Assistive Technology: Conducting Closed-Captioning Research

Honors Program

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Statement of the Problem

Research on the impact of CC has been limited largely to individuals with learning disabilities (Kirkland, Byrom, MacDougall, & Corcoran, 1995), hearing impairments (Yoon & Choi, 2010), individuals learning English as a second language (Garza, 1991; Taylor, 2005; Winke, Gass & Sydorenko, 2010), and children learning to read (Linebarger, 2001). Across all these studies, the use of captioned video resulted in increased comprehension and/or faster learning compared to students who did not see captioning. We found only one previous captioning study that utilized a sample of individuals from a general population. Ruggiero (1986) randomly divided 80 undergraduate students into two groups, who were then showed the same 30-minute video. One group viewed the video with captions, and the other without. A subsequent 35-item assessment showed not statistically difference in test scores of the two groups. We were able to locate only an abstract description of the Ruggiero study that was presented at a conference in the late in the late 1980s. Therefore, more detailed information about how the study was conducted was not readily available.

Further, not much experimental research has been done on the impact of captioning among non-disabled students in postsecondary settings. It is apparent that video-based information is frequently used, yet it is unknown whether closed-captioning technology is educationally beneficial for students without disabilities. This study will examine these areas concerned with the goal of learning more about the use of closed-captioning in postsecondary settings as well as the potential benefits for a broad population of students.

Purpose of Closed-Captioning Research:

The purpose of the research project is to learn more about the effects of closed-captioning (CC) to see if it helps undergraduate students without disabilities learn material in the classroom. Some students will see the video with CC, others without. A subsequent assessment will help determine if CC helps, hinders or has no effect on learning.

Accessible Population and Method Sampling:

The target population for this study is students without disabilities 18-22 years of age who do not have a disability and attend Northern Illinois University. The method of sampling for this study will be stratified random sampling. This method will allow the exact representatives of the study to be known. Specifically, gender, age, and whether they have a disability will be known. To clarify, not having a disability means the individuals cannot have a condition that restricts a person's mental, sensory, or mobility functions to undertake or perform a task in the same way a person who does not have a disability would.

Inclusion and Exclusion Criteria:

To begin, in regarding inclusion criteria participants must be individuals who are 18-22 years old, students who attend Northern Illinois University, and individuals who do not have a disability. However, for the exclusion criteria participants cannot be individuals who are under the age of 18 or over the age of 25, individuals who do not attend Northern Illinois University, and individuals who have any type/form of disability.

Research Design:

To begin, students without disabilities aged 18-22 years old will be selected to complete an assessment after watching an educational based-video. Not to mention, the possible control group for the study would be individuals who are not receiving closed-caption instruction.

Therefore, the type of research design for the study would be experimental. The method of sampling for this prospective descriptive research study will be stratified random sampling. The participants must attend Northern Illinois University. Therefore, the sample size will include 30 undergraduate students in Dr. Bryan Dallas's class. For individuals to participate in the study they must meet all the following requirements: individuals who are age 18-22 years of age, students who are enrolled in Dr. Dallas's class, and students who do not have a disability.

However, the participants cannot be individuals under the age of 18 or over the age of 22, individuals who are not enrolled in the class, and individuals who have a disability. The questionnaire will be done at Northern Illinois University at Wirtz Hall. Participants should be at the designated classroom on time. If participants arrive late, they cannot partake in the assessment. Further, the assessment will consist of 20-30 multiple choice questions based on the videos they watched with closed-captioning instruction. Many questions on the assessment are meant for them to remember key points and topics that were mentioned in the videos. However, there will be some closed-ended questions as well. Also, at the end of the assessment there will be a question asking the participants to share their thoughts about watching a closed-caption video. Therefore, the questions are meant to determine the effectiveness of closed-captioning for individuals without disabilities compared to students without disabilities that did not receive closed-captioning instruction.

Lastly, the duration of this study will be for the Fall of 2019 and future semesters to determine if all teachers should show captions when playing videos. However, the anticipated outcomes of this study will correlate with past research and research that is being done to understand if closed-captioning helps undergraduate students in higher education learn better.

Further, this study aims at learning about the student's attitudes toward closed-captioning as well.

Major Findings: Literature Reviews

Closed-Captioning Matters: Examining the Value of Closed-Captioning for All Students and Effects of Captions and Time-Compressed Video on Learner Performance and Satisfaction

There is a difference between closed-captioning and subtitles. I know many people do not know the difference. Subtitles provide a text alternative for the dialogue in video footage while closed-captions also explain other sounds that are important to the story like a phone ringing or engine struggling to start. A study on television accessibility by Ofcom finds that 80% of people who use closed captions are neither deaf nor hard of hearing. And, while the remaining 20% is the most important audience to provide closed captions for, this goes to show how many environments call for closed captions. Therefore, people use closed-captions for many reasons. Some examples might include watching something in a loud environment, when something is in a foreign language, and watching something to not distract others just to name a few.

Further, closed-captions are not just for people with disabilities it is meant for anyone. In society, there is a stigma about having a disability because it makes you weak and less inferior. That is not true, but since people do not understand the different types of disabilities the come up with their own ideas and assumptions. People with disabilities are unique, beautiful and independent just like people without disabilities. As a society, we need to stop judging one another and start accepting people for who they are. Therefore, people should be treated with respect and dignity regardless if they have a disability or not.

Furthermore, the following literature review attempts to demonstrate closed-captioning is for everyone and determine if CC does in fact help people without disabilities perform better on assessments, homework, exam scores and improved memory.

Summary

Online courses are becoming popular among college students for multiple reasons. Online courses can help single parents who are working, it can provide a more comfortable learning environment, it can be more convenient and flexible, and it can allow for better concentration without distractions in a standard classroom. However, one area which is becoming more prevalent in online classes in the use of closed-captioning. The University of South Florida St. Petersburg Distance Learning Accessibility Committee and faculty contributors conducted an initial investigation to determine the benefits of providing captioned media for students with and without disabilities. Further, they conducted a study in which they monitored college students taking two online classes to learn and determine the benefits of closed-captioning among the students and faculty. In addition, this practice brief includes a discussion about how captioned videos employ principles of universal design to make course content accessible to students in online courses. A section of the article addresses the cost of captioning videos as well as alternate transcription options. The article concludes with the results and recommendations for further research.

In addition, the second literature reviewed focuses on how videos are becoming popular in higher education among universities everywhere in which faculty are recording their lectures for students. The study mainly focuses on if the speed of the captioned video determines if students will perform better in class and on assessments. Research was conducted containing of

147 undergraduate students were randomly assigned to one of six video treatments based on speed.

Introduction

Have you wondered why words would pop up on your television when you would watch your favorite show? These words help people who have any form of disability to enjoy their favorite cartoon, video game, movie and even succeed at school. Therefore, these words equal the playing field for people with disabilities and people without disabilities. The words you see are called “Closed Captioning. However, what is closed-captioning? Closed captioning displays the audio into text on the television show, and it mainly helps individuals who are deaf or hard-of-hearing. Furthermore, I will try to give you basic background about this assistive technology. In 1972 the first captioned broadcast was, "The French Chef" a PBS show. The group that was responsible for this accomplishment was the "Caption Center". By 1987, the Caption Center was given a grant for three years in the sum of 1 million dollars so they could close caption all nationally syndicated television programming. (Caption center, www.caption.org). As of July of 1993, all television sets with at least a 13-inch screen had to have a decoder built into them that would allow viewers to display closed captioning. To explain, this was a monumental moment for individuals’ part of the deaf and hard-of-hearing community because it gave them a sense of belonging in society. However, there was another act called the Americans with Disabilities Act which prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public. Therefore, until title four of the ADA it focuses on telecommunications, and it requires closed-captioning on all federally funded public

announcements. With this in mind, closed-captioning has come a long way in providing all kinds of people the opportunity to live indecently but also have the same opportunity.

Further, research on closed-captioning has been going on for many years to determine if it helps, hinder or has no effect on undergraduate students. Previous research shows that closed-captioning can benefit several kinds of learners. Therefore, students with visual impairments, non-native English learners, and students who get distracted easily from loud noises seem to benefit from closed-captioning. In remedial reading classes, closed captioning improved students' vocabulary, reading comprehension, word analysis skills, and motivation to learn (Goldman & Goldman, 1988). Therefore, there are many benefits pertaining to closed-captioning when it comes to undergraduate students' success in their classes. However, the problem the literature focuses on if they need a more proactive approach to accessibility in online courses at the University of South Florida St. Petersburg. Further, the literature has three guiding questions they wanted to determine through their investigation which was: (1) Is there a statistically significant difference in student achievement between the captioned and non-captioned course? (2) Was there a significant change in the academic assessment of the instruction? (3) Lastly, what, if any, were the benefits of closed-captioned media to students? Therefore, these three guiding questions goes hand-to-hand with our own research which focuses on closed-captioning and students without disabilities. In addition, this literature will highlight the effects of closed-captioning for students with and without disabilities at the University of South Florida St. Petersburg.

Secondly, when we hear the word closed captions in higher education, we often think about people with disabilities who specifically who are deaf or hard of hearing. However, what about people without disabilities? Will closed-captioning help them do better recalling

information and performing on assessments? Further, it is evident that closed-captioning helps people with disabilities, but there isn't any information pertaining students without disabilities. Therefore, undergraduate students need to be exposed to closed-captioning and other assistive technology to determine if closed-captioning is effective. This can be done by the multimedia principle. "The multimedia principle suggests that presenting multiple representations, verbal a nonverbal, that explain for one another, is better for learning than one" (Clark & Mayer, 2011). Since, there is evidence a multimedia principle works other research and studies have been done to confirm the results. One of the new principles was the modality principle. "The modality principle, states that audio narration and images is better for learning than text and images" (Sweller, 2005).

Further, this allows students to focus on the words being said and the images presented as well. Furthermore, another different principle presented in the literature was time-compression. Time compression refers to the media that has been increased in speed yet has preserved quality (Orr & Friedman, 1967). This study has been going on for several decades. Current research on multimedia and time-compression has shown that 25 percent learning of high-level material is not significantly different than those going through the multimedia content at a regular pace (Pastore, 2012; Ritzhaupt & Barron, 2008; Ritzhaupt, 2008). This shows there is not a significant difference, but more research is being conducted on this subject.

Literature Review

The investigation proposed by Distance Learning Accessibility Committee at the University of South Florida St. Petersburg is to dive deeper into the concept of closed-captioning

to determine if it helps undergraduate students learn better. To test out their hypothesis they chose two online courses which didn't have closed-captioning and captioned all their videos for the new semester. Therefore, this would allow for comparison of the data between the students who took the two online courses when it wasn't captioned and captioned. Further, the two classes being captioned for this study were Law & Business 1 and Introduction to Psychology. Both classes lasted for sixteen weeks for the semester, but the interesting concept was the weekly video lecture length was different between the two classes. Moreover, for Law and Business One it was ninety-nine minutes and for Introduction to Psychology it was one-hundred and eight minutes. The videos were then transcribed by a third party that were attached to videos in post-production. Finally, the videos would be hosted on a server and links to the videos would be on the course site. Furthermore, towards the end of the semester students were asked to reflect on their experience of having the videos closed captioned. Therefore, the data assessment of 224 students who are taking the captioned classes will be compared to the 334 students who didn't have the captioning for the two classes. The results were divided between several topics which were: student benefit, clarification, comprehension, spelling of keywords, note-taking and cost analysis.

Research done by Morris, Frechette, Dukes, Stowell, Topping and Brodosi (2016) hypothesis centered around if the inclusion of closed-captioning would benefit undergraduate students. Therefore, the results conducted in this study supported their initial hypothesis. The students who had Introduction to Psychology and Law & Business did show closed-captioning improved their performance in the class compared to the students who didn't have the classes captioned. Further, when it came down to see if closed-captioning was beneficial ninety-nine percent said it was helpful. To break it down five percent said it was slightly helpful, ten percent

said moderately, thirty-five percent said very helpful and forty-nine percent said extremely helpful. However, even though they couldn't determine the differences between people with and without disabilities it still shows that closed-captioning does help undergraduate students retain information. However, research done by Lee and Meyer (1994) and Collins (2013) were supported with this study, because they believed closed-captioning may help all students learn video-based information. Therefore, in this study there was a positive correlation between closed-captioning and students' academic performance.

In addition, research done by Dallas, Long and McCarthy (2014) shows that closed-captioning has a positive effect when it pertains to student's attitude and academic performance. Their research suggests participants who were exposed to closed captions performed better on the information recall assessment compared to participants in the no-captioning conditions (Dallas, Long, McCarthy, 2014). Therefore, with this study one can infer being exposed to assistive technology like close captioning can improve academic performance and having minimal exposure to close captioning results in students' attitude and performance not being at a high enough level. Further, research being done at the University of South Florida St. Petersburg shows how their research and other studies being done show a positive correlation between close captioning and students' ability to recall information and success in class.

Further, one area that the study mentioned how if they were in a noisy/loud environment and couldn't hear their instructor through the video it made it difficult for them to understand the material. However, one point the study did point out that several students who had difficulty hearing their instructor was able to understand the material due to the close captioning. Therefore, one student said, "Close caption helped me because I was able to read and process what was being said a little easier." Also, another student said, "The closed caption helped when

viewing [sic] the videos at home, because I have small children and at times, they can be loud. The closed caption allowed me to read when I could not hear what was being said" and "Helped me because it's not my first language. Further, from the statements mentioned-above close captioning helped the two students process and understand the material better. However, if they were in the group that didn't have close caption available one can infer they would probably have a harder time understanding their professor. Therefore, this study is showing students have a higher level of clarification with close captioning compared to without captioning.

In addition, the study mentioned note-taking was a positive for several students when it pertained to close captioning. One student mentioned, "They helped because when I was taking notes, I was able to pause the video and use the captions rather than rewind and repeat the video." Therefore, the statement mentioned by the student is evident by research. Research by Locke (1977); Nye, Crooks, Powley & Tripp (1984) has shown that taking more comprehensive, accurate notes is correlated with better student academic outcomes. Other research by Shrager and Mayer (1989) suggested learners who take notes while watching video-based lectures remember the information better. Furthermore, the help of captions made it better for the students to understand the material and take notes at the same time. Further, the correlation between captioning and note-taking can be related to academic achievement. The study mentioned for the Spring 2013 class of Law & Business 1 with closed-captioning had a slightly higher-grade average than the fall 2012 class without closed-captioning. Therefore, in the Introduction to Psychology the class average for the spring 2013 class (with captions) was 7.18% higher than the summer 2012 class (without closed captioning). Further, the results shown in this study can be seen in research done by Dallas, Long and McCarthy (2014). Their research suggest higher participant GPA's were also associated with higher information recall scores.

Interestingly, in both studies, male participants scored significantly higher compared to female participants. Differences in recall performance among male and female students are something that should be examined further. The average GPA among males and females in both studies was not significantly different (Dallas, Long & McCarthy, 2014). To explain, this suggest that student's grade point average goes hand to hand with closed captioning in determining if it helps students retain the information better.

However, since Dallas, Long & McCarthy (2014) could not find a difference among recall performance among male and female students in their study. Research done by Ritzhaupt (2008) focuses on the idea of time-compression related to closed-captioning. Time-compression was the major theme presented in his literature. Time compression refers to media that has been increased in speed yet has retained quality (Orr & Friedman, 1967). This is interesting because it allows videos to be slowed down to the instructors or students comfort level to ensure they are retaining information. Current time-compression literature indicates that multimedia can be compressed up to 25 percent without sacrificing factual and problem-solving knowledge (Pastore, 2010; Ritzhaupt & Barron, 2008; Ritzhaupt, 2008). Further, studies were done, and it was evident that normal and semi-normal pace students did around the same. However, when it pertained to fifty percent slower students did significantly worse (Pastore, 2012). This research shows compressing doesn't have any effect on student's ability to retain information which is important for instructors to look at if they are thinking about captioning videos. Therefore, if Dallas, Long & McCarthy want to gain a better understanding when it pertains to students recalling information Ritzhaupt would suggest implementing time-compression before playing the video.

Lastly, interestingly enough closed-captioning helped the instructors who were apart of this study. The study mentioned a statement provided by one of the professors at the University of South Florida St. Petersburg. Morris, Frechette, Dukes, Stowell, Topping and Brodosi (2016) found the following:

I was thrilled to be able to offer the on/off captioning option to my students. I really liked that the students could turn off the captioning option if they found it distracting. I have had several students tell me they liked the closed-captioning feature (p. 234).

To explain, this statement shows teachers like having the closed-caption feature for the two online courses. The positive relationship between the professor and the student is improving which shows the benefits of closed-captioning for undergraduate students. However, data was collected to see how much did closed-captioning improve the student's relationship with the faculty. For example, for the Introduction to Psychology class the mean for Respect and Concern for Students was 4.15 (without captions) but for the captions the mean was a 4.49 which is a plus 3.4 difference. This data shows a positive correlation between the students and faculty relationship. However, for the Law and Business 1 class the results were similar as well. When it pertained to availability to assist students in or out of class the mean average without captions was 4.52 and the average with captions was 4.76 so the difference was a plus .24. Therefore, this data shows the relationship between faculty and students is going in a positive correspondence to one another. One can infer closed captioning can improve faculties relationship with their students.

Not to mention, research done by Ritzhaupt (2008) correlated with the results of the research mentioned-above. Students performed better when showed a video with closed-caption

instruction. However, the component of time-compression did not become a factor, but it is actually a good thing. It shows you do not have to make a video faster, normal pace or slower. As long as you have captions, students will perform better which is the ultimate goal at the end of the day.

Conclusion

To conclude, closed-captioning helps people with disabilities immensely by improving independence and having equal opportunities to enjoy the everyday activities like watching television, going to the movies and doing well in school. People with disabilities have come a long way when it pertains to equality, but with the help of the Americans with Disabilities Act of 1990 and many other programs we are seeing a change. Further, research has shown us the benefits of closed-captioning which is better test scores, improvements in academics and positive relationship between faculty and students. Research also indicates students at the undergraduate level needs to be exposed to assistive technology with an emphasis on closed-captioning because students' attitudes will change, and test scores will improve. Even though, the research mentioned- above shows students who had the online class with closed-captioning did better than students without closed captioning for the online classes. This proves our hypothesis that closed-captioning has a positive effect on the way students without disabilities learned the material. In addition, even though it is costly to close caption videos there are alternative ways like Dragon Naturally Speaking, Camtasia and other software programs that can do the same thing with the right amount of effort and training. Closed-captioning improves the lives of millions of people with disabilities and it is evident institutions need to incorporate closed-captioning in their classes. Therefore, more studies need to explore the effects of closed-captioning, but current and past research shows closed-captioning does work.

Importance

The importance of the two literature reviews I conducted above did not show the use of closed-captioning on students without disabilities but more on students with disabilities. However, it did give insight about how closed-captioning does help students learn better in postsecondary settings which is an area we are determining. Not to mention, this study gave us an in-depth understanding about student's view/perception regarding closed-captioning. Students reported they did not have a problem watching closed-caption instruction when watching their PowerPoint slides, but students need to be exposed to closed-captioning, and a good place to start that exposure is in school. Therefore, this study gave us reassurance that closed-captioning in fact does work in improving academic performance.

Further, the literature review above regarding time-compression and closed-captioning is important because it highlights how closed-captioning does in fact have a positive impact on assessments. Since we are trying to determine if our assessments for the students who receive closed-captioning will perform better on assessments this give us reassurance that our students will do well. Not to mention, another key points this review gives us is determining a method to deliver the assessment to the students. Having one group receiving closed-caption instruction and the other group without will give us a precise understanding about the effects of closed-captioning. Dr. Bryan Dallas will be distributing two different assessments for the Fall 2019 and future semesters for his students enrolled in REHB 495.

Assessments

I created two assessments titled 60 Minutes: Chris Downey and Only God Could Hear. The two assessments seen below will be the ones Dr. Bryan Dallas will be distributing in future semesters.

60 Minutes: Chris Downey

1. At what age did Chris Downey construct the life he always wanted?
   A. 35
   B. 55
   C. 45
   D. 60
2. What does Chris Downey do for a living?
   A. Police Officer
   B. Architect
   C. Accountant
   D. Business Owner
3. Where is Chris Downey's small housing firm located?
   A. Chicago
   B. Washington
   C. New York
   D. San Francisco
4. How old is Chris Downey's son?
   A. 10
   B. 13
   C. 7
   D. 11
5. What type of disability does Chris Downey have?
   A. Intellectual Disability

B. Physical Disability

C. Mental Disability

D. Sensory Disability

6. Why is Mr. Downey collaborating with sited architects?

   A. To build a new school

   B. To build a new restaurant

   C. To build a new hospital

   D. To build a new gymnasium

7. True or False: Is the creative process an intellectual process?

   A. True

   B. False

8. What new tool did Chris Downey find that could emboss architectural drawings so that he could read and understand through touch?

   A. Printer

   B. Phone

   C. Computer

   D. Fax Machine

9. How does Chris Downey sketch his ideas onto plans?

   A. Clay

   B. Stickers

   C. Malleable Wax Sticks

   D. Beads

10. Chris Downey mentioned he can no longer see buildings and spaces. What did he begin to do?

    A. Admiring them

    B. Seeing them

    C. Talking to them

    D. Hearing them

11. What activity were Chris Downey and his son playing when he realized something was wrong?
    A. Hockey
    B. Basketball
    C. Baseball
    D. Soccer
12. Where was Chris Downey's tumor located?
    A. Abducens Nerve
    B. Vagus Nerve
    C. Olfactory Nerve
    D. Optic Nerve
13. How long did Chris Downey's surgery last?
    A. 9.5 hours
    B. 9 hours
    C. 8.5 hours
    D. 10 hours
14. What career professional did the doctor send in after telling Mr. Downey his vision loss was permanent?
    A. Occupational Therapist
    B. Physical Therapist
    C. Social Worker
    D. Pediatrician
15. What two people did Chris Downey think about in his hospital room?
    A. His son and his own mother
    B. His own father and his wife
    C. His own mother and father
    D. His son and his own father
16. What is Chris Downey's son name?
    A. Lonzo

B. Renzo

C. Chris Jr.

D. Michael

17. What does Bashon's Organization the Light House do?

A. Helps people new to vision loss learn how to figure things out

B. Help people find employment

C. Help people live more independent

D. All the above

18. What specialty did Chris Downey develop?

A. Making spaces accessible to people with intellectual disabilities

B. Making spaces accessible to people with physical disabilities

C. Making spaces accessible to people with hearing disabilities

D. Making spaces accessible to people with visual impairments

19. Where did Chris Downey design a new eye center at?

A. University of North Carolina

B. Duke University

C. North Carolina State University

D. Stanford University

20. What is Universal Design?

A. Accommodates people with and without disabilities

B. Accommodates people with disabilities only

C. Accommodates people without disabilities only

D. Accommodates professors at universities only

21. What concrete did Chris Downey use for his building?

A. High-strength concrete

B. Stamped concrete

C. Polished Concrete

D. Regular concrete

22. What is the name of the subject of the documentary?
    A. Chris Harrell
    B. Chris Harrison
    C. Chris Downey
    D. Chris Jackson

23. At what age did the subject lose his sight?
    A. 55
    B. 65
    C. 75
    D. 45
24. What does the subject do competitively?
    A. Tennis
    B. Baseball
    C. Rowing
    D. Baseball
25. What is printing braille or tactile maps called?
    A. Embossing
    B. Uncontracted
    C. Contracted
    D. Coloring
26. What is the name of wife?
    A. Jennifer
    B. Amy
    C. Rosa
    D. Brianna

27. At what age did subject's father die?
    A. 7 years old
    B. 8 years old
    C. 11 years old
    D. 13 years old
28. Where did subject get help in transitioning (navigation, cooking) to being blind?
    A. Hospital
    B. Lighthouse for the Blind
    C. IATP
    D. Association for Individual Development
29. Why did Chris Downey lose his job? Recession
    A. Drug or Alcohol Possession at Work
    B. Falsifying Company Records
    C. Recession
    D. Taking Too Much Time Off
30. What was solution for Blind individuals using transit? Grooves in the platform
    A. Grooves in the platform
    B. Guide Dogs
    C. Having a friend/individual help them
    D. None of the above
31. How would blind users know when to turn when using transit?
    A. Switch from hard to textured concrete.
    B. Switch from smooth to textured concrete.
    C. Switch from smooth to reinforced concrete.
    D. Switch from hard to polymer concrete.
32. What was name of lighthouse director's name?
    A. Bryan Reed
    B. Bryan Bashin

C. Michael Thomas

D. Peter Williams

33. At the time of the video, how many years had subject been blind?

A. 9 years

B. 11 years

C. 12 years

D. 10 years

Only God Could Hear Me Assessment:

1. What is Bruce Baker's background in?
   A. Mathematics
   B. Psychology
   C. Linguistics
   D. Sociology
2. What is Bruce Baker President and CEO of?
   A. Semantic Compaction Systems
   B. AAC Institute
   C. Tobii Dynavox
   D. TEIS Early Intervention
3. What new communicative device is Bruce Baker working on?
   A. Naturally Dragon Speaking
   B. Minspeak
   C. Dynavox
   D. AAC
4. What made Minspeak unique?
   A. Bruce's background as a linguist
   B. Bruce's background as a SLP
   C. Bruce's background as a physical therapist
   D. Bruce's background as an occupational therapist

5. Where was Bruce born?
    A. Chicago
    B. Wisconsin
    C. Iowa
    D. Baltimore
6. Where did Bruce study classical language at?
    A. Harvard University
    B. University of Wisconsin-Madison
    C. Indiana University
    D. Indiana State University
7. What disability does Jen Lowe have?
    A. Autism
    B. Cystic Fibrosis
    C. Down Syndrome
    D. Cerebral Palsy
8. What were the two allied healthcare professionals Jen mentioned that helped her with communicating?
    A. Speech-Language Pathologist and Physical Therapist
    B. Occupational and Physical Therapist
    C. Occupational Therapist and Speech-Language Pathologist
    D. Physical Therapist and Social Worker
9. How old is Chris Klein?
    A. 32
    B. 35
    C. 37
    D. 36
10. What device does Chris Klein use to communicate?
    A. Minspeak

B. Naturally Dragon Speaking

C. Dynavox

D. Phone

11. When Chris uses Minspeak, which part of the body does he use?

A. Hands

B. Chin

C. Feet

D. Tongue

12. What does Minspeak stand for?

A. Maximum Communicating

B. Minimum Communicating

C. Minimum Effort Speaking

D. Maximum Effort Speaking

13. What disability does Chris Klein have?

A. Cerebral Palsy

B. Down Syndrome

C. Autism

D. Prader-Willi Syndrome

14. What does Jen Lowe do for a living?

A. Librarian

B. Human Resources

C. Teacher

D. Executive Director of SHOUT

15. Chris Klein mentioned he grew up in a family that enjoyed doing what?

A. Music

B. Traveling

C. Nature

D. Sports

16. Chris mentioned he grew up 23 years asking who questions?
    A. Moses
    B. God
    C. Abraham
    D. Matthew
17. What is Matt Young's profession?
    A. Police Officer
    B. Pastor
    C. Occupational Therapist
    D. Physical Therapist
18. Do most people think about communicative disabilities?
    A. Yes
    B. No
19. Who is Cindy Halloran?
    A. Speech-Language Pathologist
    B. Occupational Therapist
    C. Pediatrician
    D. Physical Therapist
20. What does Bac Shelton love to do?
    A. Playing Sports
    B. Singing
    C. Painting
    D. Reading
21. What disability does Bac have?
    A. Down Syndrome
    B. Cerebral Palsy
    C. Cystic Fibrosis
    D. Autism

22. What activity does Chris and Josh love to do?
    A. Sink Ball
    B. Garbage Ball
    C. Basketball
    D. Football
23. What activity does Lucas like to do?
    A. Play sports with friends
    B. Listen to music with friends
    C. Going to the movies with friends
    D. Singing at church
24. How long has Lucas been going to his church?
    A. 14 years
    B. 13 years
    C. 11 years
    D. 15 years
25. True or False: Minspeak uses hieroglyphics?
    A. True
    B. False
26. Bruce mentioned Semantic Compaction Systems is like what?
    A. Gym
    B. School
    C. Studio
    D. House
27. Jen Lowe mentioned when she was growing up her form of communication was?
    A. A series of yes and no questions
    B. A series of no and maybe questions
    C. A series of sure and maybe questions
    D. A series of yes and sure questions

28. Bruce mentioned when he was developing Minspeak numbers and letters required what?
    A. Short Sequences
    B. Long Sequences
    C. No Sequences
    D. A and B
29. What does the acronym SHOUT stand for?
    A. Sharing Helps Officers Use Technology
    B. Sharing Hinders Others Use Technology
    C. Sharing Helps Others Use Technology
    D. Sharing Helps Owls Use Technology
30. Who is Barry Romich?
    A. Co-Founder and Chairman of Dynavox
    B. Co-Founder and Chairman of ABS Material Incorporation
    C. Co-Founder and Chairman of Forbes Rehab Services
    D. Co-Founder and Chairman of Prentke Romich Company

References

Chen, Y (2012). A study of interactive video-based learning system for learning courseware. *Research Journal of Applied Sciences, Engineering and Technology*, 4(20), 4132- 4137.

Cook, A. M., & Polgar, J. M. (2015). *Assistive technologies: Principles and practice*. Elsevier Health Sciences.

Garza, T. (1991). Evaluating the use of captioned video materials in advanced foreign language learning. Foreign Language Annals, 24(3), 239-258

Kirkland, C. E., Byrom, E. M., MacDougall, M. A., & Corcoran, M. D. (1995, April). The effect of television captioning on comprehension and preference. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA. Retrieved from http://eric. ed.gov/?id=ED389286

Lenker, J. A., Harris, F., Taugher, M., & Smith, R. O. (2013). Consumer perspectives on assistive technology outcomes. *Disability and Rehabilitation: Assistive Technology*, *8*(5), 373-380. Yeager, P., Kaye, H. S., Reed, M., & Doe, T. M. (2006). Assistive technology and employment: Experiences of Californians with disabilities. *Work*, *27*(4), 333-344.

Ruggiero, R. M. (1986, November). Impact of television captioning on hearing audiences. Paper presented at the annual meeting of the California Educational Research Association, Marina

U.S. Bureau of Labor Statistics. (2016). *Persons with a disability: Labor force characteristics summary*. Retrieved from https://www.bls.gov/news.release/disabl.nr0.htm

U.S. Census Bureau. (2012). *Nearly 1 in 5 people have a disability in the U.S*. Retrieved from https://www.census.gov/newsroom/releases/archives/miscellaneous/cb12-134.html

Wang, J., Ding, D., Teodorski, E. E., Mahajan, H. P., & Cooper, R. A. (2016). Use of assistive technology for cognition among people with traumatic brain injury: a survey study. *Military medicine*, *181*(6), 560-566.