THE PENNSYLVANIA STATE UNIVERSITY SCHREYER HONORS COLLEGE

DEPARTMENT OF COMMUNICATION SCIENCES AND DISORDERS

Evaluation of an Online Training to Support Health Care Interactions for Individuals with Complex Communication Needs

REBECCA STROSCHEIN SPRING 2022

A thesis submitted in partial fulfillment of the requirements for a baccalaureate degree in Communication Sciences and Disorders with honors in Communication Sciences and Disorders

Reviewed and approved* by the following:

Dr. Janice Light Professor of Communication Sciences and Disorders Thesis Supervisor

Dr. Carol Miller Professor of Communication Sciences and Disorders Honors Adviser

* Electronic approvals are on file.

ABSTRACT

Successful communication between a patient and medical staff, sometimes called "patient provider communication" is essential for good health care outcomes. Unfortunately, many healthcare providers lack experience and/or training to support interactions with individuals who have complex communication needs and cannot rely on speech to meet their communication needs. As a result, communication breakdowns may be a frequent occurrence during healthcare appointments. People who have difficulty with speech are three times more likely to experience an adverse medical event, sometimes even dying as a result of communication breakdowns. There has been a lack of research investigating how to improve these outcomes and most research to date has primarily focused on training healthcare providers. In addition to training healthcare providers, it is also important to prepare individuals who rely on augmentative and alternative communication for medical interactions. The PACT strategy was developed to address these concerns. This study investigated the effects of an online training to teach pre-service professionals how to prepare individuals who rely on augmentative and alternative communication (AAC) for successful healthcare communication outcomes using the PACT strategy. Sixty-two preservice students were randomly assigned to two groups in a switching replication design. Results demonstrated a statistically significant positive increase in the number of steps used in the strategy after completing the online training which suggests that we can prepare preservice professionals to work with individuals who rely on AAC to improve patient-provider communication. Limitations and clinical implications are also discussed. Future research is required to validate the results, streamline the training, and evaluate alternative methods of training.

TABLE OF CONTENTS

LIST OF FIGURESiii
LIST OF TABLESiv
ACKNOWLEDGEMENTSv
Chapter 1 Introduction
Chapter 2 Methods
Research Design
Participants7
Recruitment7
Inclusion criteria7
Participant information7
Materials
Online training
Procedures15
Assessment probes using case scenarios16
Measures
PACT Scoring Rubric17
Inter-and intra-rater reliability18
Data analysis
Social Validity
Feedback on Training
Chapter 3 Results
Use of the PACT Strategy
Chapter 4 Discussion
Prior Research
Effects of the Training
Implications for Practice
Limitations of the Study
Directions for Future Research
Appendix A Guided Notes
Appendix B PACT Scoring Rubric
Appendix C Table of Individual PACT Scores out of 9 for Group 1 and Group 2 at Each Time Point

REFERENCES

LIST OF FIGURES

Figure 1: Structure of Online Training	11
Figure 2: Interactive Elements of Training	12
Figure 3: Example Practice Question	12

LIST OF TABLES

Table 1: Switching Replications Experimental Design	6
Table 2: PACT Strategy Action Steps	9
Table 3: Mean PACT Scores out of 9 for Group 1 and Group 2 at Each Time Point	24
Table 4: Difference in PACT scores for Group 1 and Group 2 between Time 1 and Time 2 a Time 2 and Time 3	and 25
Table 5: Maintenance Training Scores	25
Table 6: Percentage of Participants who Completed Each PACT Action Step at Each Time I	Point 26
Table 7: Social Validity Survey Question Results	27

ACKNOWLEDGEMENTS

I would first like to thank Dr. Janice Light for her continuous support and guidance through this thesis process. I have gained an immense amount of knowledge from her and her contributions to the AAC field inspire me as I continue my career path in research. I would also like to thank Dr. David McNaughton who was instrumental in the development of these materials and the person who introduced me to the field of patient-provider communication. Finally, I would like to thank David Chapple for sharing his personal experiences, numerous blog posts and insights that were the foundation of the materials and Emily Laubscher for providing a great deal of support for the statistical analysis.

The contents of this thesis were developed, in part, under a grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90REGE0014) to the Rehabilitation Engineering Research Center on Augmentative and Alternative Communication (RERC on AAC). NIDILRR is a Center within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this thesis do not necessarily represent the policy of NIDILRR, ACL, or HHS, and you should not assume endorsement by the Federal Government. This research was also supported by an Erickson Discovery grant. The findings and conclusions do not necessarily reflect the Erickson Discovery grant committee.

Chapter 1

Introduction

Successful communication is a fundamental aspect of many activities in daily living including education, employment, healthcare, and community living. Effective communication is especially important in healthcare. In 2010, the United States Joint Commission released a statement on effective communication stating, "No longer considered to be simply a patient's right, effective communication is now accepted as an essential component of quality care and patient safety" (p.1).

In the health care setting, communication allows patients to receive adequate care. Through communicating, patients are able to participate in treatment planning and critical decision-making, ensure comprehension of instructions, and inform providers of changing and new conditions (Downey, Zubow, & Hurtig, 2012). For individuals who are hospitalized, communication is involved and central in every step from admission, to assessment, to treatment, and to discharge (The Joint Commission, 2010). Successful communication between a patient and medical staff is known as patient-provider communication.

For individuals with disabilities (e.g., acquired conditions such as traumatic brain injury, developmental disabilities such as autism spectrum disorder, cerebral palsy, and intellectual developmental disabilities), effective communication is especially vital for their healthcare. Individuals with disabilities are at risk for greater health needs because the nature of their disability often requires medical care. Individuals with disabilities report making two to three times more medical visits per year than those without disabilities (McColl, 2005).

Ensuring effective communication is particularly important for individuals with disabilities who have complex communication needs and cannot rely on speech to meet their communication needs (e.g., individuals with developmental disabilities such as autism spectrum disorder, acquired conditions such as a traumatic brain injury, degenerative conditions such as amyotrophic lateral sclerosis or temporary conditions). Many of these individuals rely on augmentative and alternative communication (e.g. tools used to supplement or replace typical communication methods such as American Sign Language, picture cards, and speechgenerating devices).

Most people are not familiar with augmentative and alternative communication (AAC). In the medical setting, healthcare staff typically receive little to no training in augmentative and alternative communication. The lack of training leads to frequent communication breakdowns and significant health disparities for this population. Patients with complex communication needs are at the highest risk for preventable adverse events such as hospital re-admissions, and extended stays in the intensive care unit (Bartlett et al., 2008). People who have difficulty with speech are three times more likely to experience an adverse medical event, sometimes even dying as a result of communication breakdowns (Hurtig, Alper, and Berkowitz, 2018). It has been estimated the 63% of these adverse events would be preventable if appropriate access to communication was provided (Landrigan et al., 2010). Poor access to communication not only impacts health outcomes, but it also has significant financial repercussions. It is estimated that if appropriate AAC and assistive technology was provided to improve patient-provider communication, 6.8 billion dollars would be saved annually (Hurtig et al., 2018).

Unfortunately, health care providers currently receive very minimal training on how to interact effectively with those who have complex communication needs. Furthermore, individuals with complex communication needs are seldom well-prepared for interactions with medical staff. Both the provider and the patient need to be prepared for successful communication to occur.

There has been some preliminary work on developing strategies for both patients and doctors (e.g., Burns, Baylor & Yorkston, 2016; Morris, Dudgeon & Yorkston, 2013). Burns, Baylor and Yorkson (2016) described a strategy (PACT) to address how patients who use augmentative and alternative communication can prepare to share with their provider about their communication and needs. Morris, Dudgeon and Yorkston (2013) studied the experiences of adults who use augmentative and alternative communication in their interactions with medical professionals and highlighted barriers to communicating with medical professionals. Although this work is promising, it has not yet been applied to a broader audience and is not in a format that is accessible to a wide range of people.

Most of the research completed to date has evaluated training for healthcare providers (e.g., Downey, 2014; Downey & Happ, 2013; Gormley, 2019). For example, Gormley (2019) developed and evaluated the effectiveness of a brief mobile training designed to teach healthcare providers how to offer choices to children with complex communication needs in inpatient rehabilitation settings to support their participation in their care. Downey (2014) evaluated the use of an online training to teach acute care nurses effective communication strategies for daily interactions with their patients who have complex communication needs. Although this research is important, individuals who rely on AAC also need to be prepared for interactions with medical professionals. Frequently, individuals who rely on AAC will find themselves in situations where they will need to train the healthcare providers. Individuals who rely on AAC require preparation to take on this role and to interact successful with their healthcare providers.

Unfortunately, most individuals who rely on AAC receive very little, if any, training to prepare them to interact successfully with healthcare professionals. Speech language pathologists, teachers, related professionals, and parents seldom address this issue and they may be ill prepared to support individuals who rely on AAC in learning these skills. There is an urgent need for trainings to teach speech language pathologists, teachers, and other stakeholders to prepare individuals who rely on AAC to interact effectively with healthcare providers. To date, there has been no research to address this specific issue; however, there is evidence that shows preservice professionals can be taught effective strategies through online instruction in other relevant areas (McCoy & McNaughton, 2021, Mandak, Light & McNaughton, 2020). For example, Mandak et al. (2020) developed and evaluated the effectiveness of an online training designed to teach preservice speech language pathologists the relational skills required to deliver effective family-centered AAC services; McCoy and McNaughton (2020) developed and evaluated the effectiveness of an online training designed to teach preservice special education teachers to implement a system of least prompts to support learning by children with complex needs. Results of these two studies demonstrated the effectiveness of the trainings, suggesting that online training can be an effective way to teach preservice professionals. Online training is especially advantageous as it can reach a wide range of preservice students across the country. In comparison to live-trainings, online trainings can be advantageous as they ensure that each participant has the same training experience and eliminates variability that can occur when

multiple trainers are facilitating face-to-face trainings (Geiger et al., 2018). It has also been found to be a more cost-effective solution (Jung & Rha, 2000; Jung, 2005).

Clearly it is important to prepare individuals who rely on augmentative and alternative communication to interact with healthcare providers. Unfortunately, educational and rehabilitation professionals are poorly prepared to do so. Therefore, the goal of this project was to develop and evaluate a web-based instructional module to teach preservice professionals to prepare individuals who rely on AAC to interact with healthcare providers. The study was designed to answer the following question: what is the effect of an online training on preservice professionals' use of strategies to prepare individuals who rely on AAC to improve patient-provider communication?

Chapter 2

Methods

Research Design

This study utilized a 2 (groups) x 3 (measurement points) switching replications experimental design (Edmonds & Kennedy, 2016). Preservice students were randomly assigned to one of two groups. Pre-test measurements (i.e., case scenario responses) from the two groups were collected first, followed by the intervention (online training) for Group 1. Both groups then completed a second assessment measure; then Group 2 completed the online training. A third assessment measure was then completed for both groups. Employing this design ensured that all participants received the intervention and removed threats to internal validity (Trochim et al., 2015; Edmonds & Kennedy, 2016). The design provides strong experimental control and allows determination of the functional relationship between the independent variable, in this case the online training, and the dependent variable, in this case the students' responses to the case scenarios. Both groups were randomly assigned. Table 1 illustrates the design used.

	Assessment 1		Assessment 2		Assessment 3
Group 1	Case scenario (Pre-test)	Intervention	Case scenario (Post-test)		Case scenario (Maintenance)
Group 2	Case scenario (Pre-test)		Case scenario (Pre-test)	Intervention	Case scenario (post-test)

Table 1: Switching Replications Experimental Design

Participants

Recruitment

Ethics approval for this study was obtained from the Penn State University Office of Research Protections prior to any recruitment or study activities. Participants were recruited from an online undergraduate assistive technology course taught at the Pennsylvania State University during the summer of 2021. All of the students were required to complete the online training as part of the requirements of the course. Students were invited to participate in the study if they were interested and 62 students consented to have their responses recorded and analyzed for this study.

Inclusion criteria

The following inclusion criteria were utilized for participation in the study: (1) Pennsylvania State University students enrolled in the assistive technology course for Summer 2021, and (2) students over the age of 18. All of the students enrolled in the course met this inclusion criteria. Of the 124 students enrolled in the course, 62 consented to participate in the study.

Participant information

All of the 62 participants were undergraduate education majors: 52 (84%) of the participants were elementary education majors, while three (5%) were music education majors

and seven (11%) were secondary education majors. 59 participants were female; three were male. Participants ranged from 19 to 24 years old.

Materials

Online training

Training content

The purpose of this online training was to teach preservice professionals (e.g., general education teachers, special education teachers, speech-language pathologists) how to support positive communication between individuals with complex communication needs and medical professionals. To facilitate this learning, the PACT strategy (Burns, Baylor and Yorkston, 2016) was utilized. The PACT strategy consists of four steps with each letter standing for a needed step to support effective patient-provider communication:

- "P" stands for prepare. Professionals need to help individuals who rely on AAC prepare their AAC device, develop a communication passport, and summarize their concerns prior to the appointment.
- "A" stands for ask questions. Professionals need to help clients prepare for questions commonly asked by healthcare providers.
- 3. "C" stands for create a plan. Professionals should assist in making sure that individuals who rely on AAC feel they have a voice in the healthcare process; they can help to identify the roles of the client and caregiver in healthcare interactions.
- 4. "T" stands for take-away information.

Clients who rely on AAC need sufficient take home information in a format that is accessible and understandable for them. Within these 4 steps in the training, nine action substeps were identified and added to further specify actions required; concrete examples were included to illustrate ways to support patient-provider communication (see Table 2).

PACT Strategy					
PrepareDiscuss the purpose for the appointment with the provider• Prepare communication supports• Prepare to meet new communication partners• Prepare to share important information					
Ask Questions Prepare patient questions Anticipate provider questions 					
Create a Plan	 Review structure of the appointment Identify communication and decision-making roles 				
Take-away Information	Document key information				

Table 2: PACT Strategy Action Steps

As part of the online training, each participant was provided with guided notes at the beginning of the training to help guide learning throughout the lesson and encourage note-taking (Heward, 1994) (see Appendix A). Note-taking has been found to facilitate students' understanding and learning of content and also leads to greater understanding of content (Boyle & Rivera, 2012; Bohay, Blakely, Tamplin and Radvansky, 2011).

Instructional procedures

The training utilized a strategy instruction approach to facilitate the active learning of the PACT strategy. A strategy instruction approach supports active learning and response which has been shown to be vital in an online environment (Geiger et al., 2018). The strategy instruction

approach gives students an overall description of the strategy, examples of the strategy in use, the opportunity to practice the strategy with guidance, and then additional opportunities to practice while lessening the amount of prompting provided. Following the strategy instruction model proposed by Kent-Walsh and McNaughton (2005), participants went through the following stages: (1) pretest and commitment to instructional program, (2) strategy description, (3) strategy demonstration, (4) verbal practice of strategy steps, (5) controlled practice and feedback, (6) advanced practice and feedback, and (7) posttest and commitment to long-term strategy use. Research shows that strategy instruction has proved effective in the education field with regards to math (Machini & Hughes, 2000) and reading instruction (Jitendra, Hoppes, and Xin, 2000). More recently, a strategy instruction approach was used and showed a successful outcome for an online training in family-centered AAC services with preservice professionals (Mandak, Light & McNaughton, 2020).

Training format

The online training consisted of 5 sections: introduction to the PACT strategy, case example 1, case example 2, case example 3, and conclusion (see Figure 1).

Figure 1: Introduction to the Training



Students began by being introduced to augmentative and alternative communication, patient-provider communication, and the importance of successful communication outcomes for individuals with complex communication needs. Students were then presented with three cases: an autistic¹ adolescent going to the dentist, an adult with cerebral palsy going to a medical appointment, and an adolescent with a traumatic brain injury in the intensive care unit. These case scenarios were developed based on the lived experiences of individuals who use augmentative and alternative communication gathered through blog posts. The cases were evaluated by experts in the field (e.g., occupational and speech therapists) and individuals who use AAC. For each case, the preservice students were led through the process of implementing

¹ In this paper, individuals on the autism spectrum will be referred to identity-first (e.g., "autistic adolescent"). Recent research has indicated that a majority of individuals on the autism spectrum prefer identity-first language instead of person-first language (e.g., "adolescent with autism") (Kenny et al., 2016; Bury et al., 2020). However, it should be noted that some individuals may prefer person-first and individual choice should be provided when possible.

the PACT strategy and the nine action steps. Within each case, interactive elements were

included to encourage active participation of the preservice students (see Figure 2)

Figure 2: Interactive Elements of Training

```
Michael is an adult with cerebral palsy who is investigating treatments to help deal with pain in his back.

Please click on the three items below that should be a part of every Communication Passport.

Name of individual

Current medication and relevant medical history

Detailed medical history including list of all medications started and ended over the past 10 years

Communication strategies used by individual

Lumit
```

At the end of each case, students participated in a practice fill-in-the-blank activity to help

identify the action steps to be taken in a particular case (see Figure 3).

Figure 3: Example Practice Question

```
PREPARE
Discuss the purpose for the visit
Example: Email the nurse's office and explain Anna's need for a quiet setting with low light levels.
Prepare supports
```

Example: Review the vocabulary with Anna to support communicating how she is feeling through the blood work (e.g. dizzy, great, okay)

Students were given a word bank to help guide their answers. The word bank was a box provided to students at the bottom with all of the possible correct answers for the nine questions. Word banks facilitate a recognition response rather than a recall response, providing more support to students initially (Glass, Crause, and Kreiner, 2007). Practice cases were set-up in the three-part format (background, communication skills and supports, and medical situation).

At the end of the training, students completed an advanced practice activity. The advanced practice activity focused on a new case example and followed the same three-part format to introduce the case. In contrast to the earlier practice cases, the preservice students did not have access to a word bank and had to recall answers independently. Students received a certificate of completion at the end of the training and participated in a six- question feedback survey.

Training setting

The training occurred on an e-learning platform rather than via face-to-face instruction. This enabled participants to move at their own pace rather than having to move along with the pace of a lecturer in an in-person training. Gorman and Staley (2018) found that most students who had experienced both face-to-face and online training preferred the online method since they could engage with the material at their own pace. Additionally, an online format ensures each participant has the same training experience and eliminates variability that can occur when multiple trainers are facilitating face-to-face trainings (Geiger et al., 2018). Finally, when comparing a face-to-face training versus online learning approach, online training has been found to be a more cost-effective solution (Jung & Rha, 2000; Jung, 2005). Perhaps most importantly, the online format of the training supported future access to the training by preservice students across the country who might not otherwise receive such training.

The training was conducted through Moodle which is an online learning platform that allows educators to create personalized lessons in a secure and robust system (About Moodle, 2020). Moodle has been used in the past to conduct online trainings for preservice professionals with success (Mandak, Light & McNaughton, 2020). The assessment probes used to measure the preservice students' use of the PACT strategy were delivered through Instructure Canvas, an online-learning management system. Using a separate system for the assessment probes from the online training ensured that learners were given access to the probes at the correct times (e.g. the experimental group received Probe 1, followed by the training, and then Probe 2 and later Probe 3; the control group received Probe 1, and later Probe 2 followed by the online training and then Probe 3).

Case scenarios as assessment probes

In addition to the cases incorporated into the training, three additional case scenarios were developed to be used as assessment probes to simulate preparing an individual who relies on AAC for a medical appointment/stay. Since it was not possible to observe the preservice students actually preparing an individual who relied on AAC for communication with a healthcare provider, the study utilized case scenarios as proxy measures to evaluate the preservice students' implementation of the PACT strategy. Case scenarios were used to allow the future educators to demonstrate their knowledge gained during the training. There is a rich history of using case examples to enhance training and evaluate competencies in medicine, health-related professions, and education (Kunselman & Johnson, 2004; Bowe, Voss & Aretz, 2009, Sandstrom, 2006). Case examples are particularly helpful in assessing how students apply new knowledge in practice (Ulanoff, Fingon, & Beltran, 2009).

All three scenarios used in the assessment probes were fictitious but based on the lived experiences from individuals with complex communication needs. The cases were focused on individuals across the lifespan (one child, one teenager, and one adult), with different disabilities (e.g. developmental disability such as autism, acquired disability such as traumatic brain injury). The case scenarios presented to the students for the assessment probes were similar in age range and disability to those presented in the training, but contrasted in the setting of the healthcare event (e.g. physical therapy appointment, optometry appointment, hospital discharge meeting) in order to determine generalization of skills. Each of the case scenarios followed the three-part format: (1) introduction and background (e.g. the individual's name, age, diagnosis, likes/dislikes), (2) communication skills and supports (e.g. the receptive language skills of the individual, and the augmentative and alternative communication supports they have) and (3) the medical situation/appointment. Each student in each of the two groups responded to one of the case scenarios at each of the three time points: Time 1, Time 2, and Time 3. The case scenarios were counterbalanced across the students across the three assessment time points.

The three case scenarios used in the assessment probes were reviewed by experts to ensure their validity. Specifically, the case scenario based on the hospitalized adolescent with a wired jaw was reviewed by a practicing speech-language pathologist in a hospital setting. The case based on the child with autism was reviewed by a doctoral student and certified speechlanguage pathologist with experience in AAC and autism. The case based on an adult with cerebral palsy was evaluated by an individual with cerebral palsy who uses AAC.

Procedures

As noted earlier, each of the preservice students was randomly assigned to one of the two groups at the start of the study. All of the preservice students in both groups completed one of the three case scenarios as an assessment probe at Time 1 to determine baseline performance (pretest). As noted earlier, the case scenarios were counterbalanced across time points to control for any confounds related to the case scenarios. After the students completed the first assessment probe (Time 1), those students in Group 1 completed the online training; the students in Group 2 did not complete the training at this time. All of the students in both groups then completed an assessment probe at Time 2: for Group 1, this probe served as a posttest measure after the training; for Group 2, this probe served as a second pretest probe. After the probe was completed at Time 2, the students in Group 2 completed the online training. Then all students completed a third assessment probe: for Group 1, this probe served as a measure of skill maintenance; for Group 2, it served as a posttest measure after training.

The students accessed the assessment probes via Canvas, an online learning management system that the class was conducted through. Students had a series of one-week periods in which they needed to complete the training, and/or a probe. As activities were due, they would appear on the student's assignment list with details and deadlines for completion. The feedback the same for all students during the training. Students did not received feedback on the assessment probes but were given completion points.

Assessment probes using case scenarios

As noted earlier, case scenarios were used as a proxy measure to assess the students' acquisition and use of the PACT strategy. The preservice educators participated in three different case scenarios, one at each time point. All of the students' responses to the case scenarios were gathered through Instructure Canvas and completed at each time point (e.g., Time 1, Time 2 and Time 3). At each time point, the participants were given the same instructions: "What action steps could (*name of individual who relies on AAC*) take to ensure a positive communication outcome? In order to receive full points on this assignment, your answer must contain a minimum of 70 words. Your response can be in point form (you do not need to write complete sentences, but you can if you choose). We estimate it will take approximately 10 minutes of time for you to read the case, consider your response, and then write your text."

Measures

Data Collection

Responses for each of the participants in each group for each time (Time 1, Time 2, and Time 3) were downloaded from Instructure Canvas upon completion, labeled with a numeric code and uploaded to a secure digital-storage system.

PACT Scoring Rubric

A coding scheme was developed to evaluate the students' case responses. Each written response was reviewed and then coded according to the presence or absence of the nine targeted substeps or actions rather than line by line coding. The coding rubric was created based on the PACT strategy presented by Burns, Baylor and Yorkston (2016) and the salient elements identified in the online training developed in this study (see the 9 sub-steps summarized in Table 2). Each of the nine action steps were include in the rubric for the study, as well as examples of each action step (e.g., P3: Prepare to meet new communication partners, Example: prepare

introduction statement). The participant could receive a maximum of one-point for each sub-step identified in their written response (totaling a maximum score of 9). In order to receive a point, the participant could either include the name of the action step or an example of the action step for the scenario. A coding manual was developed that included each action step title (e.g., Prepare patient questions), allowable examples of the action step (e.g., send questions prior to visit) and any exclusionary criteria (e.g., no mention of AAC elsewhere in the response) (see Appendix B).

Inter-and intra-rater reliability

The coder was an undergraduate student in communication sciences and disorders and was blind to conditions of all of the case scenarios. The coder was trained on the coding scheme with an initial set of five cases to score given the rubric. The coder was instructed to read the entire written response for each case scenario and then evaluate the response for the presence or absence of each of the nine target action sub-steps. The coder was given access to the secure online folder which contained the blinded probe responses in a random order. Inter-rater reliability was performed by an undergraduate research assistant for 25 (13%) of the 186 case scenario responses, which were randomly selected from each group and time point. The rubrics from each coder were compared for each of the randomly selected written responses. Agreement was calculated by comparing the coder's rating for each of the nine-target action sub-steps, for a total score out of 9. Results indicated 89.4% interrater agreement.

Data analysis

Data were summarized for each group of participants at each of the three time points and analysis was completed in order to answer the following research question: What is the impact of an online training on preservice educators' use of the PACT strategy to improve communication outcomes between individuals with complex communication needs and medical professionals? To determine the effects of the online training, an independent t-test was used to compare gain scores from Time 1 to Time 2 for the experimental group which had completed the training during this time period and the control group which had not completed the training. It was hypothesized that the experimental group would show greater gains in the use of the PACT strategy than the control group since the experimental group had completed the training and the control group had not.

A paired samples t-test was also used to compare gain scores for the control group (Group 2) from Time 1 to Time 2 to gain scores from Time 2 to Time 3. It was hypothesized that the gains from Time 2 to Time 3 (after completion of the training) would be greater than those from Time 1 to Time 2 (when the training had not yet been completed).

Data were also analyzed for the experimental group (Group 1) to determine if the students maintained their use of the PACT strategy after they had completed the training. In order to answer this question, the students' scores at Time 2 were compared to those at Time 3. Data analyses were also conducted to determine the size of the effect if a treatment effect was seen. Specifically, Cohen's d tests were run with both of the t-tests to determine the size of the treatment effect.

Post hoc analyses were conducted in order to determine the use and relative ease of learning each of the sub-steps in the PACT strategy. Specifically, the percentage of preservice students who implemented each of the steps at each of the time points was calculated separately for each group.

Social Validity

Prior to the first assessment probe (Time 1) and following the last assessment probe (Time 3), all of the participants in both groups were asked to respond to a set of five statements to assess their perceptions of the value of the content of the online training:

- All individuals should have the communication supports they need to communicate with their healthcare provider
- 2. Learning how AAC can be of benefit during patient-provider interaction is important for me in my future work as a professional
- Given my expected career role (e.g., teacher, SLP), I currently have the appropriate knowledge and skills to EFFECTIVELY support patient-provider communication for individuals with complex communication needs.
- 4. Given my expected career role (e.g., teacher, SLP), I currently have the appropriate knowledge and skills to EFFICIENTLY support patient-provider communication for individuals with complex communication needs.
- Given my expected career role (e.g., teacher, SLP), I am CONFIDENT in my current ability to support effective communication outcomes for persons with complex communication needs during interactions with healthcare professionals.

Participants were given the statement and responded on a five-point Likert-type rating scale ranging from strongly agree to strongly disagree. These statements targeted the perceived

usefulness and importance of the skills targeted, and the participants' perceived effectiveness, efficiency and confidence in supporting patient-provider communication for individuals with complex communication needs.

Feedback on Training

Following the training, students completed the five social validity questions described above as well as seven questions/statements to assess the quality, efficiency and perceived effectiveness of training materials. Participants answered the following questions or responded to the statements on a five-point Likert rating scale (e.g., strongly disagree, disagree, no opinion, agree, strongly agree):

- 1. Please describe the impact of this module on your knowledge of supporting patientprovider communication for persons with complex communication needs.
- Learning how AAC can be of benefit during patient-provider interaction is important for me in my future work as a professional.
- 3. Would you recommend this module to another person who wants to participate in an online learning module on this topic?
- 4. The methods used to teach this online lesson were effective for me.
- 5. When I begin my expected career (e.g., teacher, SLP), I would like the opportunity to learn more about supporting communication for people with complex communication needs.

Participants responded to the following open-ended questions:

1. What recommendation do you have for improving this module?

2. What classes, if any, have you ever taken that provided information on augmentative and alternative communication (AAC) besides this one?

Students were also asked if they used the guided notes and if "yes", did they find them useful and have any suggestions for improvement. The students' responses to the Likert type ratings were summarized separately from pre-training to post-training.

Chapter 3

Results

The aim of the study was to evaluate the effect of an online training to teach preservice education professionals how to support positive outcomes in patient-provider communication for individuals who relied on AAC. The dependent variable was the score determined by the presence or absence of each action sub-step from the PACT strategy in the preservice students' written responses to the case scenarios.

Use of the PACT Strategy

The PACT scoring data measuring the students' use of the PACT strategy are presented below in the following order: (1) mean PACT action step scores for Group 1 and Group 2 at each of the three time points; (2) gain scores for Group 1 and Group 2 from Time 1 to Time 2 and from Time 2 to Time 3; and (3) the percentage of participants who used each specific PACT action step for both groups at each time point.

The mean scores for use of the PACT action steps and the standard deviations for Time 1, Time 2, and Time 3 for each group can be found in Table 3. Group 1 averaged 2.1 out of 9 at Time 1 (prior to training), increased to 4.5 at Time 2 (after training), and 3.4 at Time 3 (as a measure of maintenance). Group 2 averaged 1.8 out of 9 at Time 1, stayed consistent at 1.7 at Time 2, and increased to 4.32 at Time 3 (after training). The average number of action steps used by the two groups more than doubled after the preservice students completed the training. Appendix C lists the individual PACT scores for each participant at Time 1, Time 2, and Time 3.

	Time 1		Time 2		Time 2		Time 3	
Group	М	(SD)	М	(SD)	М	(SD)		
Group 1	2.1	(1.03)	4.5	(1.93)	3.4	(2.03)		
(n=31)								
Group 2	1.8	(1.02)	1.7	(0.91)	4.32	(2.27)		
(n=31)								

Table 3: Mean PACT Scores out of 9 for Group 1 and Group 2 at Each Time Point

To calculate the effectiveness of the training, difference scores were calculated for each of the groups from Time 1 to Time 2 and from Time 2 to Time 3 (see Table 4). For Group 1, training occurred between Time 1 to Time 2 and for Group 2 training occurred between Time 2 to Time 3. The average gain score from Time 1 to Time 2 was significantly greater for Group 1 (who had completed the training) than the average gain score for Group 2 (who had not yet completed the training). Group 1 showed a mean gain score of +2.39, while Group 2 actually showed a slight loss of -0.10. Results of the independent t-test were statistically significant, t(60)=5.74, p<0.001); Cohen's d showed a large effect size for the training (d=1.458).

A paired samples t-test was also run on the Group 2 data to compare the students' gain scores from Time 1 to Time 2 (before they completed the training) to their gain scores from Time 2 to Time 3 (after they completed the training). The average gain score for Time 2 to Time 3 was significantly greater than the average gain score from Time 1 to Time 2, which is as hypothesized since the training was completed between Time 2 and Time 3 for Group 2. The mean gain score from Time 1 to Time 2 was -0.10 while the mean gain score from Time 2 to Time 3 was +2.65. The paired samples t-test was statistically significant, t(30)=5.016, p<0.001, with a large effect size for the training (Cohen's d = 0.901).

Table 4: Difference in PACT scores for (Group 1 and Group	2 between Tim	e 1 and 7	Гime 2
and Time 2 and Time 3				

Group	Time 1 to Time 2	Time 2 to Time 3
Group 1	+2.39	-1.10
(n=31)		
Group 2	-0.10	+2.65
(n=31)		

A separate paired samples t-test was run to compare the scores for Group 1 at Time 2 (immediately after the training) to their scores at Time 3 (some time after the training was completed) to look at maintenance effect. The average score at Time 3 decreased by 1.10 from Time 2; results of the paired sample t-test were statistically significant, t(30)=3.427, p=0.002. However, it is important to note that the average score for the students in Group 1 at Time 3 (i.e., 3.4) remained higher than their average baseline (pretest) score at Time 1 (i.e., 2.1).

Table 5: Main	tenance Trai	ning Scores
---------------	--------------	-------------

	Time 2			Time 3
	М	M (SD)		(SD)
Group 1	4.5	(1.93)	3.4	(2.03)

The percentages of preservice students who implemented each of the action steps in PACT strategy in each of the groups at each of the time points are presented in Table 6. There was variation in the implementation of the PACT strategy steps at each assessment point for each group. Only one of the nine action steps was implemented by a majority of the participants at the pretest; 65% and 68% of students in Group 1 and Group 2, respectively, referenced preparing communication supports in their initial pretest response prior to training; the fact that only one of the nine steps was implemented underscores the need for training to improve patient-provider communication for individuals with complex communication needs. After training (that is, at Time 2 or Time 3 for Group 1 and at Time 3 for Group 2), the majority of the students implemented 4-5 of the sub-steps in the PACT strategy, including: prepare communication supports, prepare to meet new communication partners, prepare to share important information, prepare patient questions, and review the structure of the appointment. Some strategies were used less frequently by the students after the training. Less than half of the students used the following action steps after the training: discuss the purpose of the medical appointment, anticipate provider questions, identify communication and decision-making roles, and document key information. The breakdown of participants who used each strategy sub-step at each time point are listed below.

	Group 1				ıp 2	
PACT Action Step	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Discuss the purpose for the medical appointment with the provider	10%	23%	23%	0%	0%	19%
Prepare communication supports	65%	81%	61%	68%	58%	61%

 Table 6: Percentage of Participants who Completed Each PACT Action Step at Each Time

 Point

Prepare to meet new communication partners	48%	71%	48%	39%	45%	65%
Prepare to share important information	3%	65%	48%	0%	0%	71%
Prepare patient questions	16%	58%	39%	6%	3%	58%
Anticipate provider questions	0%	45%	29%	10%	6%	35%
Review the structure of the appointment	35%	42%	58%	29%	19%	52%
Identify communication and decision-making roles	26%	39%	16%	26%	32%	42%
Document key information	0%	23%	13%	0%	0%	29%

Participants responses to the social validity questions were gathered pre-training and post

training. The responses from pre-training and post-training are summarized in Table 7:

1: All individuals should have the COMMUNICATION SUPPORTS they need to communicate with					
their healthcare provider.					
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Pre-training	0%	0%	0%	3%	97%
Post-training	0%	0%	0%	10%	90%
2: Learning how AAC can be of benefit during patient-provider interaction is important for me in my					
future work as a professional.					
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Pre-training	0%	1%	5%	26%	68%
Post-training	0%	0%	0%	16%	84%

3: Given my expected career role (e.g., teacher, SLP), I currently have the appropriate knowledge and						
skills to EFFECTIVELY support patient-provider communication for individuals with complex						
		communica	ation needs.		-	
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	
Pre-training	2%	21%	11%	56%	10%	
Post-training	0%	0%	1%	34%	65%	
4: Given my ex	pected career role (e.	g., teacher, SL	LP), I currently hav	ve the appropriat	te knowledge and	
skills to EFI	FICIENTLY support	patient-provid	ler communication	for individuals	with complex	
		communica	ation needs.			
	Strongly Disagree Disagree No Opinion Agree Strongly Agree					
Pre-training	5%	24%	10%	61%	5%	
Post-training	0%	2%	3%	29%	66%	
5: Given my	5: Given my expected career role (e.g., teacher, SLP), I am CONFIDENT in my current ability to					
support effective communication outcomes for persons with complex communication needs during						
interactions with healthcare professionals.						
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	
Pre-training	0%	26%	13%	61%	0%	
Post-training	0%	3%	3%	34%	60%	

Chapter 4

Discussion

The goal of this study was to evaluate the effectiveness of an online training to teach preservice professionals how to support positive patient-provider communication outcomes. The results demonstrated that the training was an effective way to teach the PACT strategy as a way to facilitate patient-provider communication for individuals with complex communication needs to a group of preservice teachers. This section reviews the prior research done in this area, considers the training results, and discusses implications for practice as well as limitations and future directions for research

Prior Research

Ensuring effective patient-provider communication is critical for individuals who rely on augmentative and alternative communication; unfortunately, this has been an area neglected in research. The few studies completed to date have focused on training healthcare providers (e.g., Gormley, 2019); however, individuals who rely on AAC also require preparation to enhance their effectiveness interacting with healthcare providers. Unfortunately, most speech language pathologists, teachers, and related professionals do not work with individuals with complex communication needs to prepare them for interactions with healthcare providers; they are ill equipped to do so. Training is urgently required to prepare preservice professionals to work with individuals who rely on AAC to interact effectively with healthcare providers. The PACT strategy developed by Burns et al. (2016) provides a list of action steps to improve patientprovider communication for individuals who rely on AAC. Until this study, there were not any studies that evaluated the effects of training in the PACT strategy on preservice professionals' acquisition and implementation of these action steps.

Online instruction may be particularly powerful as a media to deliver this training as it provides access to preservice students from across the country, is cost-effective and eliminates threats to internal validity (Geiger et al., 2018; Jung, 2005). This study contributes significantly to the field by developing and evaluating an online training to teach preservice professionals how to support individuals who rely on AAC in interactions with healthcare providers. Overall, the training proved to be effective and relatively efficient. Given the lack of research in this area it is not possible to directly compare the results of this study to prior studies. However, there has been prior research investigating the effectiveness of an online training model to teach preservice professionals in related fields. For example, Mandak, Light, and McNaughton (2020) investigated the effectiveness of an online training to teach preservice speech language pathologists the relational skills to deliver family-centered AAC services and saw positive results post-training. McCoy and McNaughton (2021) completed a similar study that used online instruction to teach preservice teachers to implement the system of least prompts with positive results after training. Both of these studies used a strategy instruction approach to learning, case study examples, and an online instructional environment as used in this study. The current study further extends the range of topics effectively addressed through such online preservice training.

Effects of the Training

Overall, there was a positive increase of scores from pre to post training for both groups (a mean gain score of +2.4 from Time 1 to Time 2 for Group 1 and +2.62 from Time 2 to Time 3 for Group 2), suggesting that the training was effective in increasing the students' use of the action steps in the strategy. The positive gains could be due to a couple of reasons: using a strategy instruction approach, targeting an evidence-based strategy, providing practice applying the strategy with case examples, including input from field professionals and individuals who rely on AAC, and using an online mode of instruction. As described by Clark (2014) and Kent-Walsh and McNaughton (2005), a strategy instruction approach provides multiple opportunities for practice with varied levels of supports. Additionally, the PACT strategy was supported by research (Burns, Baylor & Yorkston, 2016; Balandin and Waller, 2010; Morris, Dudgeon & Yorkston, 2013). Case examples were used throughout the training to demonstrate implementation in practice; use of case studies has been proven effective in training doctors, educators, and other healthcare professionals (Kunselman & Johnson, 2004; Bowe, Voss & Aretz, 2009, Sandstrom, 2006). Prior to launching the training with participants, the material was also reviewed by experts in the field (one occupational therapist, two speech language pathologists) and two individuals who rely on augmentative and alternative communication to ensure its validity. Finally, as noted earlier, online instruction has been found to be an effective mechanism to deliver self-paced instruction (Geiger et al., 2018). It is not possible to tease out which, if any, of these factors positively impacted the effects of the training; future research is required to disentangle the relative effects of these factors.

After the training, the preservice students demonstrated substantial, statistically significant gains, more than doubling (on average) the number of action steps that they

implemented. However, despite these gains, the participants did not demonstrate full mastery of the strategy. Ideally, the students would have implemented 100% (9 of 9) of the strategy substeps after the training, but instead the students in Group 1 implemented a mean of 50% of the action steps and the students in Group 2 implemented a mean of 48% of the steps. This finding could be accounted for by a couple of possibilities. Participants may have needed more time to learn the strategy with more repetition and practice to utilize the strategy. Typically, in a strategy instruction approach, individualized feedback and prompting is provided to learners. However, the training did not provide individualized feedback to learners; rather the training used automated feedback to tell students that their answer was correct or that it was incorrect and to try again. The lack of individualized feedback is a limitation of the online approach. In addition, there is the potential that the training tried to teach too much at one time. The PACT strategy, although four larger steps, had nine action steps for participants to master. Cowan (2001) described 2-4 steps as the "magic" number for short-term memory and concluded that targeting skills beyond that can be overwhelming. Additionally, most of the preservice students were new to this topic. All of the students were education majors. Out of 62 participants, only 29 (46%) students had prior coursework that mentioned augmentative and alternative communication broadly. Their experiences in AAC were more limited entering the training than might be the case for preservice students from other majors such as communication sciences and disorders/ speech language pathology.

In terms of maintenance, scores for the students in Group 1 decreased (from 4.5 to 3.4) from Time 2 (immediately following the training) to Time 3 (later). As with most learning, typically participants do best immediately after training with skills falling off somewhat over time. Some of the preservice students in Group 1 took maintenance tests up to two weeks

following initial training. Given the decrease in the use of the strategy over time after training, ongoing "booster" training sessions after the initial training may be important to ensure maintenance of skills. Potentially, greater use of the guided notes or the checklist could have supported greater maintenance of skills; only 59% of participants in this study reported that they used the guided notes as a learning tool. Despite the decrease in skills over time after training, it is important to note that the students in Group 1 still demonstrated greater use of the strategy at Time 3 than at the pretest (Time 1), suggesting that they retained some learning. Some elements of the training (e.g., strategy instruction, case examples) seemed to support not only initial learning, but also retention.

Implications for Practice

In this study, there were positive changes in the preservice students' use of the PACT strategy which suggest that this type of online training at a preservice level is an effective way to build competencies in preservice professionals, including those in education majors who have limited prior experience or training in augmentative and alternative communication. The results also suggest that the training could be of benefit to practicing professionals in education and communication sciences and disorders as well as preservice students.

The online format of the training may be particularly important for universities who do not currently offer coursework on augmentative and alternative communication at a graduate or undergraduate level. Even those universities with existing coursework could utilize this online training in classes where instructors do not have substantial background in augmentative and alternative communication or the resources available to teach a course in AAC. The online format of the instruction makes the training freely available to stakeholders from varied backgrounds across the country and around the world.

Limitations of the Study

Despite the contributions of this study, there are some limitations that should be noted when considering the results. Overall, the study included a relatively small number of participants (n=62). Ideally, future research would investigate the effects of the training with a larger and more varied group of preservice professionals. The participants in this study all came from one university. Ideally, students would come from a wider range of universities and demographic areas. Additionally, most of the participants were general education majors so this content was outside of their typical course sequence. This training to improve patient-provider communication outcomes, although potentially important to all educational and rehabilitation professionals, may be more applicable to students studying speech-language pathology as they work directly with individuals who rely on AAC to enhance their communication. Future research should evaluate the effects of the training with preservice students from other disciplines, especially speech language pathology. Although this study investigated short term maintenance, the maintenance data were collected approximately two weeks after the training. If the training is to have a positive impact on patient-provider communication, then professionals need to demonstrate long term maintenance and use of the PACT strategy. Therefore a long-term study would be beneficial to see if the skills are still remembered and implemented in two, six, and eight months' time.

Furthermore, the intent of the training was to impact professional competencies during real world educational or rehabilitation practice; unfortunately, there is a limitation as it was not possible to go out and observe the students utilizing the action steps in a real-life situation. Rather proxy measures were used to assess acquisition and use of the action steps – specifically written responses to case study scenarios. These proxy measures assume that what the participants wrote about is what they would actually do in a real-life situation; unfortunately, we cannot be sure without having seen participants interact outside of the online environment. However, this case-based approach to learning has been utilized in a wide range of disciplines as well as with augmentative and alternative communication (e.g., Mandak et al., 2020) and has shown similar results to this study.

Directions for Future Research

There are many directions for future research to improve patient-provider communication for individuals with complex communication needs. Although the training resulted in positive gains in the use of the PACT strategy by the preservice students, they did not master the strategy nor did they maintain their initial levels of skill use long term. There are plans to revise the training to enhance its effectiveness, specifically to integrate feedback from students as well as incorporate further information gained from individuals who use augmentative and alternative communication. Data are being gathered from participants who use augmentative and alternative as most valuable in their interactions with healthcare providers. This information will be used to validate the content in the training. Ideally, we hope to streamline the number of substeps targeted in the training and only include what is necessary for preservice professionals to learn. The PACT action steps are based on evidence-based research (Burns et al., 2016), but require validation from individuals with complex communication needs who have lived experiences interacting with healthcare providers.

Additionally, the efficacy of the revised training should be tested with preservice professionals, but future research should also reach out to practicing professionals to determine the effectiveness of the training with those who are currently providing services to individuals who rely on AAC. This research should investigate use of the PACT strategy in actual practice and should explore whether the strategy is maintained long-term.

Finally, it is important to consider the relative effectiveness of different formats for training in the future. Recently, there has been research completed showing the effectiveness of using brief, "just-in-time" partner training where communication partners are trained on the spot for new strategies and procedures (Gormley, 2019). There is also evidence to support the effectiveness of in-person trainings where feedback can be more personalized. However, it is important to note that 100% of the preservice students reported that the online method was effective for them and 98% said they would recommend the training to another person who wants to participate in an online learning module on this topic. Future research is required to compare the effectiveness of different approaches to training to determine which is most effective and which is most acceptable to preservice and inservice professionals.

Conclusion

Effective patient-provider communication is extremely important for individuals who have complex communication needs. In previous research, there has been a lack of attention to patient-provider communication by education and rehabilitation professionals who work with individuals who rely on AAC. There is also a lack of training that effectively prepares individuals who rely on AAC to communicate with healthcare providers. This study developed and evaluated an online training using a strategy instruction and case model approach. The results provide preliminary evidence that preservice professionals can be taught action steps to prepare individuals who rely on AAC to interact successfully with healthcare providers leading to improved healthcare outcomes.

Appendix A

Guided Notes

Patient-Provider Communication Guided Notes

The 5 million Americans with complex communication needs¹ are 3 times more likely to experience preventable adverse medical events2 .



The PACT strategy³ contains 9 action steps to support positive patient-provider communication for persons who would benefit from AAC.

	Action steps	Examples for adolescents and adults	Examples for children and individuals with high cognitive support needs
P	REPARE		
•	Discuss the purpose for the appointment	 Document concerns and history Share info with provider before visit (message from patient) 	 Document concerns and history, special visit needs Share info/meet with provider before visit (message from parent or caregiver)
•	Prepare communication supp	 Review/add vocabulary , key phrases Make referrals to speech-language pathology (SLP), and occupational therapy (OT) if needed 	 Practice use of vocabulary in role plays Prepare to offer choi Make referrals to SLP /OT if needed
•	Prepare to meet n communication partners	Prepare Introduction Statement (describe use of AAC system)	Prepare Introduction Statement (describe use of AAC system)
•	Prepare to share important information	Communication Pass	All About Me! book
AS	SK QUESTIONS	1	
•	Prepare patient questions	 Send questions before appointment to maximize visit time 	Add questions ("What's that?") to promote interaction
•	Anticipate prov questions	Prepare responses to common provider questions	Role-play responses to common provider questions
CI	REATE A PLAN	1	
•	Review structure of the appointment	 Review agenda, identify need for key words and phrases 	 Social stories Visual schedules Role pl
•	Identify communication and decision-making ro	Add information to Introduction Statement or Communication Passport	 Introduction Statement or Communication Passport Provide choices Talking Mats
TA	KE-AWAY INFORMATION		
•	Document key information	Take written notes	Record a video model

Beukelman, D. R., & Light, J. (2020). Augmentative and alternative communication. Baltimore: Paul H. Brookes.
 Hurtig, R. R., Alper, R. M., & Berkowitz, B. (2018). The cost of not addressing the communication barriers faced by hospitalized patients. *Perspectives of the ASHA special interest groups*, 3(12), 99-112.
 Burns, M. I., Baylor, C. R., & Yorkston, K. M. (2016). Words of Preparation for Patients. *The ASHA Leader*, 21(3), 52-56.

Key Resources

· Blackstone, S. W., Beukelman, D. R., & Yorkston, K. M. (2015). Patient-provider communication: Roles for speechlanguage pathologists and other health care professionals. Plural Publishing.

· Patient Provider Communication Website: https://www.patientprovidercommunication.org/

Appendix B PACT Scoring Rubric

P1: Discuss purpose for the appointment with the provider
• document <i>MEDICAL</i> concerns and history (must be discussed or shared prior to visit)
• exclusion: not intro of AAC only, generic "prepare"
P2: Prepare communication supports
• add vocabulary and key phrases
practice use of vocabulary
 discuss importance of or make referral to SLP/OT
 identify possible AAC options
• use of AAC at visit
exclusion: no mention of AAC elsewhere in response
P3: Prepare to meet new communication partners
• prepare (or use) introduction statement
• describe use of AAC system or other key communication issues (includes receptive
language)
• <i>exclusion: patient introduces self without mention of AAC</i>
elsewhere in answer
P4: Prepare to share important information
• prepare (or use) communication passport or all about me book (information above
and beyond how someone communicates)
• note: if introduction statement or AAC overview is included
in communication passport, score as P3 as well
A1: Prepare patient questions
• send questions prior to visit
• add questions to promote interaction at visit
• ask questions
exclusion: no mention of AAC elsewhere in response
A2: Anticipate provider questions
• prepare responses to common provider questions
 role play responses to common questions
• answer questions
• exclusion: no mention of AAC elsewhere in response
C1: Review structure of the appointment
• review agenda with patient (may include prior visit by patient to office)
 create a plan for visit related to communication
• identify need for key phrases
• social stories, visual schedules or role plays

	C2: Identify communication and decision-making roles
	 discuss (beforehand) or describe to provider communication preferences as it relates to who should be spoken to (can be by patient or PCA) add information to communication passport and providing choices Advocate for self
	• <i>Exclusion: No mention of AAC elsewhere in response</i>
,	T1: Document key information
	 Taking written notes Asking for information to be sent electronically, sending questions afterward Recording a video model

Appendix C Table of Individual PACT Scores out of 9 for Group 1 and Group 2 at Each Time Point

	PACT Score			
Participant	Time 1	Time 2	Time 3	
1	3	5	3	
2	1	5	4	
3	3	5	4	
4	3	3	3	
5	2	3	1	
6	3	5	7	
7	3	4	2	
8	4	7	6	
9	1	2	2	
10	2	3	2	
11	2	3	1	
12	2	6	6	
13	2	6	5	
14	2	1	1	
15	3	6	3	
16	1	8	8	
17	2	2	3	
18	0	4	6	
19	4	4	3	

Group 1

20	0	4	1
21	2	3	3
22	2	8	6
23	2	3	2
24	2	4	1
25	3	4	5
26	2	3	2
27	2	9	2
28	3	5	1
29	2	3	3
30	1	7	6
31	0	3	2

Group 2

	PACT Score		
Participant	Time 1	Time 2	Time 3
1	1	2	4
2	1	0	5
3	0	2	4
4	2	4	2
5	3	2	5
6	2	0	6
7	1	1	5
8	3	2	9

9	3	2	2
10	0	2	1
11	2	2	3
12	3	2	6
13	3	2	4
14	3	2	6
15	1	2	5
16	1	2	8
17	3	2	7
18	1	2	2
19	1	0	1
20	2	0	1
21	2	2	5
22	2	1	9
23	3	1	3
24	1	2	3
25	2	2	5
26	1	2	4
27	1	2	8
28	3	2	3
29	1	2	3
30	0	0	2
31	3	3	3

REFERENCES

About Moodle. MoodleDocs. (2020). https://docs.moodle.org/311/en/About Moodle.

- Balandin, S., Waller, A. (2010). Medical and health transitions for young adults who use AAC.
 In: McNaughton, D. B., Beukelman D. R., editors. *Transition strategies for adolescents and young adults who use AAC*. Baltimore: Paul H. Brookes, 181-198.
- Bartlett, G., Blais, R., Tamblyn, R., Clermont, R. J., & MacGibbon, B. (2008). Impact of patient communication problems on the risk of preventable adverse events in acute care settings. *CMAJ*: Canadian Medical Association Journal = Journal de l'Association Medicale Canadienne, 178(12), 1555–1562. <u>https://doi.org/10.1503/cmaj.070690</u>
- Bohay, M., Blakely, D.P., Tamplin, A. K., Radvansky, G.A. (2011). Note taking, review, memory and comprehension. *American Journal of Psychology*, 124, 63-73. <u>https://doi:10.5406/amerjpsyc.124.1.0063.</u>
- Bowe, C. M., Voss, J., & Aretz, H. (2009). Case method teaching: an effective approach to integrate the basic and clinical sciences in the preclinical medical curriculum. *Medical teacher*, 31(9), 834–841. https://doi.org/10.1080/01421590902922904
- Boyle, J. R., Rivera, T. Z. (2012) Note-taking techniques for students with disabilities: A systematic review of the research. *Learning Disability Quarterly*, 35, 131-143. <u>https://doi.org/10.1177/0731948711435794</u>
- Burns, M. I., Baylor, C. R., & Yorkston, K. M. (2016). Words of preparation for patients. *The ASHA Leader*, 21(3), 52-56. <u>https://doi.org/10.1044/leader.FTR3.21032016.52</u>
- Clark, R. C. (2014). *Evidence-based training methods: A guide for training professionals*. American Society for Training and Development.

Cowan, N. (2001). The magical number 4 in short-term memory: A reconsideration of mental storage capacity. *Behavorial and Brain Sciences*, 24, 87-114. https://doi:10.1017/s0140525x01003922

- Downey, D., Zubow, L., Hurtig, R., (2012). *AAC in acute care it works!* Presentation at the International Society for Augmentative and Alternative Communication Conference. Pittsburgh, PA.
- Downey, D. (2014). The effectiveness of AAC training protocols for acute care Nurses: a randomized controlled trial of an instructional online medium for clinical skills teaching [University of Iowa]. <u>https://doi.org/10.17077/etd.r9isv1i3</u>
- Downey, D., Happ, M., (2013). The need for nurse training to promote improved patientprovider communication for patients with complex communication needs. *Perspectives on Augmentative and Alternative Communication*, 22 (2), 112. https://doi.org/10.1044/aac22.2.112
- Edmonds, W. A., & Kennedy, T. D. (2016). *An applied guide to research designs: Quantitative, qualitative, and mixed methods*. Sage Publications. https://dx.doi.org/10.4135/9781071802779
- Geiger, K. B., LeBlanc, L. A., Hubik, K., Jenkins, S. R., & Carr, J. E. (2018). Live training versus e-learning to teach implementation of listener response programs. *Journal of Applied Behavior Analysis*, 51(2), 220–235. <u>https://doi.org/10.1002/jaba.444</u>
- Glass, L., Clause, C., Kreiner, D (2007). Effect of test-expectancy and word bank availability on test performance. *College Student Journal*, *41* (2), 342-351.

- Gorman, E.F., & Staley, C. (2018). Mortal or Moodle? A comparison of in-person vs. online information literacy instruction. *Journal of Library & Information Services in Distance Learning*, 12, 219-236. <u>https://doi.org/10.1080/1533290X.2018.1498635</u>
- Gormley, J. (2019). Supporting children with complex communication needs to communicate choices during an inpatient stay: Effect of a partner training on healthcare professionals.
 (Doctoral dissertation). The Pennsylvania State University, University Park, PA.
- Heward, W. L. (1994). Three "low-tech" strategies for increasing the frequency of active student response during group instruction. In R. Gardner III, D. M. Sainato, J. O. Cooper, T. E. Heron, W. L. Heward, J. W. Eshleman, & T. A. Grossi (Eds.), *Behavior analysis in education: Focus on measurably superior instruction* (pp. 283–320). Thomson Brooks/Cole Publishing Co.
- Hurtig, R. R., Alper, R. M., & Berkowitz, B. (2018). The cost of not addressing the communication barriers faced by hospitalized patients. *Perspectives of the ASHA Special Interest Groups*, 3(12), 99-112. doi:10.1044/persp3.sig12.99
- Jitendra, A.K., Hoppes, M.K., Xin, Y.P. (2000). Enhancing main idea comprehension for students with learning problems: The role of a summarization strategy and selfmonitoring instruction. *The Journal of Special Education*, 34(3), 127-139. https://doi.org/10.1177/002246690003400302

Jung, I. (2005). Cost-effectiveness of online teacher training. Open Learning: The Journal of Open, Distance and e-Learning, 20(2), 131-146. https://doi.org/10.1080/02680510500094140

- Jung, I., & Rha, I. (2000). Effectiveness and Cost-Effectiveness of Online Education: A Review of the Literature. *Educational Technology*, 40(4), 57-60. Retrieved January 12, 2021, from <u>http://www.jstor.org/stable/44428629</u>
- Kent-Walsh, J. & McNaughton, D., (2005). Communication partner instruction in AAC: Present practices and future directions. *Augmentative and Alternative Communication*, 21(3), 195-204, DOI: 10.1080/07434610400006646
- Kunselman, J., Johnson, A. (2004). Using the case method to facilitate learning. *College Teaching*, *52*, 87-97, https://doi.org/<u>10.3200/CTCH.52.3.87-92</u>
- Landrigan, C.P., Parry, G, Bones, C., Hackbarth, A., Phil, M., Goldmann, D., Sharek, P. (2010).
 Temporal trends in rates of patient harm resulting from medical care. *The New England Journal of Medicine*, *363*, 2124-34. https://doi:10.1056/NEJMsa1004404
- Maccini, P., & Hughes, C.A. (2000). Effects of a Problem-Solving Strategy on the Introductory Algebra Performance of Secondary. *Learning Disabilities Research & Practice*, 15(1), 10. https://doi-org.ezaccess.libraries.psu.edu/10.1207/sldrp1501_2
- Mandak, K., Light, J., & McNaughton, D. (2020). The effects of an online training on preservice speech-language pathologists' use of family-centered skills. *American Journal of Speechlanguage Pathology*, 29(3), 1489–1504. <u>https://doi.org/10.1044/2020_AJSLP-19-00057</u>
- McColl M. A. (2005). Disability studies at the population level: issues of health service utilization. *The American Journal of Occupational Therapy*, 59(5), 516–526. <u>https://doi.org/10.5014/ajot.59.5.516</u>
- McCoy, A., & McNaughton, D. (2021). Effects of online training on educators' knowledge and use of system of least prompts to support augmentative and alternative

online) https://doi.org/10.1007/s10864-020-09374-6

- Morris, M., Dudgeon, B., & Yorkston, K., (2013). A qualitative study of adult AAC users' experiences communicating with medical providers, *Disability and Rehabilitation: Assistive Technology*, 8:6, 472-481, DOI: <u>10.3109/17483107.2012.746398</u>
- Sandstrom S. (2006). Use of case studies to teach diabetes and other chronic illnesses to nursing students. *The Journal of nursing education*, *45*(6), 229–232.

https://doi.org/10.3928/01484834-20060601-07

The Joint Commission. (2010). Advancing effective communication, cultural competence, and patient and family-centered care: A roadmap for hospitals. Retrieved from https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/health-equity/aroadmapforhospitalsfinalversion727pdf.pdf?db=web&hash=AC3AC4BED1D973713C2CA6B2E5ACD01B&hash=AC3AC4BED1D973713C2CA6B2E5ACD01B

- Trochim, W., Donnelly, J. P., & Arora, K. (2015). *Research methods: The essential knowledge base*. Nelson Education.
- Ulanoff, S.H., Fingon, J.C., Beltran, D. (2009). Using case studies to assess candidates' knowledge and skills in a graduate reading program. *Teaching Education Quarterly*, 36, 125-142.

ACADEMIC VITA

Academic Vita of Rebecca Stroschein

EDUCATION

The Pennsylvania State University Schreyer Honors College College of Health and Human Development Bachelor of Science in Communication Sciences and Disorders

RELEVANT EXPERIENCE

The Acres Project

Program Director, Curriculum Writer and Instructor

- Develop and lead curriculum for adults with autism based on independent living and vocational skills
- Oversee and lead instruction of self-advocacy, job readiness and independent living skills for 80+ high school students
- Coordinate job placements for clients and create new connections with businesses for placements
- Lead initiative for distributing 20+ sensory bags to local businesses to promote inclusion across Centre County

National Student Speech Language Hearing Association

President

- Led efforts to increase membership of student organization by 56%
- Conduct meetings of 120+ students five times over the course of the semester
- Assisted in the creation of a new leadership position on the executive board to promote diversity equity and inclusion within the club
- Arrange guest speakers, professional development workshops, and design activities for club

meetings

- Chapter earned *Gold Chapter Honors* from National NSSLHA in Spring 2021 in recognition of a high level of participation in legislative advocacy, community outreach and fundraising for the American Speech-Language Hearing Foundation's NSSLHA Scholarship
- Chapter received the *Diversity and Inclusion Enhancement Award* from PSU Student Affairs in Spring 2021

University Park, PA

Inducted in July 2020 Anticipated Class of 2022

State College, PA

September 2018 – Present

University Park, PA

May 2020 – Present

• Chapter received the *Outstanding Student Organization Award* from PSU Student Affairs in Spring 2021

Speech, Language and Hearing Clinic at Pennsylvania State University

Undergraduate Assistant for Early Language Therapy Group

- Assist graduate clinicians in data collection of spontaneous and prompted speech production
- Write weekly newsletters for client's parents
- Aid in executing lessons and encourage client interactions
- Facilitate communication between peers using different communication modalities such as American Sign Language and augmentative and alternative communication

Rehabilitation Engineering Research Center on Augmentative and Alternative Communication (AAC)

University Park, PA

Student Researcher	September 2019 – Present
• Co-developed online training module available to 35 colleges and universities	
across the country	
• Evaluated efficacy of the online training with 62 students in a switching-	
replications design as part of honors thesis project	
• Assist on video visual scene display project, identifying participants, designing	
meaningful research activities and serve as liaison between The Acres Project and	
Penn State	
Cognition and Language Learning Lab at Pennsylvania State University	University Park, PA
Undergraduate Research Assistant	January 2019 — Present

- Attended weekly meetings throughout semester discussing ongoing projects, research and information about autism
- Trained for administering CELF-5, EOWPT-4, PPVT-4, TONI-4, SRS-2 and SAMMI tests
- Collaborated on the design of and responsible for maintenance of lab website

University Park, PA

August 2019-March 2020, January 2022-Present

PRESENTATIONS

- Stroschein R., Chapple, D. & McNaughton, D., (2021, December) Supporting patient provider communication for persons who rely on AAC: What is the role of education and communication professionals? Presentation at ECHO Augmentative and Alternative Communication Waisman Center, University of Wisconsin, Online.
- Stroschein, R., Chapple, D., & McNaughton, D., (2021, November) Building capacity: Sharing the knowledge of people with complex communication needs. Poster presentation at the Student Engagement Network Exposition, Penn State University, University Park, PA.
- Stroschein, R., Chapple, D., & McNaughton, D., (2021, November) Supporting patient-provider communication for persons with complex communication needs: Development, evaluation, and dissemination of an online training module. Presentation at Augmentative and Alternative Communication Colloquium at Pennsylvania State University, Online.
- McNaughton, D., Chapple, D., Stroschein, R., (2021, October). The AAC learning center: Sharing knowledge, building capacity, assessing impact. Presentation at the College of Education Research Conference, Penn State University, University Park, PA
- Stroschein, R., Chapple, D., & McNaughton, D. (2021, September). Supporting patient-provider communication: The training and research activities of the RERC on AAC. Presentation at the Patient Provider Communication Network Forum, Online.
- McNaughton, D., Ousley, C., Baker, K., Bhana, N., Cherry, M., & Stroschein, B. (2021, July 7-9). A scoping review of video modeling interventions to support community participation for autistic adolescents and adults [Paper presentation]. Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) National Conference.
- Chapple, D., McNaughton, D., & Stroschein, R. (2021, April). Supporting communication with healthcare professionals for people with complex communication needs. Presentation at Augmentative and Alternative Communication Colloquium at Pennsylvania State University, Online.
- Chapple, D., McNaughton, D., & Stroschein, R. (2021, January). *Interactions with healthcare professionals: The experiences of people who use AAC*. Presentation at the Annual Conference of the Assistive Technology Industry Association (ATIA), Online.
- Stroschein, R., Chapple, D., Maturano, M., & McNaughton, D. (2020, October). Development and evaluation of an online training model to support interaction between individuals using augmentative and alternative communication (AAC) and medical professionals. Online poster presentation at the Communication Sciences and Disorders Undergraduate Virtual Research Event, Penn State University, University Park, PA.

AWARDS AND ACHIEVEMENTS

Awards: Erickson Discovery Grant Recipient (Summer 2021), Rose Cologne "Volunteer Of The Year" (April 2021) Achievements: Deans List (Fall 2018, Spring 2019, Fall 2019, Spring 2020, Fall 2020, Spring 2021), Schreyer Honors Scholar