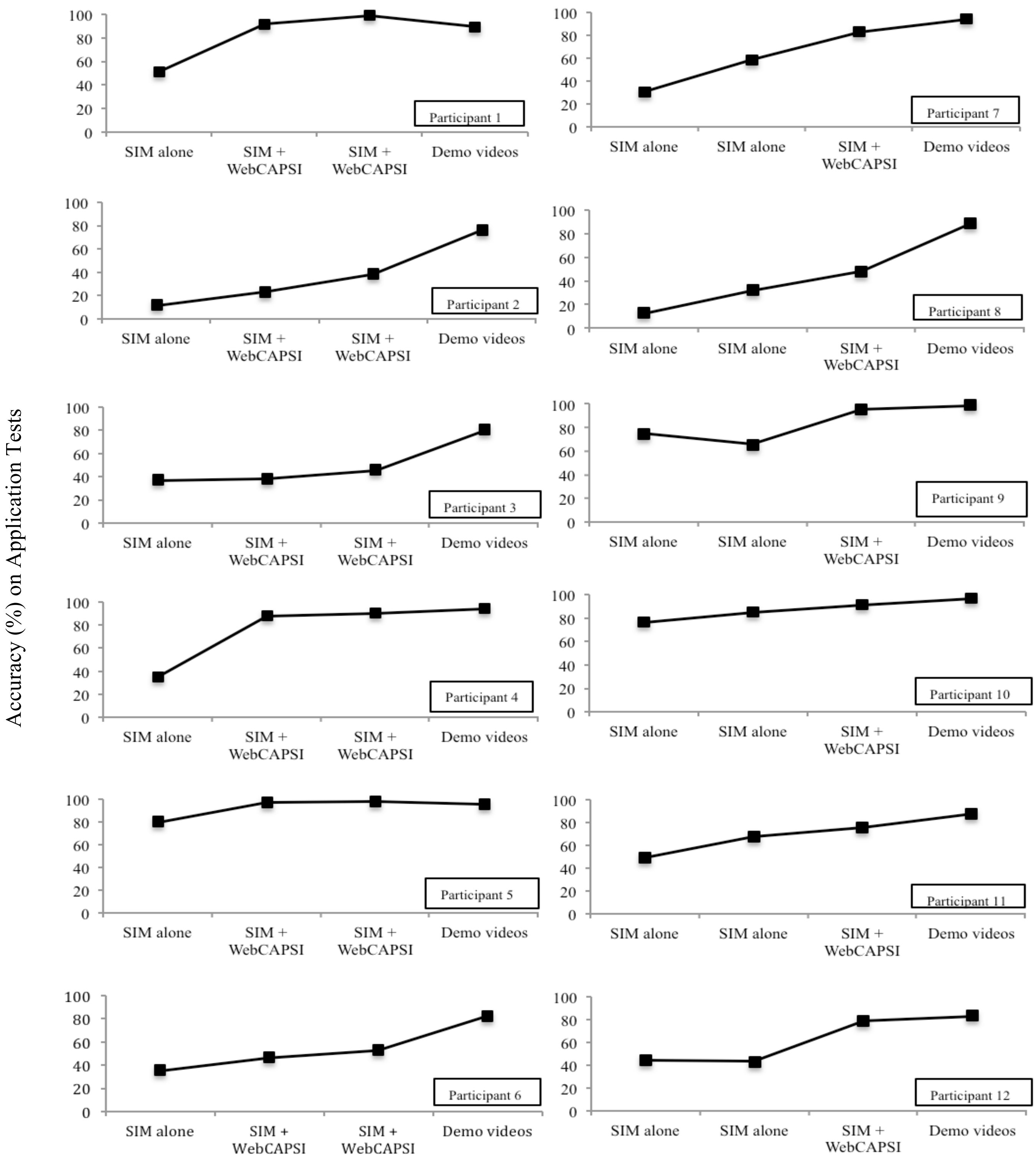

Figure 5. Accuracy (% correct) on conducting ABLA application tests for each participant across phases.

Mean accuracy for two groups of participants across phases. Table 7 and Figure 6 show the mean percentage of correct performance on conducting application tests for two groups of participants across phases.

Table 7
Mean accuracy (% Correct) on Conducting ABLA Application Tests for Two Groups of Participants across Phases

Groups	Phase I		Phase II		Phase III		Phase IV	
	SIM alone		SIM + WebCAPSI		SIM + WebCAPSI		Demo videos	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Group 1	41.6	22.8	64	31.8	70.7	28.1	86.2	8.1
	SIM alone		SIM alone		SIM + WebCAPSI		Demo videos	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Group 2	47.9	24.7	58.5	18.8	78.7	16.6	91.7	6.1

The figure indicates that, on average, performance for the two groups of participants on the application tests increased across phases regardless of training conditions. Viewing the videos demonstrating the correct procedures and common errors in administration of the ABLA levels may have improved accuracy by a mean of 16% (range: -10% to 38%) for participants in the first group and by a mean of 13% (range: 3% to 41%) for participants in the second group. However, the superiority over the videos on administering the ABLA cannot be stated with certainty because the mean performance of both groups showed an increasing trend across the first three phases.

Interestingly, compared to the mean accuracy on conducting the application tests in Phase II for both groups, participants who commenced training under the SIM plus WebCAPSI condition showed 2 times the improvement in accuracy of those who remained in the SIM alone condition (22% versus 11% improvement). Moreover, when trained in the same condition (SIM plus WebCAPSI), participants' performance in the first group was relatively stable (with only 7% improvement from Phases II to III). Finally, compared to the improvement after training in the same condition (SIM alone) from Phases I to II for participants in the second group, participants' performance after training under SIM plus WebCAPSI in Phase III increased almost twice (11% versus 21% improvement), suggesting that studying the SIM combined with WebCAPSI might be more beneficial for application.

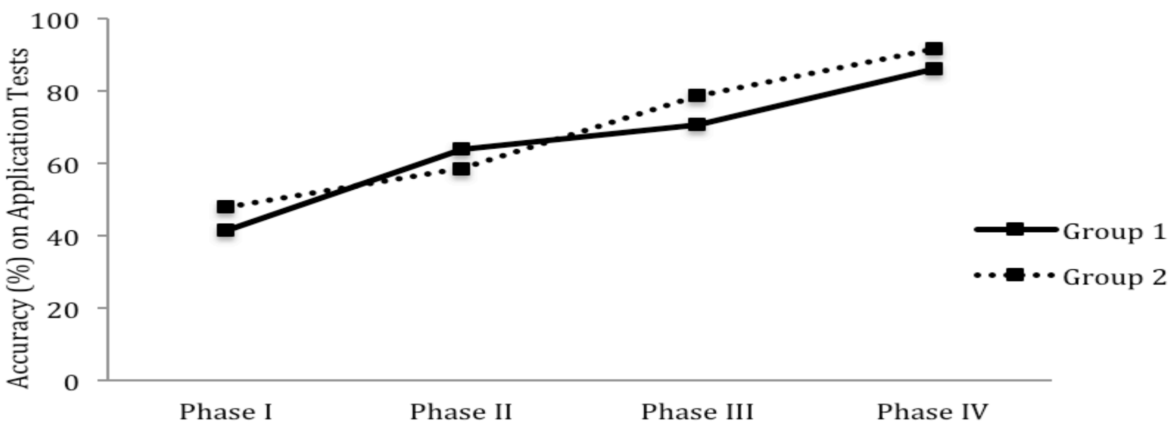

Figure 6. Mean accuracy (% correct) on conducting ABLA application tests for two groups of pariticipants across phases.

Accuracy for each participant across training conditions. Figure 7 shows the percentage correct performance on conducting application tests for each participant across the SIM, SIM plus WebCAPSI, and videos conditions. Note that the scores for participants who conducted the tests twice under the same training condition were averaged.

The results indicate that (1) compared to their performance after studying the SIM and after studying the SIM combined with WebCAPSI, participants' accuracy increased by a mean of 42% (*SD* = 17; range: 17% to 67%), $t(11) = 8.3$, $p < .01$ (two-tailed), and a mean of 16% (*SD* = 18; range -6% to 43%), $t(11) = 3.1$, $p < .05$ (two-tailed), respectively, on conducting the application tests after viewing the videos; (2) In the videos condition, 10 of the 12 participants maximized their performance although the remaining two participants (Participants 1 and 5) did so after studying the SIM combined with WebCAPSI; (3) After viewing the videos, eight of the 12 participants scored ≥ 85%, which was considered a good accuracy on conducting all levels of the ABLA; and (4) Although the remaining four participants (Participants 2, 3, 6, and12) scored ≤ 85%, their improvement after viewing the videos was substantial, with 43%, 38%, 31%, and 5%, respectively.

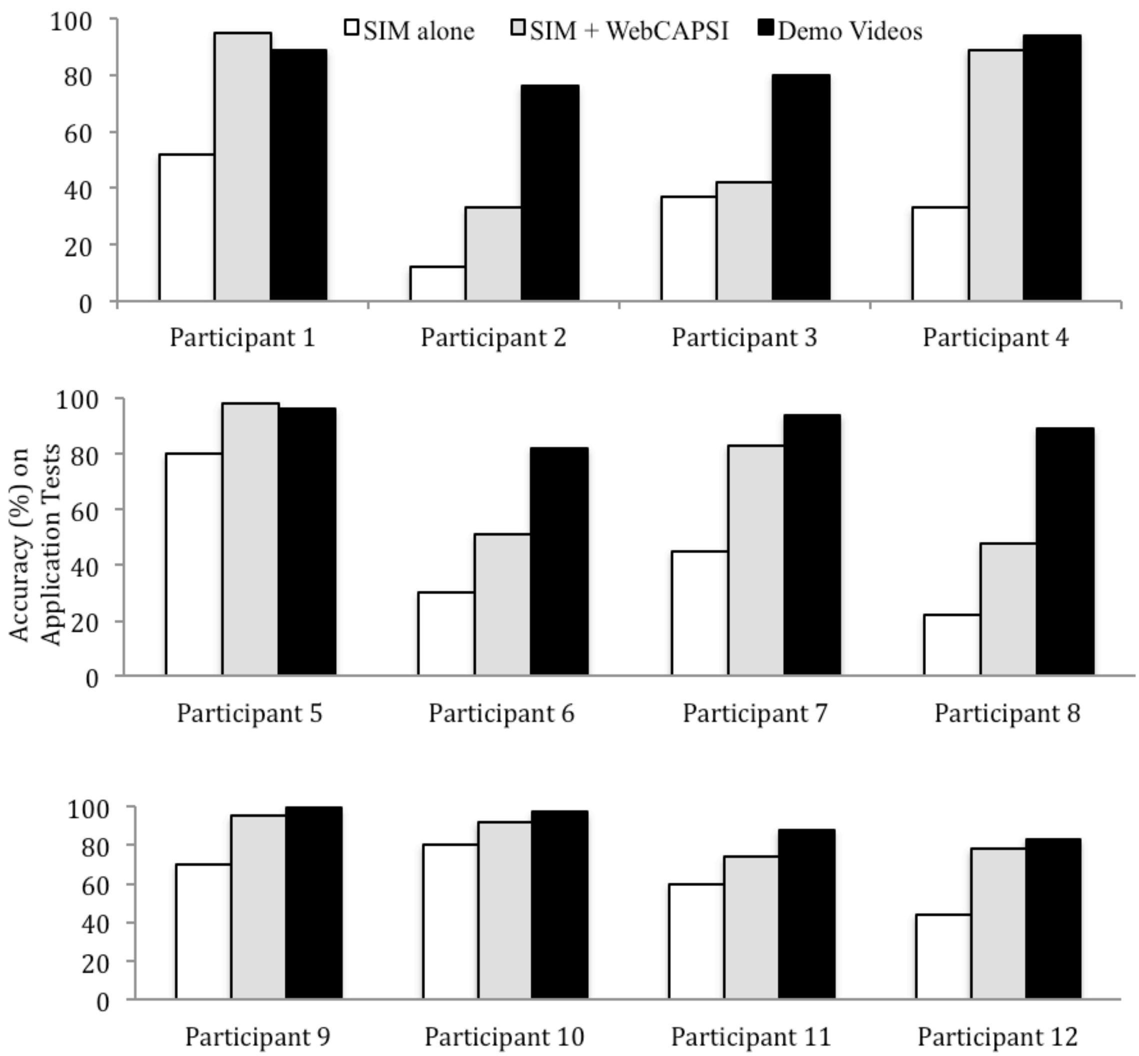

Figure 7. Accuracy (% correct) on conducting ABLA application tests for each participant across the SIM, SIM plus WebCAPSI, and videos conditions.

Mean accuracy for all participants across training conditions. Figure 8 shows the mean percentage of correct performance on conducting application tests for all participants across the SIM, SIM plus WebCAPSI, and videos conditions. The mean accuracy increased from 47% after studying the SIM to 73% after studying the SIM combined with WebCAPSI, and then further improved to 89% after viewing the videos (although recall that this last application test was based on all 6 levels of ABLA). Thus, participants who viewed the videos produced better performance on conducting the ABLA than those who received training under either the SIM or the SIM plus WebCAPSI condition (42% and 16% more accurate, respectively).

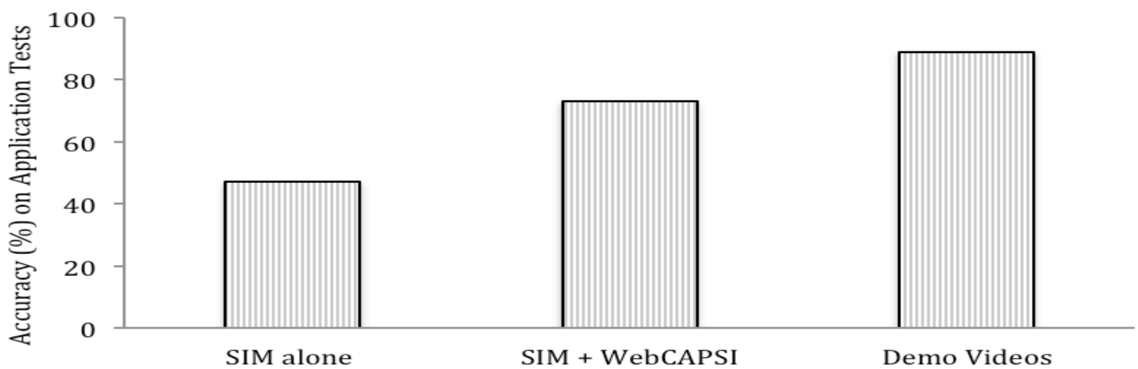

Figure 8. Mean accuracy (% correct) on conducting ABLA application tests for all participants across the SIM, SIM plus WebCAPSI, and videos conditions.

Correlation between ABLA Knowledge-Based Tests and Application Tests

Pearson's correlation coefficient revealed that the two different tests were significantly and strongly correlated with each other (*r*[48] = .66, p = .00 [two-tailed]). It hence indicated that the participants, who had better performance on answering questions about the ABLA, were more likely to accurately administer the assessment, and vice versa.

Responses to the Survey

All participants responded to a training feedback and evaluation survey after the completion of the application test in Phase IV. Table 8 shows the participants responses to each of 11 questions included in the survey.

Table 8
Participants' Responses to a Training Feedback and Evaluation Survey

Statements	Participants					
	P1	P2	P3	P4	P5	P6
How convenient is WebCAPSI to use?	Extremely convenient	Moderately convenient	Slightly convenient	Very convenient	Very convenient	Moderately convenient
How easy is WebCAPSI to use?	Very easy	Somewhat easy	Very easy	Extremely easy	Very easy	Somewhat easy
How professional is the self-instructional manual?	Very professional	Extremely professional	Moderately professional	Very professional	Very professional	Very professional
How easy is the self-instructional manual to read?	Very easy	Somewhat easy	Somewhat easy	Very easy	Somewhat easy	Very easy
How useful are study questions included in the self-instructional manual?	Extremely useful	Moderately useful	Slightly useful	Very useful	Very useful	Extremely useful
How helpful is the self-instructional manual in writing knowledge-based tests?	Very helpful	Very helpful	Moderately helpful	Very helpful	Very helpful	Very helpful
How helpful is the self-instructional manual in performing procedures of the ABLA?	Extremely helpful	Slightly helpful	Slightly helpful	Extremely helpful	Very helpful	Very helpful
How helpful is the self-instructional manual combined with mastery-based unit tests (delivered via WebCAPSI) in writing knowledge-based tests?	Extremely helpful	Moderately useful	Very helpful	Extremely helpful	Very helpful	Extremely helpful
How helpful is the self-instructional manual combined with mastery-based unit tests (delivered via WebCAPSI) in performing procedures of the ABLA?	Very helpful	Moderately helpful	Slightly helpful	Extremely helpful	Very helpful	Very helpful
How helpful are demonstration videos in writing knowledge-based tests?	Very helpful	Extremely helpful	Moderately helpful	Very helpful	Extremely helpful	Extremely helpful
How helpful are demonstration videos in performing procedures of the ABLA?	Extremely helpful	Extremely helpful	Moderately helpful	Extremely helpful	Extremely helpful	Extremely helpful

Table 8 (continued)
Participants' Responses to a Training Feedback and Evaluation Survey

Statements	P7	P8	P9	P10	P11	P12
How convenient is WebCAPSI to use?	Slightly convenient	Very convenient	Very convenient	Extremely convenient	Very convenient	Moderately convenient
How easy is WebCAPSI to use?	Somewhat easy	Very easy	Extremely easy	Extremely easy	Very easy	Very easy
How professional is the self-instructional manual?	Very professional	Very professional	Extremely professional	Extremely professional	Very professional	Very professional
How easy is the self-instructional manual to read?	Very easy	Very easy	Very easy	Extremely easy	Extremely easy	Very easy
How useful are study questions included in the self-instructional manual?	Very useful	Very useful	Very useful	Extremely useful	Extremely useful	Very useful
How helpful is the self-instructional manual in writing knowledge-based tests?	Very helpful	Very helpful	Extremely helpful	Extremely helpful	Very helpful	Extremely helpful
How helpful is the self-instructional manual in performing procedures of the ABLA?	Very helpful	Very helpful	Extremely helpful	Very helpful	Moderately helpful	Very helpful
How helpful is the self-instructional manual combined with mastery-based unit tests (delivered via WebCAPSI) in writing knowledge-based tests?	Very helpful	Extremely helpful	Very helpful	Extremely helpful	Extremely helpful	Very helpful
How helpful is the self-instructional manual combined with mastery-based unit tests (delivered via WebCAPSI) in performing procedures of the ABLA?	Very helpful	Very helpful	Extremely helpful	Extremely helpful	Very helpful	Very helpful
How helpful are demonstration videos in writing knowledge-based tests?	Extremely helpful	Very helpful	Moderately helpful	Extremely helpful	Extremely helpful	Extremely helpful
How helpful are demonstration videos in performing procedures of the ABLA?	Extremely helpful	Very helpful	Extremely helpful	Extremely helpful	Very helpful	Extremely helpful

Table 9 shows participants' ratings of perceived helpfulness of the SIM alone, SIM plus WebCAPSI, and videos conditions, on both knowledge-based tests and application tests. Note that twice as many participants viewed the SIM plus WebCAPSI condition as being extremely helpful as viewed the SIM alone condition as being extremely helpful with regard to the knowledge-based test. Three times as many participants perceived the videos as being extremely helpful as perceived either the SIM alone or its combination with WebCAPSI as being extremely helpful with regard to the application test. In addition, about as many participants perceived the videos as being extremely helpful as perceived the SIM plus WebCAPSI condition as being extremely helpful with regard to the knowledge-based test. Further, there is no difference in how many participants viewed either the SIM alone or SIM plus WebCAPSI conditions as extremely helpful with regard to the application test.

Table 9
Participants' Ratings of Perceived Helpfulness of Training Conditions on Two Types of Tests

Types of Tests	Helpfulness	Training Conditions					
		SIM alone		SIM + WebCAPSI		Demo Videos	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Knowledge-Based Test	Extremely	3	25%	6	50%	7	58%
	Very	8	67%	5	42%	3	25%
	Moderately	1	8%	1	8%	2	17%
	Slightly	0	0%	0	0%	0	0%
	Not at all	0	0%	0	0%	0	0%
	Total	12	100%	12	100%	12	100%
Application Test	Extremely	3	25%	3	25%	9	75%
	Very	6	50%	7	58%	2	17%
	Moderately	1	8%	1	8%	1	8%
	Slightly	2	17%	1	8%	0	0%
	Not at all	0	0%	0	0%	0	0%
	Total	12	100%	12	100%	12	100%

It therefore appears that, (1) studying the SIM combined with WebCAPSI was perceived as more beneficial for knowledge acquisition, while (2) viewing demonstration videos was perceived as more effective for conducting procedure-specific behavioural techniques. However, it is not known whether participants would perceive the videos themselves as effective as in combination with the SIM or the SIM plus WebCAPSI.

Discussion

To date, few studies have investigated training methods using demonstration videos (Catania et al., 2009) and SIMs delivered in a web-based computer-aided teaching environment (Scherman, 2010; Hu et al., 2012) to convey knowledge and application of behavioural techniques for working with individuals with IDs and ASDs. Hu et al. (2012) showed that a training package, consisting of the SIM with study questions delivered via WebCAPSI and demonstration videos, was effective in teaching university students the ABLA. The present study went further by examining the efficacy of various training components in terms of improving knowledge and implementation of the ABLA.

Performance for each participant across training phases on writing knowledge-based tests suggests that: (1) studying the manual itself (i.e., SIM alone) can be effective, considering that 3 out of the 12 participants commenced with a relatively good accuracy (≥ 80%) which, on the other hand, reduced room for further improvement (i.e., "ceiling effects" may have occurred); (2) studying the manual delivered with mastery-based tests would be more beneficial as substantial improvements (≥ 15%) occurred immediately following the first phase of the SIM plus WebCAPSI condition for eight of the 12 participants; (3) even though the helpfulness of the videos was reported, viewing them in the last phase, in fact, was followed by a slightly decline in accuracy on writing the knowledge-based test for all participants. Although an incomparable test (i.e., a cumulative version of the test) was given, the slight decrease might be due to inefficient training in the previous phases (e.g., SIM alone); and (4) practice effects likely existed across the phases even though a strong attempt was made to preclude them. Mean accuracy for all participants across training conditions shows that performance on the knowledge-based tests increased from 60% after studying the SIM alone to 89% after studying the SIM combined with WebCAPSI and declined to 78% after viewing the videos. Although it is not possible to exclude the improvement due to practice, results suggest the effectiveness of studying the SIM combined with mastery-based unit tests.

Performance for each participant across training phases on conducting ABLA application tests suggests that: (1) studying the manual by itself (i.e., SIM alone) might be insufficient as only one out of the 12 participants obtained a relatively good accuracy (≥ 80%) in the first phase; (2) although studying the SIM combined with mastery-based unit tests (i.e., SIM plus WebCAPSI) appeared to show superiority over the SIM alone on training individuals to administer the ABLA, participants' performance only reached at a moderate level, suggesting the helpfulness of adding other training components; (3) viewing the videos demonstrating correct procedures and common errors in administration of the ABLA further improved application performance to a high level, indicating the usefulness of adding the videos; and (4) practice effects may have been presented across the phases. Mean accuracy for all participants across training conditions shows that performance on the application tests increased from 47% after studying the SIM alone to 73% after studying the SIM combined with WebCAPSI and further improved to 89% after viewing the videos. Although practice effects could not be excluded, the results suggest the usefulness of using the demonstration videos for administering the ABLA.

Moreover, performance on the knowledge-based tests and application tests was positively correlated with each other. Although the two types of the tests were complementary and tended to respectively assess participants' abilities from different perspectives, the participants who performed better on the knowledge tests were more likely to also perform more accurately in administering the ABLA, and vice versa. The strong correlation suggests that, for professional development, the more effective a service provider learned knowledge about a behavioural technique, the more precise he or she implements the technique.

Overall, the results of this study indicate that the ABLA SIM combined with the WebCAPSI program has considerable potential for improving knowledge acquisition while the demonstration videos could be effective for potential knowledge users to fully develop behavioural procedures for administering the assessment.

Participants' performance in the present study is similar to DeWiele et al.'s study in which, before assessing service providers' knowledge about and implementation of the ABLA, they were required to achieve mastery (90% accuracy) on knowledge-related exams and then to role play with an individual working with persons with developmental disabilities. In addition, the present study systematically replicated Hu et al.'s findings by successfully teaching knowledge and application of behavioural procedures to 12 university students to conduct the ABLA at a high level of accuracy (i.e., ≥ 85%) using a SIM combined with WebCAPSI. Moreover, based on the self-report, the majority of participants rated that the mastery-based unit tests delivered via WebCAPSI were "very helpful" for writing knowledge-based tests while the videos were "extremely helpful" for conducting procedure-oriented application tests. Finally, since Hu et al.'s study used a training package, the present study, as a follow-up, evaluated the efficacy of different training components included in the package, and therefore contributes to current literature on developing effective and low-cost training approaches to address a growing demand on qualified service providers for individuals with IDs and ASDs.

Several limitations for the present study need to be pointed out. First, as described previously, some participants' accuracy across phases continuously increased regardless of the conditions they were in. This may have been due to repeated exposure to the similar material (e.g., introduction section from the SIM) across the first three training phases for all participants. Second, the experiment did not include a generalization phase in which participants could apply learned skills to individuals whose basic learning abilities need to be assessed. Thus, we do not know whether this training procedure would be effective for individuals working with real clients. Third, related to the first limitation, we do not know what the results would have been if the SIM plus WebCAPSI condition rather than the SIM alone condition served as the baseline. Fourth, we do not know whether providing feedback to participants after knowledge-based and application tests across phases would have improved their performance on subsequent tests. Fifth, results for the application test in the last phase would be strengthened if participants had completed a full assessment (rather than only two trials per level) for the ABLA.

Future research is needed to address several issues. First, in order to make a clear conclusion on component analyses, an independent groups design, consisting of a SIM alone, a SIM plus WebCAPSI, and a SIM plus WebCAPSI plus videos group, might be needed. Or, as an alternative, a pre-test could be included for each phase to compare with the performance after training of that phase. Second, replications with other SIMs and with participants (e.g., knowledge users) who might not such efficient learners (as university students tend to be) would be beneficial. Third, research is needed to compare the effects of successfully passing three versus more mastery-based unit tests for each CAPSI-involved training phase. Finally, participants in this study only viewed each video once. Future research could evaluate the impact of the number of each video was viewed on the participants' performance in conducting the ABLA.

In summary, in the present study, (1) compared to accuracy after studying the SIM alone, all twelve participants showed improvement in writing knowledge-based tests after they studied the SIM combined with WebCAPSI; (2) nine of the 12 participants averaged ≥ 85% accuracy on the tests after studying the SIM combined with WebCAPSI; (3) after viewing the videos in the last phase, 10 of the 12 participants maximized their performance while the remaining two participants also remained at a high level of accuracy; and (4) eight of the 12 participants averaged ≥ 85% accuracy on the application tests in the last phase. The findings suggest that a combination of a SIM, WebCAPSI, and demonstration videos could be an effective and low-cost training approach to teach not only knowledge, but also the application of behavioural procedures to potential knowledge users. As an increasing demand for teaching direct-care service providers behavioural-specific procedures for working with individuals with IDs and ASDs, a SIM plus WebCAPSI with instructional videos embedded into the system can be a powerful tool in reducing resources needed to conduct direct instruction and in maintaining structure for staff training.

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Appendix A

Recruitment Poster

UNIVERSITY OF MANITOBA

DEPARTMENT OF PSYCHOLOGY

190 Dysart Road
Winnipeg,
Manitoba
Canada R3T 2N2

PARTICIPANTS NEEDED

FOR RESEARCH IN TEACHING A BEHAVIOURAL ASSESSMENT METHOD

We are looking for volunteers to take part in a study of different training methods, individually or in combination, including individual self-study, computer-mediated instruction, and demonstration videos, to teach
a behavioural assessment method to individuals with autism or developed disabilities.

As a participant, you would be asked to study 3 sets of self-instructional materials, watch 6 short video clips, complete 4 written and application tests. Your responses on application tests will be videotaped and the videotapes will be destroyed immediately after data analysis.

Your participation would involve 4 phases. The total time commitment is approximately 12 hours within a 4-week span at your convenient time.

In appreciation for your time, you can receive
an honorarium of up to $65

The study will be conducted by Lei Hu, a Master's student in the Psychology Department, for his Master thesis and will be supervised by Dr. Joseph Pear, a professor in the same department.

This study will happen in May/June, 2012. For more information about this study, or to volunteer for his study, please contact:

Lei Hu
Department of Psychology
Phone: (204)-xxx-xxxx
Email: umhul@cc.umanitoba.ca

This study has been approved by Psychology/Sociology Research Ethics Boards (REB), University of Manitoba.

Appendix B

Recruitment Letter for Research Participation Opportunity

UNIVERSITY OF MANITOBA

DEPARTMENT OF PSYCHOLOGY

190 Dysart Road
Winnipeg,
Manitoba
Canada R3T 2N2

Research Project Title: Effects of a Self-Instructional Manual and Web-Based Computer-Aided Personalized System of Instruction (WebCAPSI) on Training Individuals Knowledge and Implementation of the Assessment of Basic Learning Abilities (ABLA)

Researcher: Lei Hu, Principal Investigator and Master's student, Department of Psychology, University of Manitoba, umhul@cc.umanitoba.ca, (204) xxx-xxxx.

Research Supervisor: Dr. Joseph J. Pear, Professor, Department of Psychology, University of Manitoba, pear@cc.umanitoba.ca, (204) 480-1466.

Purpose: The assessment of basic learning abilities (ABLA) test is a practical instrument to measure the difficulty of the position, visual, and auditory discriminations that can readily and reliably be learned by an individual with an intellectual disability or autism. The primary purpose of this project is to compare the effects of a self-instruction manual by itself and in its combination with an online teaching tool on administering the ABLA test to a researcher playing the role of a child with autism. In addition, the effects of viewing videos demonstrating behavioural procedures and common mistakes in administering the ABLA will be examined. Knowledge of the ABLA and accuracy of administering the test will be assessed.

To be eligible to participate in this research, you have to meet the criteria enumerated below:

- (1). You are currently enrolled as a student at the University of Manitoba;
- (2). You have not previously read the procedural manuals for the ABLA, or books or articles related to the ABLA;
- (3). You have not had previous experience working with individuals with autism or other related disorders;
- (4). You have access to the Internet.

The purpose of this study is to teach you knowledge about and how to accurately administer the ABLA test. The total time commitment is approximately 12 hours in a 4-week span during which you are expected to learn different portions of a self-instruction manual for conducting the test and need to meet a researcher of the study at the Fort Garry campus 5 times, with approximately ½ hour per time.

The entire study consists of a pre-study taking visit taking about ½ hour and 4 phases taking about 3 and ½ hours each for the first three phases and about 1 hour for the fourth phase. Therefore, you total time commitment is about 12 hours (i.e., ½ + 3* 3½ + 1 = 12 hours). You will receive $5 for the pre-study visit and $15 for each phase of the study that you begin regardless of your performance (up to $65 in total). In addition, you might acquire expertise in the ABLA test, which may benefit you if you are interested in working with individuals with autism or related disorders.

If you are interested in participating or have any questions about the study, please contact Lei Hu by email or by phone before May 10, 2012. My email address is umhul@cc.umanitoba.ca and my phone number is (204) xxx-xxxx.

Appendix C

Script for Potential Participants
Who Call in Response to the Recruitment Poster for Participation

Hello,

Thank you for your interest in participating my study. My name is Lei Hu, a Master's student in the Department of Psychology. I am doing research for my Master's Thesis on investigating the effects of a self-instruction manual (SIM) by itself with the SIM in combination with an online teaching tool in teaching you knowledge about the *Assessment of Basic Learning Abilities* (ABLA) and how to administer it. In addition, the effects of viewing demonstration videos regarding the ABLA will be also examined. The accuracy in responding to questions about the ABLA and administering the test will be assessed. The study is supervised by Dr. Joseph Pear, a professor in the Department of Psychology (contact information: pear@cc.umanitoba.ca; 204-480-1466).

Before I describe the procedure, duration, time commitment, and risks/ benefits of the study and finally sign you into the study, I would first ask you a few questions: (1) Are you currently enrolled as a full time student at the University of Manitoba? (2) Prior to this study have you read the procedural manuals for ABLA, or books or articles related to ABLA? (3) Have you had previous experience working in a behavioral intervention program for individuals with autism or other developmental disorders? (4) Do you have Internet access? [If a potential participant responds Yes on questions (1) and (4), and No on questions (2) and (3), he or she is eligible to participate, and I will continue to the next paragraph. Otherwise, I will say, "I am sorry. You are not eligible to participate because the study requires participants to be university students who have not had prior exposure to the ABLA test and have not had any working experience with individuals with autism or other developmental disorders. Thank you for your interest."]

You are eligible to participate. This study consists of 4 phases. If you agree to participate you will be asked to (1) study three combined sets of contents from the ABLA self-instructional manual (about 88 pages), (2) complete 3 brief unit tests assigned to you for each of the first three phases, (3) view 6 short videos in the 4^{th} phase demonstrating correct procedures for all levels of the ABLA, and (4) complete 4 post-training measures in which each measure takes about 0.5 hour, consisting of a written test with 10 fill-in-the-blank questions, and an application test that involves administering ABLA levels to me or a research assistant. The tasks involved in this study include individually or in combination the following: individual self-study, computer-mediated instruction, and video demonstration of skills. The total time commitment is approximately 12 hours within a 4-5 week span during which you need to meet with me or the research assistant at the Fort Garry Campus 5 times (a pre-study visit and 4 visits for post-training measures).

Before starting the first phase, you will meet with me to read a consent form for this study and sign it indicating that you agree to participate in the study. During Phase 1, you will be asked to study the first set of contents (about 25 pages) from the ABLA self-instructional manual and to complete 3 unit tests in the set of contents. Once you feel comfortable for a post-training measure (consisting of a written test and an application test), it will be arranged in a testing room at the university. During Phase 2, you will be asked to study the second set of contents and to complete either 3 unit tests in the set of contents or 3 mastery-based unit tests online. A post-training measure will be given in the same manner described above. During Phase 3, you will be asked to study the third set of contents and to complete 3 mastery-based unit tests online. Again, a measure will be given after the completion of training for this phase. During phase 4, you will be asked to watch 6 videos (about 40 minutes) demonstrating correct procedures for ABLA levels and to complete a post-training measure described previously.

You will receive up to $65 regardless of your performance on post-training measures. The money will be paid within two weeks after the completion of the study. In addition to momentary compensation, another benefit is that you will acquire knowledge of the ABLA test, which will be of benefit for you if you become interested in working in this field.

The project accommodates a maximum of 12 participants. If more than 12 individuals volunteer to participate, the 12 who respond first will be selected. You will be informed by email or phone before May 05, 2012, as to whether or not you have been accepted and, if you have, the start date of the project.

Finally, do you have any question about this study? Please feel free to ask me question and point out your concerns about participation. Thank you again for your interest.

Appendix D
Project Description and Consent to Participation Form

UNIVERSITY OF MANITOBA

DEPARTMENT OF PSYCHOLOGY

190 Dysart Road
Winnipeg,
Manitoba
Canada R3T 2N2

Research Project Title: Effects of a Self-Instructional Manual and Web-Based Computer-Aided Personalized System of Instruction (WebCAPSI) on Teaching Knowledge and Implementation of the Assessment of Basic Learning Abilities (ABLA)

Principal Investigator: Lei Hu, Master's student, Department of Psychology, University of Manitoba, umhul@cc.umanitoba.ca, (204) xxx-xxxx.

Research Supervisor: Dr. Joseph J. Pear, Professor, Department of Psychology, University of Manitoba, pear@cc.umanitoba.ca, (204) 480-1466.

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

What is the purpose of the study?

The assessment of basic learning abilities (ABLA) test is a practical instrument to measure the difficulty of position, auditory, and visual discriminations that can readily and reliably be learned by the an individual with an intellectual disability or autism. The purpose of this study is to compare the effects of a self-instruction manual (SIM) by itself with the SIM in combination with an online teaching tool in teaching you knowledge about the ABLA and how to administer it. In addition, the effects of viewing demonstration videos will be also examined. The accuracy in responding to questions about the ABLA and administering the test will be assessed.

This study is conducted for the principal investigator's M.A. thesis in partial fulfillment of the Master's degree requirements. A copy of this thesis will be kept in the University of Manitoba library. Moreover, the results of the study may be presented at academic psychological or behavioral conferences or published in academic psychological or behavioral journals. However, no individual identifying information will be included in the thesis or any presentation or publication of the results.

What are the study procedures and how long will the study take?

The tasks involved in this study include individually or in combination the following: individual self-study, computer-mediated instruction, and video demonstration of skills. The study consists of the following pre-study visit and phases:

Pre-study visit: (0.5 hour)

1) After reading this consent form, you may ask any questions regarding your potential participation and sign this form if you wish to participate. This will require an estimated 20 minutes.

2) After you sign the consent form, a set of material (approximately 25 pages) from the ABLA SIM will be distributed to you. You will be asked to study the materials within a week at your own pace at any locations you choose. The principal investigator will clarify any questions you may have regarding the study materials. This will take an estimated 10 minutes.

Phase 1: (3.5 hours)

Training:

1) You will be assigned the first set of material (approximately 25 pages) from the ABLA SIM to read. The set will take approximately 2 - 2.5 hours to study.
2) You will also need to answer 3 units of study questions and check your responses against answer keys in the set of material.
3) You can choose anywhere you prefer for the training of this phase.

Post-training measure:

The post-measure after training consists of *a written test* and *an application test* based on what you have learned in this phase. Once you are comfortable with doing the tests, you will meet with the principal investigator or a research assistant at a testing room at the University of Manitoba. The written test consists of 10 fill-in-the blank questions, which will be used to measure your knowledge of the ABLA. This test will take a maximum of 10 minutes. The application test consists of administering 12 trials on two different levels (6 trials on each level), which will be used to measure the accuracy with which you are able to implement the ABLA test. This test will take approximately 10 minutes. During the application test, you will administer the ABLA to either the principal investigator or the research assistant who will be playing the role of an individual with autism or related disorders. Your performance during the application test will be recorded by a video camera.

Phase 2: (3.5 hours)

During this phase, you will be assigned the second set of material (about 25 pages) from the ABLA SIM to study under *either* one of two training methods:

Training method 1:

Identical to the training method described in the Phase 1, you will be asked to read the material (3 units covered), answer study questions, and check your responses against answer keys.

Training method 2:

You will be asked to read the set of material *sequentially* on a unit-by-unit basis and to access a mastery-based unit test online. Three online tests will correspond to the three units, including an introduction, a level selected from levels 1 to 3, and another level selected from levels 4 to 6 of the ABLA. The mastery criterion for each test will be 90% accuracy. That is, in order to proceed to the next unit test, you have to correctly respond to at least 9 out of 10 fill-in-the-blank questions within 15 minutes. You will be required to restudy the unit and rewrite the unit test at least 15 minutes after a failed attempt. The training in this phase is completed after you successfully passed the last unit of the contents.

Post-training measure:

This will follow the same procedure as the post-training measure for the previous phase.

Phase 3: (3.5 hours)

Training:

You will study a third set of material from the ABLA SIM using the training method 2 described above in Phase 2.

Post-training measure:

This will follow the same procedure as the post-training measure for the previous phase.

Phase 4: (1 hour)

Training:

You will make an appointment to meet with the principal investigator or the research assistant to view six demonstration videos. The videos show actors demonstrating the correct procedures and common errors for administration of the ABLA levels, one video per level. All videos take approximately 40 minutes to watch.

Post-training measure:

Identical to the measures conducted previously, a written knowledge test and an ABLA application test will be given. However, the measurement of knowledge and the procedural assessment in this phase is to be tested in a cumulative fashion. That is, a novel set of 10 knowledge questions will be randomly selected from the entire SIM and 12 trials of the assessment will be randomly selected from all six levels of the ABLA test, 2 trials for each level. In addition, a survey will be given to you to ask opinions and suggestions about your learning experience using the ABLA SIM, WebCAPSI program, and demonstration videos.

The total time commitment is approximately ***12*** hours in a 4-week span. The experiment is expected to occur during the month of April 2012.

What are the risks and benefits in taking part in the study?

Risk: This study will involve "minimal risk". We do not foresee any risks for you beyond what might be normally encountered in everyday situations.

Benefits: A potential benefit of the study to you is that you might acquire some knowledge and abilities that might be useful to you if you are interested in working with individuals with autism or related disorders.

Will any recording devices be used?

Yes. Your performance on conducting selected levels of the ABLA test will be videotaped for data analysis later. The videotapes will show your interactions with the principal investigator or a research assistant and will be used to assess the accuracy with which you administer the ABLA. Tapes will be accessible only to research staff of this study and will be kept in a locked filing cabinet of a research room (P133 of the Duff Roblin Building). Following data analysis, the videos will be destroyed before October 30, 2012.

Will I be asked to provide personal information about myself?

Yes. You will be asked to provide your age, educational background, and whether or not you have conducted behavioral training sessions with individuals with autism or related disorders during your first (i.e., pre-study) visit**.**

Will personal information about you be kept confidential?

Your identity will be known to the researchers of this study since direct meetings are involved. All personal information and physical data collected throughout the study will be stored in a locked office (Room P133 of the Duff Roblin Building), accessible only to Dr. Pear and CAPSI researchers working on this project under his supervision. All electronic data will be stored on a secured server that is maintained exclusively for CAPSI by the University of Manitoba's Information Technology Services.

The results of the study will be included in the principal investigator's M.A. thesis and a copy of this thesis will be kept in the University of Manitoba library. Moreover, the results may be presented at academic psychological or behavioral conferences or published in academic psychological or behavioral journals. However, your identity will be coded on all score forms and therefore will not be revealed in the thesis and any academic reports, presentations, or publications. The key to decode your identity will be destroyed within one month after the completion of the study (approximately June 30, 2012). All physical data including demographic information, your opinions and suggestions about training, and data collected from the written tests will be destroyed confidentially before August 30, 2012. The videos recording your performance on the application tests will be destroyed confidentially before October 30, 2012.

Will I receive the results of the study?

If you wish to be informed of the results, please check YES in the appropriate box at the end of this form with your emailing or surface mail address, and we will send to you a summary of the findings within approximately 4 months after the completion of the study (by approximately October 2012).

Is there payment or cost for participating?

You will receive $5 for a pre-study visit and $15 for each phase of the study that you begin regardless of your performance. A total of $65 will be paid to you for starting all phases. All participants will be paid within 2 weeks after the completion of the study (approximately June 15, 2012).

Is participation voluntary?

Participation is voluntary. Whether you give consent to take part in this study will in no way affect the instruction that you are receiving now or may receive in the future from the University of Manitoba.

Moreover, even after you give you consent; you can stop at any time and for any reasons by simply calling the principle investigator listed at the beginning of the consent from. Again, your decision to stop will not affect any services that you may be receiving now or in the future from the University of Manitoba.

Will I be contacted in the future for other studies?

No.

Signing the Consent Form

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba Research Ethics Board(s) and a representative(s) of the University of Manitoba Research Quality Management / Assurance office may also require access to your research records for safety and quality assurance purposes.

This research has been approved by the Psychology/Sociology Research Ethics Board of the University of Manitoba. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at 474-7122. A copy of this consent form has been given to you to keep for your records and reference.

Signatures

I, __________________________, hereby consent to participate in the project,
(*please print your name*)

Effects of a Self-Instructional Manual and Web-Based Computer-Aided Personalized System of Instruction (WebCAPSI) on Teaching Knowledge and Implementation of the Assessment of Basic Learning Abilities (ABLA)

By giving consent I allow the research project staff to make video recordings of me during project sessions, and to include my results in publications, reports, and talks, so that others may learn from this project. I understand that my identity will not be disclosed.

I understand that I can revoke or amend this consent at any time and for any reason.

For the purposes of contacting you to participate in the experiment, and sending you the results when the experiment is completed, please print your mailing and/or email address and phone number here:

Please check YES or NO for the following items:	**YES**	**NO**
I would like to receive the results of this project. Please send them to my (check one) mailing address___ email address___.		
The researchers may contact me directly to inform me of possible future related studies.		

___________________________ _______________
Signature of Participant **Date**

___________________________ ___________________________ _______________
Name of Researcher/Delegate **Signature of Researcher/Delegate** **Date**

Please return all pages of this *Project Description and Consent to Participation Form* in the enclosed stamped envelope to the researcher. A copy will be sent to you for your records. Thank you.

Appendix E

ABLA Knowledge-Based Test (Cumulative version)

Participant coded #: _______________

Instruction: Based on what you have learned about the *Assessment of Basic Learning Abilities* (ABLA), please answer the following fill-in-the-blank and single-choice questions to the best of your knowledge. (Time limit: 10 minutes).

1. In the kitchen, on a cupboard, is a pile of knives, forks, and spoons, all mixed up. The client must pick up a knife, a fork, and a spoon and take them and place them at the appropriate place by a plate in the cafeteria, and repeat this for each setting. The steps of this task would be classified as follows:

i) Pick up a knife, a fork, and a spoon from the pile in the kitchen. This is a Level ____ discrimination.

ii) Take the three utensils to a plate in the cafeteria. This is a Level ____ discrimination.

iii) Place the fork to the left of a plate, the knife to the right of that plate, and the spoon to the right of the knife. This is a Level ____ discrimination.

2. Under the container-position column on the Level 6 data sheet, when you see a dot in the circle, the spoken prompt you should say is "____ ____" which should be presented in a ____ pitch and in a ____ fashion.

3. The verbal prompt "where does it go?" is the same for 5 different levels of the ABLA, they are ____ ____ ____ ____, and ____. The test object is the same for levels ____, ____, ____, and ____ is the foam.

4. If a student makes an error on a scoring trial in Level 4, you should shade the rectangle under ____ ____ and perform the ____ ____ procedure.

5. If a student fails Level 5 of the ABLA, the student is ____ (likely / not likely) to pass Level 6. However, if a student passes Level 5 of the ABLA, the student is ____ (likely / not likely) to pass Level 4.

6. When you see a square on a scoring trial under the "container" column of a data sheet for Level 1, you should present the ____ as the container for this trial and the correct response for a student is to place the ____ into the ____.

7. In the testing of Level 1, a student should have performed ____ correct responses in a row with the box before switching to the can. Level 1 is mastered if the student can perform ___correct scoring trials with red box and _____ correct scoring trials with the yellow can.

8. The difference between Levels 2 and 3 is that, during the testing of Level 2, both containers, the box and the can, are placed in front of a student in a _____ left-right position across trials; however, during the testing of Level 3, the position of the container is ____ across trials.

9. The difference between Levels 4 and 5 is that, during the testing of Level 4, the test object for a student to respond is either the red ____ or the yellow _____ across trials; however, during the testing of Level 5, the test object is either the silver piece of wood shaped in to the word ____ or the purple piece of wood shaped into the word _____ across trials.

10. In the initial prompting sequence of Level 3, the ____ ____ is provided after the demonstration.

Appendix F

36 Trials of ABLA Assessment (for all 6 levels, 6 trials for each level)

Instruction: Imagine that you are a professional (e.g., a behavioral analyst) and attempt to administer the following trials of the ABLA to a confederate (the principal researcher of this study) playing a role of a child with autism. Note that the levels of the ABLA may be randomly alternated. The confederate's planned reaction, in respect to either a correct or incorrect response, for each trial is scripted under the last column.

-Level 1 *(you will need a yellow can, red box, and a piece of foam)*
Please administrate three-step prompting sequence before the following trials.

Trial #	Containers to be presented	Required containers & objects	Planned responses
1	Can	Can + Foam	Correct (Foam in can)
2	Box	Box + Foam	Correct (Foam in box)
3	Box	Box + Foam	*Incorrect* (Foam on table)
4	Can	Can + Foam	Correct (Foam in can)
5	Box	Box + Foam	*Incorrect* (Foam on table)
6	Box	Box + Foam	Correct (Foam in box)

-Level 2 *(you will need a yellow can, red box, and a piece of foam)*
Please administrate three-step prompting sequence before the following trials.

Trial #	Containers to be presented	Required containers & objects	Planned responses
7	Box + Can (Stable)	Box + Can + Foam	Correct (Foam in can)
8	Box + Can (Stable)	Box + Can + Foam	*Incorrect* (Foam in box)
9	Box + Can (Stable)	Box + Can + Foam	Correct (Foam in can)
10	Box + Can (Stable)	Box + Can + Foam	*Incorrect* (Foam in box)
11	Box + Can (Stable)	Box + Can + Foam	*Incorrect* (Foam in box)
12	Box + Can (Stable)	Box + Can + Foam	Correct (Foam in can)

-**Level 3** *(you will need a yellow can, red box, and a piece of foam)*
Please administrate three-step prompting sequence before the following trials.

Trial #	Container's position	Required containers & objects	Planned responses
13	Left	Can, Box + Foam	Correct (Foam in can)
14	Right	Box, Can + Foam	Correct (Foam in can)
15	Right	Box, Can + Foam	*Incorrect* (Foam in box)
16	Left	Can, Box + Foam	Correct (Foam in can)
17	Right	Box, Can + Foam	Correct (Foam in can)
18	Right	Box, Can + Foam	*Incorrect* (Foam in box)

- **Level 4** *(you will need a yellow can, a red box, a cylinder, and a little box/cube)*
Please administrate three-step prompting sequence *twice* for 2 different objects before the following trials.

Trial #	Container's position	Required containers & objects	Planned responses
19	Left	Can, Box + Cube	Correct (Cube in box)
20	Right	Box, Can + Cylinder	Correct (Cylinder in can)
21	Right	Box, Can + Cube	*Incorrect* (Cube in can)
22	Right	Box, Can + Cube	*Incorrect* (Cube in can)
23	Left	Can, Box + Cube	Correct (Cube in box)
24	Right	Box, Can + Cylinder	Correct (Cylinder in can)

- **Level 5** *(you will need a yellow can, a red box, a piece of wood shaped like the word "Can", and a piece of wood shaped like the word "BOX")*
Please administrate three-step prompting sequence *twice* for 2 different objects before the following trials.

Trial #	Container's position	Required containers & objects	Planned responses

25	Left	Can, Box + "*Can*"	*Incorrect* ("*Can*" in box)
26	Right	Box, Can + "*BOX*"	*Incorrect* ("*BOX*" in can)
27	Right	Box, Can + "*BOX*"	Correct ("*BOX*" in box)
28	Left	Can, Box + "*Can*"	Correct ("*Can*" in can)
29	Right	Box, Can + "*BOX*"	Correct ("*BOX*" in box)
30	Right	Box, Can + "*BOX*"	*Incorrect* ("*BOX*" in can)

-Level 6 *(you will need a yellow can, red box, and a piece of foam)*
Please administrate three-step prompting sequence *twice* before the following trials.

Trial #	Container's position	Required containers & objects	Planned responses
31	Left	Can, Box + say: RB	Correct (Foam in box)
32	Right	Box, Can + say: YC	Incorrect (Foam in box)
33	Right	Box, Can + say: YC	Correct (Foam in can)
34	Left	Can, Box + say: RB	Correct (Foam in box)
35	Left	Can, Box + say: YC	Correct (Foam in can)
36	Left	Can, Box + say: RB	Correct (Foam in box)

Appendix G

Training Feedback and Evaluation Survey

Participant coded #: ___________

Instructions

Thank you for taking the time and effort to respond to this questionnaire. It is designed to help us improve our teaching procedures. Please respond to all questions as accurately and as honestly as you can. If there is no answer exactly fitting you, please answer with the response that best fits your judgment. Note that you should provide only one answer for each question, unless stated otherwise. Your answers will not associated with your name and other identities. In addition, your answers or absence in answering any questions will not impact your course grade. All of answers you shared here are strictly confidential.

ABOUT TRAINING METHODS AND TRAINING COMPONENTS

Instruction: Thinking of your most recent learning experience with different training methods (the self-instructional manual alone versus the manual along with unit tests delivered via WebCAPSI) and components (the manual, unit tests, demonstration videos). For each question below, please check the box that best describe your opinion.

1. How convenient is WebCAPSI to use?
   - ☐ Extremely convenient
   - ☐ Very Convenient
   - ☐ Moderately convenient
   - ☐ Slight convenient
   - ☐ Not at all convenient

2. How easy is WebCAPSI to use?
   - ☐ Extremely easy
   - ☐ Very easy
   - ☐ Somewhat easy
   - ☐ Not very easy
   - ☐ Not at all easy

3. How professional is the self-instructional manual?
   - ☐ Extremely professional
   - ☐ Very professional
   - ☐ Moderately professional
   - ☐ Slightly professional
   - ☐ Not at all professional

4. How easy is the self-instructional manual to read?
   - ☐ Extremely easy
   - ☐ Very easy

 Somewhat easy
 Not very easy
 Not at all easy

5. How useful are study questions included in the self-instructional manual?
 Extremely useful
 Very useful
 Moderately useful
 Slightly useful
 Not at all useful

6. How helpful is the self-instructional manual in writing knowledge-based tests?
 Extremely helpful
 Very helpful
 Moderately helpful
 Slightly helpful
 Not at all helpful

7. How helpful is the self-instructional manual in performing procedures of the ABLA?
 Extremely helpful
 Very helpful
 Moderately helpful
 Slightly helpful
 Not at all helpful

8. How helpful is the self-instructional manual combined with mastery-based unit tests (delivered via WebCAPSI) in writing knowledge-based tests?
 Extremely helpful
 Very helpful
 Moderately helpful
 Slightly helpful
 Not at all helpful

9. How helpful is the self-instructional manual combined with mastery-based unit tests (delivered via WebCAPSI) in performing procedures of the ABLA?
 Extremely helpful
 Very helpful
 Moderately helpful
 Slightly helpful
 Not at all helpful

10. How helpful are demonstration videos in writing knowledge-based tests?
 Extremely helpful
 Very helpful
 Moderately helpful
 Slightly helpful

 Not at all helpful

11. How helpful are demonstration videos in performing procedures of the ABLA?
 Extremely helpful
 Very helpful
 Moderately helpful
 Slightly helpful
 Not at all helpful

You have finished. Thank you!

Appendix H

The Description of the Contents of all ABLA Videos

Video 1 (File name: ABLA L1.wmv; Length: 7 mins 50 secs; Level 1: Imitation): A female tester demonstrates the materials required for level 1 (i.e., imitation), viz. a yellow can, a red box, and a beige piece of foam. Then, she administrates this level to a confederate (i.e., simulated client) who plays the role of a "client". Specifically, the tester presents procedures for conducting an initial (or a three-step) prompting sequence (consisting of a demonstration, a guided trial, and a choice for an independent response), models two examples (independent trials) in which the confederate makes correct responses (i.e., drop the beige piece of foam in the box), then models several examples in which the confederate makes incorrect responses followed by an error correction procedure, instructs how to record data in response to the two correct responses, and finally demonstrates some common errors.

Video 2 (File name: ABLA L2.wmv; Length: 6 mins 22 secs; Level 2: Position Discrimination): The tester demonstrates procedures for conducting the initial prompting sequence using two examples of trials in which she uses different levels of prompts in guiding the confederate to engage in a correct response (i.e., dropping a foam into a yellow can on the left side of the tester). Since the confederate makes a correct response without prompting, the tester demonstrates how to implement independent trials, how to record correct and incorrect responses for the trials on a data sheet, and how to apply different prompting methods during error correction procedures followed by the incorrect responses. Finally, the tester demonstrates some common errors (e.g., accidentally providing a prompt for a correct response and forgetting to provide a reinforcer to the confederate).

Video 3 (File name: ABLA L3.wmv; Length: 3 mins 26 secs; Level 3: Visual discrimination): The tester illustrates the difference between Levels 2 and 3. They are similar: however, the positions of the containers are fixed in level 2 while they are alternated in level 3. Then, the tester demonstrates how to conduct a trial at level 3 and points out the most common errors (e.g., forgetting to switch the containers at the beginning of a trial). Finally, the tester demonstrates conducting 5 independent trials and recording the results on a data sheet.

Video 4 (File name: ABLA L4.wmv; Length: 5 mins 24 secs; Level 4: Visual matching-to-sample discrimination): The tester demonstrates the materials required for this level, viz. a yellow can, a yellow cylinder, a red box with black strips, a red cube with black strips, and a beige piece of foam. Then, she presents procedures for conducting the initial prompting sequence using two demonstration trials (one with the box and one with the can) in which the confederate makes correct responses (i.e., the cylinder is placed into the can and a cube is placed into the box). After that, the tester demonstrates two independent trials consisting of an example of a correct response and an example of an incorrect response followed by an error correction procedure. She then describes some common errors. Finally, she implements 5 trials at level 4 and instructs how to record the responses on a data sheet.

Video 5 (File name: ABLA L5.wmv; Length: 5 minis 18 secs; Level 5: Visual non-identity match-to-sample discrimination): The tester demonstrates the materials required for this level, viz. a yellow can, a purple piece of wood that spells "*Can*", a red box with black strips, and a silver piece of wood that spells "*BOX*". Then, she presents procedures for conducting the initial prompting sequence using two demonstration trials (one with the piece of wood that spells "Can" and one with the one that spells "BOX") in which the confederate is responded correctly by placing "Can" into the can and "BOX" into a box. After that, the tester demonstrates two independent trials consisting of an example of a correct response and an example of an incorrect response followed by an error correction procedure. Finally, she describes some common errors.

Video 6 (File name: ABLA L6.wmv; length: 6 mins 26 secs; Level 6: Auditory-visual combined discrimination): The tester demonstrates procedures for conducting the initial prompting sequence using two trials (one with the box and one with the can). Then, she demonstrates an example of a correct response in which the confederate followed the verbal instruction (i.e., "REDBOX" in a rapid and high tone vs. "yellow can" in a slow and low tone) to drop a beige piece of foam into a red box with black strips. In addition, she also demonstrates an example of an incorrect response followed with an error correction procedure. Next, she describes common errors. Finally, she implements 5 independent trials at level 6 and instructs how to record the responses on a data sheet.