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Developing Effective Online Training Tools for Maine Adaptive Sports and Recreation

University of New England

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Acknowledgements: Maine Adaptive Sports and Recreation, Barbara Schneider, Judy Sullivan, Brandon Merry

Abstract

Background: Maine Adaptive Sports and Recreation (MASR) relies on volunteers to instruct their participants with disabilities to participate in a variety of adaptive sport programs. Volunteers must have a comprehensive understanding of participants' health conditions to assist appropriately. MASR's traditional training program lacked a formal curriculum and assessment of volunteer learning. Our purpose was to create online learning modules and determine whether implementing a massed or distributed schedule resulted in better long term retention.

Methods: Two non-randomized groups of eleven adults were assigned to either an in-class, massed format (Group A) or an at-home, distributed schedule (Group B) to complete six online learning modules. Participant competence was assessed prior, immediately after, and two weeks after completion of learning modules. A global rating scale survey and satisfaction survey were also completed to determine perceived confidence in using the information learned and obtain feedback.

Results: Post-hoc testing revealed both groups had significant increase in competence after reviewing the modules, in terms of both immediate recall and long-term retention scores compared to baseline. There was a significant difference between group pre-test scores, but no difference between the groups' immediate recall or long-term retention scores. Both groups exceeded the MCIC score of 2 points for the Global Rate of Change Scale, indicating a notable increase in confidence. Participants reported the modules to be beneficial and effective in the Volunteer Satisfaction Survey.

Conclusion: Our findings suggest the online learning modules were effective regardless of the applied learning schedule. Both groups increased their competence and reported improved confidence with the presented material. A small sample size and discrepancies in participant demographics between groups presented limitations which prohibit recommending a superior learning schedule.

Introduction

Maine Adaptive Sports and Recreation (MASR) is a non-profit organization that provides free adaptive sport lessons to individuals with disabilities. MASR programs provide opportunities for physical activity in a safe and social environment with the support of trained staff and volunteers. Every year, new and returning volunteers undergo training to better assist and understand the participants with whom they will be working.

MASR winter programs, such as adaptive skiing, snowboarding, and snowshoeing, require more extensive training sessions than summer programs, and accordingly, take place over multiple days. As part of this training, volunteers typically learn about the health conditions participants may have through oral presentations delivered by a health professionals. However, this traditional method was logistically burdensome to coordinate, in that, it required hiring and scheduling a trained health professional and restricted the orientation session to limited dates.

Thus, MASR was seeking to develop an alternative training method that could be instituted at various times throughout the session in an easily accessible manner.

In the spring of 2017, we surveyed current MASR volunteers to determine how MASR volunteer training could be improved. The combination of MASR staff input and volunteer feedback led to a request for development of instructional materials regarding health conditions, behavioral manifestations, and implications of associated impairments during activity. MASR was seeking an effective, efficient method of delivering this content.

Prior to developing a new method of delivering content, we considered the difference between a typical classroom versus an online presentation of information. Previous research has suggested online education and a face-to-face lecture have equivalent effects on long term retention when compared in a general education college course.¹ This was further supported by another study's findings that online training was statistically equivalent to a typical classroom setting for the purpose of teaching burn prevention to nurses.² Teaching material utilizing online methods also demonstrates the benefit of being more accessible and affordable. The incorporation of educational videos has also been found to boost long term retention in comparison to standard didactic learning.³ The use of educational videos resulted in a significant improvement in long term retention at three months compared to a control group.³ These same results were not found when comparing the standard didactic learning approach to the control group at three months.³

Short term and long term retention are dependent upon the delivery structure of educational materials. Two structures of delivery include a single uninterrupted session also known as a massed schedule, or an even dispersment of smaller segments referred to as a distributed schedule. Current research provides conflicting evidence regarding these approaches. There appears to be evidence in support of both massed and distributed patterns for improving short term retention.^{4,5,6} More specifically, the distribution pattern for optimal short term retention can be as short as within a day.⁶ For long term retention, distributed schedules demonstrate significantly greater benefits.^{4,6} Evidence has shown that varying the time between sessions by utilizing an equal or expanding distribution schedule provides greater long term retention.⁶ The equal schedule resulted in greater effectiveness across a seven day period and an expanding schedule demonstrated increased effectiveness across a thirty-five-day period.

Based on this information, the broad purposes of this project were (1) to develop a new series of online learning modules focusing on the common health conditions of MASR participants, and (2) to assess the impact of online learning modules on volunteers' competence and confidence in working with program participants with health conditions. An individual's level of confidence affects the level of involvement and effort that will be put forth in a particular situation.⁷ This may also be a better predictor of performance than competence.⁷

Competence was operationalized as short term and long term retention of learned information following completion of the online modules in either a massed or distributed pattern. Confidence was assessed by asking volunteers to rate their self-perceived change in response to a series of questions about working with MASR participants on the mountain. Based on the literature, it

was hypothesized both the massed and distributed groups will demonstrate equal immediate recall of learned information immediately after completing the modules. It was also hypothesized the distributed group will demonstrate increased long term retention in comparison to the massed group two weeks after completing the modules.

Methods

Design

This study utilized a quasi-experimental pre-test / post-test design to compare the effect of the online learning module intervention over time, delivered either in massed (Group A) or distributed (Group B) format.

Participants

Volunteers for MASR winter programs in any given year typically include laypersons from a variety of backgrounds and life experiences. Many have not had medical or health professions training. For the purpose of this study, only new volunteers with MASR in the fall of 2017 were invited to participate. Criteria for new volunteers, as defined by MASR, requires all volunteers are at least 18 years old, at least an intermediate level skier, and must attend two preseason training sessions. Exclusion criteria included any volunteer who had previously participated in the new volunteer training program, who did not have regular internet access, or who was not at least 18 years of age. The study was approved by the UNE Institutional Review Board for the Protection of Human Subjects.

Prior to arriving at the MASR preseason orientation and training session, volunteers received a written flyer which explained the study and how they could be involved. When they arrived for the initial preseason orientation, the study was verbally explained and volunteers were asked to participate. Willing volunteers were then given a written informed consent form explaining, in detail, what would be required of them, how their information and results would be kept confidential, and how the results of the tests would be used.

Intervention

A set of online learning modules that focused on six different neurological health conditions commonly seen by MASR volunteers served as the intervention for this study. The health conditions covered were decided based upon written surveys completed by sixty current volunteers with MASR as well as recommendations from the President and Activities Director of the program. The health conditions included: cerebral palsy, multiple sclerosis, spinal cord injury, traumatic brain injury, stroke, and hearing & visual impairments.

Each module ranged in length from ten to fifteen minutes, included information regarding each condition, and was delivered in language appropriate to all educational and professional backgrounds. The modules were made using iMovie (Apple, Inc., Cupertino, CA) and Microsoft Sway (Microsoft Corporation, Redmond, WA) with a combination of written slide sets and videos. Vocal narrations were recorded and played over the slides throughout each module.

The modules included definitions, etiology, pathophysiology, common primary and secondary impairments, implications for the volunteers, and physical, cognitive, and behavioral manifestations of each condition. Behavioral management strategies were also included in relevant modules as this was a subject that current volunteers believed would be an important

addition to the training materials.

Measures

Demographic information was obtained from each participant through a general survey. Information gathered via survey included: age, gender, occupation, education, previous experience with individuals with neurological health conditions, years of experience with those individuals, as well as the age groups with whom they had previously worked.

Competence of participants was assessed at three time intervals: before, immediately after, and 2-weeks after completing the modules. Participants, before viewing the modules, completed a comprehensive pre-test of 24 questions (i.e., 4 questions from each module) to serve as a baseline measurement from which change in competence would be measured over time (Appendix A). We developed the test questions specifically for this purpose..

After completing each module, immediate recall was assessed by having participants complete a five question quiz that included specific information from each module (Appendices B-G). Previous research suggests the optimal amount of questions to test competence in online modules to be ten questions at the end of each module.⁸ Test scores were found to be highest with ten questions in comparison to alternate amounts.⁸ Research participants also stated a preference for a ten question post-test over other test lengths.⁸ Despite these findings, for the interest of time, five questions per module were used.

The final assessment of competence was assessed two weeks following the completion of the modules in the form of a comprehensive post-test to determine long-term retention of information. The post-test was the same set of questions that was asked in the pre-test. This was done in order to accurately assess change in competence over time.

To assess the confidence of volunteers in applying their knowledge of neurological health conditions with Maine Adaptive participants, an 11-point Global Rate of Change (GRC) Scale was applied to 5 questions pertaining to use of learned information while working with MASR participants (Appendix H). Lower numbers indicated poor or decreased confidence, and higher numbers indicated great or increased confidence.

At the completion of the two-week long-term retention exam, participants completed a volunteer satisfaction survey (Appendix I). This survey utilized a five-point Likert scale. The scale was labeled from 1 (strongly disagree) to 5 (strongly agree) and asked participants to reflect on the teaching methods. Participants satisfaction of the quality, organization, interest-level, and relevancy of information received in modules was assessed. This information was used solely for further improvement of the teaching modules.

Procedures

Participants who were in attendance at the preseason orientation session on October 14, 2017, and who elected to participate in the study were automatically placed in Group A (massed schedule of learning). Following consent, demographic information was collected using a paper survey and baseline competence data were collected using paper tests and and scantron

testing sheets.

Due to a lower number of participants than expected, outside recruiting was required for Group B (distributed schedule of learning). Laypersons outside of the MASR network, who were not in attendance at the preseason orientation, were recruited to participate by word of mouth. Eleven people, who fit the inclusion criteria, were identified and electronic versions of the demographic surveys, consent forms, and pretests were emailed to them on October 14, 2017.

The procedures for Group A and B proceeded as follows:

Group A (Massed) participants was shown all six modules during a single 3 hour session. At the completion of each module, an immediate recall quiz was taken consisting of 5 questions regarding specific material from that module. Completion of all modules and the quizzes took about an hour and a half. Two weeks later, all participants in Group A received an email containing a link to an electronic long-term retention test, the confidence measure, and satisfaction with learning modules survey.

Group B participants were given the instructions to complete 1-2 modules per night over the course of the next seven days. Participants were allowed to pause, rewind, and review modules at their own discretion in order to optimize their learning experience. They were given the same immediate recall quizzes electronically following each module. Two weeks from the night of completion of the modules an electronic long-term retention test, the confidence measure, and satisfaction with learning modules survey was completed.

Approximately 1.5 weeks following completion of the online lessons, participants were contacted via email with a reminder of the due date for taking the long-term retention test, confidence assessment, and satisfaction survey. Participants could be contacted up to three times with a reminder to complete any of these data collection tools if they had not completed it at the designated time in order to ensure accurate data.

Data Analysis

Descriptive statistics (mean, standard deviation, frequency) were used to characterize the study sample and outcome variables (i.e., competence; confidence).

To generate each participant's immediate recall quiz score, the mean score of the six immediate recall quizzes was calculated. The immediate recall quiz score for each group was calculated by averaging the individual mean immediate recall quiz scores.

To compare the effectiveness of each mode of instruction (massed vs. distributed), competence data were analyzed using a mixed model 2-way ANOVA (GROUP x TIME) with repeated measures on TIME ($\alpha = 0.05$). The three time points were the pre-test, immediate post-test, and 2-week retention test. Post-hoc testing was conducted using the Tukey HSD and independent samples T-test procedures.

To assess the impact of the online learning modules on the volunteer's confidence, group mean GRC values were calculated for each question. Mean GRC values were compared to the previously established minimally clinically important change (MCIC) value of 2 points.⁹ If the GRC value of a group exceeded 2 points, the group's confidence was considered increased.

Satisfaction survey data was analyzed descriptively.

Results

Thirteen people attended the orientation session. One person was excluded from the study due to age and another dropped out of the study due to external scheduling conflicts. After the orientation session, one participant failed to complete the long-term retention test and post-module surveys and therefore was excluded from the study. This yielded a total of ten participants in Group A. Group B had eleven participants, yielding a total of 21 participants' results to be analyzed.

The characteristics of Group A and Group B collected from the demographic survey are summarized in Table 1.

Table 1. Group Characteristics

| Characteristic | Group A - Massed | Group B - Distributed |
|--|--|---|
| Age (mean \pm SD) | 35.2 \pm 14.0 | 41.5 \pm 14.7 |
| Gender (ratio M:F) | 7 Males : 3 Females | 3 Males : 8 Females |
| Occupation (frequency) | 3 Healthcare Related Job 5 Students 0 Education 1 Retired 2 Other | 1 Healthcare Related Job 0 Student 3 Education 0 Retired 7 Other |
| Highest Level of Education (frequency) | 1 High School Diploma/GED 9 Bachelor's Degree 0 Master's Degree 1 Doctorate/PhD | 1 High School Diploma/GED 7 Bachelor's Degree 3 Master's Degree 0 Doctorate/PhD |
| Previous experience with individuals with disabilities (frequency) | 2 with no experience 9 with at least some experience | 5 with no experience 6 with at least some experience |
| Number of years experience working with individuals with disabilities | 4 with zero experience 2 with < 1 year experience 4 with 1-5 years experience 1 with > 5 years experience | 7 with zero experience 2 with <1 year experience 1 with 1-5 years experience 1 with > 5 years experience |
| Populations of individuals with disability that participants had experience with (frequency) | 4 Children 3 Adolescents 4 More than one population | 2 Children 2 Adolescents 1 More than one group 6 with no experience with a population with a disability |

Competency scores for each group at each time point appear in Table 2. ANOVA results revealed a significant group X time interaction [$F(2,38) = 7.0$; $p < 0.05$]. This indicated that Group A and Group B differed in their pattern of test scores over time.

Table 2. Competency Results by Group (Mean \pm Std Dev)

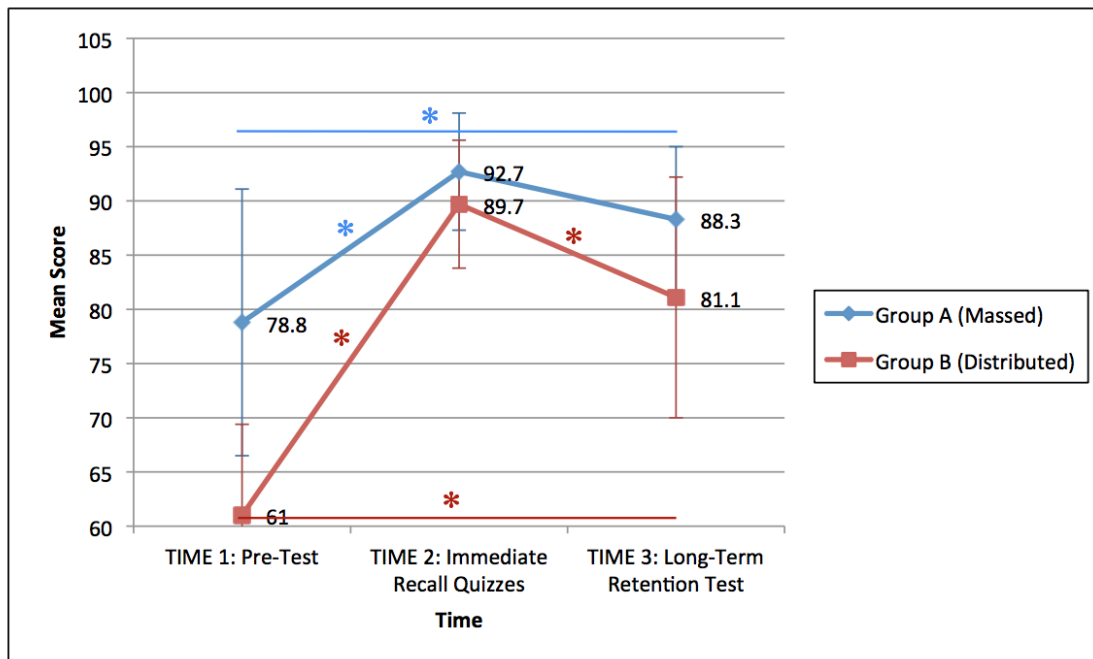
| | Group A - Massed | Group B - Distributed | P-Value |
|-----------------------------|------------------|-----------------------|-----------|
| Time 1: Pre-Test | 78.6 \pm 12.3 | 61.0 \pm 8.4 | p = 0.00* |
| Time 2: Immediate Recall | 92.7 \pm 5.4 | 89.7 \pm 5.9 | p = 0.26 |
| Time 3: Long-Term Retention | 88.3 \pm 6.7 | 81.1 \pm 11.1 | p = 0.09 |

* represents a significant difference between groups at the respective time interval

Post-hoc testing revealed that within Group A there was a significant difference between mean pre-test and immediate recall quiz scores ($p = 0.04$) and between mean pre-test and long-term retention scores ($p = 0.009$). However, there was no significant difference between immediate recall and long-term retention scores ($p = 0.073$). (Figure 1)

Post-hoc testing revealed that within Group B there was a significant difference between mean pre-test and immediate recall quiz scores ($p < 0.01$) and between mean pre-test and long-term retention scores ($p < 0.01$). Unlike Group A, there was also a significant difference between immediate recall and long-term retention scores ($p = 0.011$). (Figure 1)

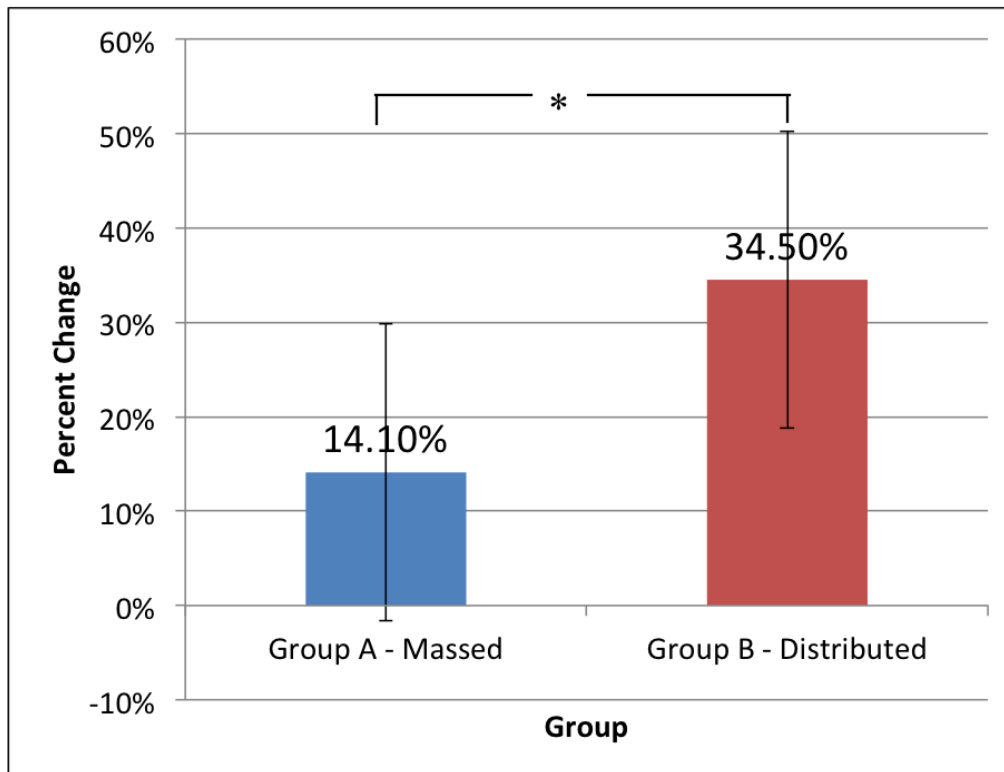
Figure 1. Competency Descriptive Statistics



* represents a significant difference ($p < 0.05$) between time points within group

Post hoc testing of between group differences revealed there was a significant difference between Group A and Group B pre-test scores (Table 2). There was no significant difference between Group A and Group B in immediate recall or long-term retention scores [$t(19) = 1.8$; $p = 0.09$] (Table 2). However, Group B had a greater improvement in scores between pre-test and long-term retention compared to Group A [$t(19) = -2.6$; $p = 0.036$] (Figure 2).

Figure 2. Percent Change between Pre-Test and Long-Term Retention by Group



* represents p-value < 0.05

Both groups felt more confident in their ability to work with participants with disabilities following completion of the learning modules (Table 4). Both groups exceeded the established MCIC of 2 points for each question. The t-test revealed no significant difference between groups for each of the survey questions ($p > 0.05$).

Table 4. Change in Confidence

| Question | Group A (Mean Rating \pm Std Dev) | Group B (Mean Rating \pm Std Dev) |
|---|--|--|
| Overall, I am confident I can effectively manage participants on the mountain. | 2.5 \pm 1.4 | 3.1 \pm 1.2 |
| I am confident that I have sufficient knowledge about specific disabilities to be a volunteer. | 2.3 \pm 2.9 | 3.1 \pm 1.6 |
| I am confident I can provide safe, individualized instruction on the mountain. | 2.4 \pm 1.7 | 2.9 \pm 1.5 |
| I am confident that I can manage participants' general problems related to their disabilities on the mountain. | 2.4 \pm 1.4 | 3.1 \pm 1.4 |
| As a volunteer, when facing a difficult situation with a participant, I am confident I can make the right management decisions. | 2.4 \pm 1.6 | 3.2 \pm 1.4 |

Twenty participants completed the Volunteer Satisfaction with Learning Modules survey. Responses of the survey indicated that, overall, participants found the modules beneficial and effective. All twenty participants who completed the survey agreed or strongly agreed that the information provided by the learning modules would be relevant when working with volunteers, that the information was well organized, and that the additional resources provided at the end of the modules were helpful. Four participants who completed the survey disagreed that the length of the modules were ideal for maintaining attention and two participants disagreed that the content in the modules was engaging and maintained their attention. Only one participant disagreed that the modules were helpful for their learning.

Discussion

Summary of Findings

This study aimed to determine whether a massed (Group A) or distributed (Group B) learning schedule improved competence and perceived confidence after completing online learning modules. The collected data revealed a significant gain in competence with immediate recall and long-term retention in both Groups A and B, suggesting the online learning modules were an effective training tool regardless of the applied learning schedule. When comparing the pre-assessment scores between the groups, there was an evident discrepancy in baseline knowledge with Group A performing significantly better than Group B. In contrast, the long term assessment resulted in similar competency scores, suggesting the distributed learning schedule may be more effective. However, due to participant differences in experience and knowledge, each group's performance cannot be solely attributed to the applied learning schedule. In addition, Group B demonstrated a greater decline in competence between immediate recall and long-term retention. Group A had no significant change in competence, indicating they were able to sustain their acquired knowledge. Although a decline between immediate recall and long-term retention is expected, the variation between the groups could be attributed to participants in Group A being primarily graduate students and future health care professionals.

Participants reported an improvement in perceived confidence regarding ability to work with individuals with disabilities and understanding of the conditions presented in the online learning modules. There was not a significant discrepancy between groups, suggesting the applied learning schedule did not have a differential impact on confidence.

Study limitations

A non-randomized group selection process resulted in varied participant demographics between Groups A and B. Group A participants were mostly current graduate students in a medical-based program with previous knowledge and experience with the neurologic conditions presented in the online learning modules. These participants' performance in this study may be attributed to their familiarity with learning and test-taking in a classroom setting. In contrast, Group B participants were primarily laypersons without a graduate level education and limited experience and knowledge of these same neurologic conditions. Although these participants may have found this material more challenging to learn, their characteristics more accurately represent the population of current MASR volunteers. We recognize this discrepancy contributed to our results and presents a limitation to our study.

When reviewing the demographic surveys, we noticed some unexpected inconsistencies that may have resulted from misunderstanding the question wording. It is therefore difficult to decipher the exact levels of previous experience and knowledge some participants had. Another limitation was the inability for participants to be blinded to their participation in a research study and which group they were designated to. Knowing they would be assessed on their learning performance could have altered their competency scores and self-reported confidence. A final

limitation to our research was the small sample size of participants in this study. It is therefore difficult to suggest these results are applicable to a larger, more diverse population.

Implications and future directions

According to our results and data analysis, we cannot determine which learning schedule is more effective for MASR to use in the future. However, the distributed learning schedule appears more practical as it provides volunteers with the ability to take notes, rewind, re-listen, and learn at a rate they prefer. The positive responses of the Volunteer Satisfaction with Learning Modules survey can be used as further support for the use of the learning modules by MASR in future volunteer training sessions. Future research could analyze the effectiveness of online learning modules by comparing the knowledge current MASR volunteers received through their standard volunteer orientation process to that of incoming volunteers who partake in the newly adopted online learning modules. This could potentially determine if online learning modules provide a more effective training program than a typical classroom setting.

Conclusion

In order to better prepare new volunteers, Maine Adaptive Sports and Recreation hoped to find a more efficient and comprehensive method to deliver information regarding different neurological conditions. Our team developed online learning modules that covered information such as etiology, impairments, presentation, and implications of six of the most common neurological conditions that volunteers encounter when working with adaptive athletes.

We sought out to observe the efficacy of utilization of online learning modules delivered in two different learning schedules: either in-class massed schedule (Group A) or at-home distributed schedule (Group B). Our results showed that the learning modules were effective in increasing competence both immediately following the modules and in long-term retention of the material in both groups. These findings support our first hypothesis. Our second hypothesis was that Group B would exhibit greater long-term retention than Group A. Due to the confounding of results by the difference in demographics, this hypothesis can be neither supported or refuted, but could serve as an area of future research.

While there were several limitations to this study, the results support our original hypothesis that online learning modules can improve volunteers' retention of material, and can prove to be meaningful data for MASR in organizing future volunteer orientation programs. There is great potential for future research in this area to either expand, or improve, upon our methods or explore other areas of analysis.

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Learning Modules Pre-Test

This is a multiple-choice quiz. Please read each question carefully and select the most appropriate answer. Your answers will be recorded and utilized for research purposes only. Your results will NOT affect your ability to participate as a volunteer for Maine Adaptive Sports and Recreation.

1. Cerebral palsy is caused by brain disturbances. When can these brain disturbances occur?

A. At any time in an individual's life

B. Before the child is born

C. Before, during, or soon after birth

D. Most often occur during infancy but can also happen in teenagers

2. *Perservation* is a characteristic potentially seen in a person who has experienced a traumatic brain injury. This term is used to describe when a person:

A. Is fixated on a word or idea- repeating the phrase constantly

B. Makes up the details to fill in the aspects of their memory that they do not know

C. Does not remember any activities happening prior to the injury

D. Does not remember any activities occurring after the injury

3. A stroke is the result of a:

A. Heart attack

B. Fainting spell

C. Lack of blood flow to the brain

D. Skull fracture

4. In order to maximize communication between you and a participant with a hearing impairment, you should:

- A. Maintain face to face communication
- B. Speak towards the less affected side if they hear better out of one ear compared to the other
- C. Speak at a normal rate

D. All of the above

5. You are instructing an athlete who has had a traumatic brain injury. When teaching a new skill, you observe that he/she is unable to remember the instructions you gave to him/her. This is an example of:

- A. Retrograde Amnesia
- B. Attention Deficit Disorder

C. Anterograde Amnesia

D. Selective Retention

6. Which of the following is one of the first symptoms associated with multiple sclerosis?

- A. Cognitive impairment
- B. Hearing impairment
- C. Hypersensitivity

D. Visual Impairment

7. Spasticity is typically associated with cerebral palsy. How would you define spasticity?

- A. A cognitive impairment hindering an individual's ability to speak but not hindering the ability to understand spoken language
- B. Lack of muscle tone that gives the limb a "floppy" appearance at rest

C. Increased muscle tone at rest that can make movement of a limb difficult

D. A sensory impairment that hinders an individual's ability to feel touch and pressure

8. A complete injury in what area of the spinal cord would result in loss of movement and sensation in all four limbs?

A. Cervical

B. Thoracic

C. Lumbar

D. Sacral

9. If your athlete, who has sustained a traumatic brain injury, becomes agitated you should do all of the following, except:

A. reason with them and explain to them there is nothing bad happening

B. identify what it was that triggered the agitation

C. try to distract them

D. be patient

10. A hemorrhagic stroke is caused by:

A. A burst blood vessel in the brain

B. A blockage in a blood vessel of the brain

C. Surgical removal of a blood vessel in the brain

D. A temporary loss of consciousness

11. Your fellow volunteer asks you what the purpose of an orthotic is and if the participant should wear it during adaptive activity. What should you tell them?

A: An orthotic is used for foot comfort and the participant should always use it during activity because it will make the participant feel more comfortable.

B. An orthotic is used to increase stability and help with movement. The volunteer should consult with someone familiar with the participant to determine if it should be worn.

C: An orthotic is used to make a participant taller, which will help them with all adaptive sports so it should be worn.

D. An orthotic is used to help with walking and should never be worn during sports because it will ruin the orthotic.

12. What is an important equipment consideration for an athlete with a complete cervical spinal cord injury?

- A. He/she is high functioning and needs only minimal equipment
- B. He/she has good abdominal muscle strength and thus does not need a lot of lateral trunk support

C. He/she has poor trunk control and requires adaptive equipment to provide external trunk support

- D. He/she has full use of their arms and hands and can easily navigate using ski poles

13. Approximately what percentage of individuals with multiple sclerosis experience pain due to this condition?

A. 80%

B. 35%

C. 15%

D. 50%

14. If an individual has impaired vision, which of the following types of cues will help with instruction?

A. Tactile

B. Visual

C. Auditory

D. A and C

15. You are working with a participant who has had a stroke. If you notice they exhibit poor judgment and impulsive behavior, you should:

A. Let them learn by making poor decisions

B. Leave them unattended

C. Establish limits and boundaries

D. Test their memory

16. Your athlete falls while on the slopes and hits their head. What could be an indication that he/she has sustained a head injury?

- A. He/she has one pupil that is larger than the other
- B. He/she is unable to squeeze their hands shut or move their legs
- C. He/she looks tired

D. All of the above

17. Does everyone with cerebral palsy have a cognitive impairment that worsens over time?

- A. No, CP is never coupled with a cognitive impairment
- B. Yes, everyone with CP has cognitive impairment, but the impairment does not get worse over time

C. No, not everyone with CP has a cognitive impairment. However, at times a stable cognitive impairment may coexist with CP

- D. Yes, cognition slowly declines over time with CP

18. You are instructing a participant that had a spinal cord injury. He/she suddenly begins complaining of having a headache. He/she, is flushed and sweating on the face and neck, has a runny nose, and feels anxious. What is he/she most likely experiencing?

- A. Flu-like symptoms
- B. Urinary Tract Infection

C. Autonomic Dysreflexia

- D. Bowel Distention

19. If a participant with multiple sclerosis begins to feel tired or fatigued, which of the following is the most appropriate response?

- A. Encourage the participant to continue with physical activity

B. Allow the participant to rest and return to activity when he/she is ready

- C. Test his/her balance and coordination abilities
- D. Leave him/her alone and unattended

20. Which of the following is an appropriate precautionary measure if a participant you are working with has difficulty regulating his/her temperature due to multiple sclerosis?

A. Ensure the participant is wearing appropriate clothing for physical activity and the environment

- B. Apply heat packs to their forehead
- C. Douse them in cold water prior to activity
- D. Make sure they stay hot when they are in the sun

21. Paresthesia is a common impairment seen in people who have sustained a spinal cord injury. What is *paresthesia*?

- A. Complete loss of motor function in a given limb
- B. Sensation of tingling, like pins and needles, in a given area of skin**
- C. Complete loss of sensation, or numbness, in a given area of skin
- D. Complete loss of motor function in a single muscle

22. Visual acuity is defined as:

- A. Low vision
- B. The sharpness or clarity at which one sees**
- C. A clouding of the lens of the eye
- D. An inability to focus light on the retina of the eye

23. Bilateral hearing loss refers to:

- A. A loss of hearing in one ear
- B. A loss of hearing after an individual learns how to speak
- C. Difficulty hearing high-pitched sounds
- D. A loss of hearing in both ears**

24. If a participant has *homonymous hemianopsia*, you should encourage them to:

A. Scan their environment for objects and obstacles on their impaired side

B. Only pay attention to their unaffected side

C. Perform physical activity with their eyes closed to improve their other senses while they are in a safe environment

D. Place extra obstacles on their impaired side to further challenge them

Cerebral Palsy Immediate Recall Quiz

This is a multiple-choice quiz. Please read each question carefully and select the most appropriate answer. Your answers will be recorded and utilized for research purposes only. Your results will NOT affect your ability to participate as a volunteer for Maine Adaptive Sports and Recreation.

1. Please enter your email address: _____

2. Does cerebral palsy worsen over time?

A: Yes. CP begins by affecting the function of the arms at first, progressing to the trunk, before finally affecting the function of both of the legs.

B: Yes. CP begins by affecting the function of the legs at first, progressing to the trunk, before finally affecting the function of both of the arms.

C: No, CP is not a neurodegenerative disorder. It should remain static over time with proper care.

D: None of the above

3. What is the difference between spastic quadriplegia and spastic diplegia in CP?

A: Spastic diplegia typically affects only the upper limbs, while spastic quadriplegia affects one arm and one leg.

B: Spastic diplegia typically affects only the lower limbs, while spastic quadriplegia affects all four limbs.

C: Spastic quadriplegia indicates that an individual is capable of using all four limbs normally, while spastic diplegia indicates an individual is only capable of using two of their limbs normally.

D: Spastic quadriplegia affects only males while spastic diplegia affects only females.

4. While skiing with a participant, you notice they are having difficulty extending their arm and wrist from a bent position. How might you help them extend their arm?

A: Try warming the arm and wrist

B: Pull quickly against the bent arm until the muscle relaxes

C: Massage the tightly contracted muscles until they relax and extend

D: Verbally prompt the individual to relax their arm so that it may extend

5. What assumptions can you make about an individual with cerebral palsy's thinking skills and how can you tailor your instruction to their needs?

A: The individual with CP will have reduced thinking skills and you will need to only use simple directions.

B. The individual with CP will have reduced thinking skills but you should provide direction just as you would to an individual without CP.

C. The individual with CP won't necessarily have reduced thinking skills but you should only provide simple directions and speak very slowly just in case.

D. The individual with CP won't necessarily have reduced thinking skills and you should tailor your instruction to match the participant's needs.

6. You are instructing a teenager with CP how to use a new piece of skiing equipment in a large group. Suddenly, the participant becomes very upset and appears anxious about using the equipment. How should you proceed and why?

A: You should continue to have the individual practice in the same way because you do not want to support quitting.

B. Consider redirecting the participant to a less stimulating environment because they are likely frustrated by learning a new task and could potentially benefit from this behavioral modification method.

C. You should discipline the participant because this is likely typical behavior for any teenager and it should be stopped.

D. This is a likely a tantrum that you should ignore because if you do they will stop soon.

Multiple Sclerosis Immediate Recall Quiz

This is a multiple-choice quiz. Please read each question carefully and select the most appropriate answer. Your answers will be recorded and utilized for research purposes only. Your results will NOT affect your ability to participate as a volunteer for Maine Adaptive Sports and Recreation.

1. Please enter your email address: _____

2. Which common symptom of MS occurs very suddenly and can worsen with physical activity?

A: Fatigue

B: Spasticity

C: Impaired cognition

D: Hemiplegia

3. Which of the following is *not* recommended if a participant has trouble regulating their temperature?

A: Seeking shade or a cool environment

B: Offering a small towel soaked with cool water

C: Ensuring they are wearing appropriate layers of clothing before activity

D: Clearing their surroundings of obstacles

4. Which of the following is a unique quality of MS?

A: Symptoms are highly variable among individuals and on a day-to-day basis

B: The presence of spasticity

C: Decreased sensation

D: Impaired vision

5. Which of the following is an important factor to take into consideration before working with a participant with MS?

A: How many pets they have

B: Their level of fatigue

C: Their occupation

D: Their favorite food

6. Pain is a self-limiting factor which can lead to:

A: An increase in physical activity

B: A decrease in fatigue

C: A decrease in physical activity

D: Increased spasticity

Spinal Cord Injury Immediate Recall Quiz

This is a multiple-choice quiz. Please read each question carefully and select the most appropriate answer. Your answers will be recorded and utilized for research purposes only. Your results will NOT affect your ability to participate as a volunteer for Maine Adaptive Sports and Recreation.

1. Please enter your email address: _____

2. You read your athlete's chart and see that he/she has sustained a spinal cord injury in the thoracic spine and is paraplegic. What does this mean?

- A. He/she has loss of function only in the feet and ankles
- B. He/she has full function on only one side of the body
- C. He/she has loss of function in both legs and one arm
- D. He/she has loss of function in both legs but has full use of both arms

3. The spinal cord itself ends in the upper lumbar region of the spine. What does this mean for lower level lumbar, as well as sacral injuries?

- A. Injuries of the lower lumbar and sacral regions result in fewer impairments
- B. Injuries of the lower lumbar and sacral regions result in the most impairments
- C. Injuries of the lower lumbar and sacral regions result in impairments of the arms only
- D. Injuries of the lower lumbar and sacral regions result only in impairments on one side of the body

4. True or False: Unless the person experienced a brain injury as well, people who have sustained a spinal cord injury will be cognitively intact.

- A. True
- B. False

SCI Immediate Recall Quiz – APPENDIX D

5. True or False. If your athlete exhibits spasticity of limbs you may be required to force them into certain positions in order to don equipment.

- A. True
- B. False

6. Your athlete is experiencing autonomic dysreflexia. You should do all of the following, except:

- A. Tell a team leader as quickly as possible
- B. Ask about fluid intake and the last time they catheterized
- C. Tighten their clothing to prevent them from getting too cold
- D. Look to see if they have any sharp objects in their pockets or are being pinched by equipment

Stroke Immediate Recall Quiz

This is a multiple-choice quiz. Please read each question carefully and select the most appropriate answer. Your answers will be recorded and utilized for research purposes only. Your results will NOT affect your ability to participate as a volunteer for Maine Adaptive Sports and Recreation.

1. Please enter your email address: _____

2. Which of the following processes can be affected by a stroke?

A: Memory

B: Speech

C: Movement

D: All of the above could be affected by having a stroke

3. An ischemic stroke is defined as:

A: A burst blood vessel in the brain

B: A blockage in a blood vessel of the brain

C: Surgical removal of a blood vessel in the brain

D: A temporary loss of consciousness

4. If a participant has a stroke on the right side of their brain, you can expect to see movement impairments:

A: On the left side of their body

B: On the right side of their body

C: In all of their limbs

D: A stroke in the right side of their brain will never lead to any physical impairments

Stroke Immediate Recall Quiz – APPENDIX E

5. If a participant has weakness on one side of their body, encourage them to:

A: Not use that side of their body at all

B: Utilize adaptive equipment to promote usage of their weakened limb throughout their activity

C: Not participate in any activity

D: Run a mile to warm up before participating in an activity

6. If a participant has speech and communication difficulties, what is one way they may choose to communicate with you:

A: Yelling

B: Staring

C: Communication boards

D: Morse code

Traumatic Brain Injury Immediate Recall Quiz

This is a multiple-choice quiz. Please read each question carefully and select the most appropriate answer. Your answers will be recorded and utilized for research purposes only. Your results will NOT affect your ability to participate as a volunteer for Maine Adaptive Sports and Recreation.

1. Please enter your email address: _____

2. What is the most appropriate action to take given the following scenario?:

You are providing instruction to an individual who has had a TBI- this individual has skied before but this is your first time working with him because his normal volunteer is away this weekend. The individual insists and seems fixated on the idea that they are capable of performing an advanced skiing skill but you are hesitant as you spoke with their normal volunteer who stated they should not be attempting this move.

A: Redirect the individual by encouraging them to partake in an activity they are equally excited about

B: Firmly tell the individual they are not allowed to attempt that move

C: Allow them to attempt the move if they are very persistent in believing they can

D: Ignore them when they tell you what they would like to try

3. If an individual becomes fixated on an idea or phrase- what is that typically called?

A: Confabulation

B: Perseveration

C: Receptive Aphasia

D: Retrograde Amnesia

4. If an individual seems distracted or lacking focus during your instruction what would be the best way to improve your methods of instruction?

A: Speak loudly to direct their attention back to you

B: Move to a quieter portion of the mountain with less skiers and break your instruction down into smaller chunks instead of giving them all the information at once

C: Use more hand motions to direct their attention back to you

D: Speak slowly and softly as though you are speaking to a child

5. If you have just finished giving an individual all the instructions they need to be successful at one time and they only seem to remember the first few steps of your instruction, what is the best way to set them up for success?

A: Explain everything again the same way as before so that they can learn through repetition

B: Have them try the task anyway without proper instruction

C: Explain everything in pieces allowing them to practice each step in between prior to putting it all together (whole-part-whole practice)

D: Refuse to repeat your instructions because they should have been listening the first time

6. An individual has the ability to understand spoken language but has difficulty forming sentences or writing what they are trying to communicate to you. What is this termed?

A: Retrograde Amnesia

B: Anterograde Amnesia

C: Receptive Aphasia

D: Expressive Aphasia

Vision and Hearing Loss Immediate Recall Quiz

This is a multiple-choice quiz. Please read each question carefully and select the most appropriate answer. Your answers will be recorded and utilized for research purposes only. Your results will NOT affect your ability to participate as a volunteer for Maine Adaptive Sports and Recreation.

1. Please enter your email address: _____

2. If a participant has 20/80 vision, this means:

A: The participant can see an object from 80 feet away that a person with perfect vision can see from 20 feet away.

B: The participant can see an object from 20 feet away that an unaffected person can see from 80 feet away.

C: The participant does not have a visual impairment.

D: The participant has normal vision in one eye and affected vision in the other eye.

3. A visual impairment that involves a lack of ability to focus light on the retina is referred to as:

A: Cataracts

B: Glaucoma

C: High vision

D: Refractive errors

4. Post-lingual hearing loss means:

A: An individual developed a hearing impairment after they learned how to speak

B: An individual can hear out of one ear better than the other

C: An individual developed a hearing impairment before they learned how to speak

D: An individual was born with a hearing impairment

Vision and Hearing Loss Immediate Recall Quiz – APPENDIX G

5. If an individual has affected hearing, which of the following types of cues will help with instruction:

A: Tactile

B: Visual

C: Auditory

D: A and B

6. A main system responsible for maintaining balance is:

A: Visual

B: Vestibular

C: Somatosensory

D: All of the above

Global Rate of Change Measure in Confidence

For each question, please indicate if or how you feel your confidence has changed after completing the learning modules compared to before. Please indicate by circling one number.

1. Overall, I am confident I can effectively manage participants on the mountain.

| Much Worse | No Change | | | | | Much better | | | | |
|------------|-----------|----|----|----|---|-------------|----|----|----|----|
| -5 | -4 | -3 | -2 | -1 | 0 | +1 | +2 | +3 | +4 | +5 |

2. I am confident that I have sufficient knowledge about specific disabilities to be a volunteer.

| Much Worse | No Change | | | | | Much better | | | | |
|------------|-----------|----|----|----|---|-------------|----|----|----|----|
| -5 | -4 | -3 | -2 | -1 | 0 | +1 | +2 | +3 | +4 | +5 |

3. I am confident I can provide safe, individualized instruction on the mountain.

| Much Worse | No Change | | | | | Much better | | | | |
|------------|-----------|----|----|----|---|-------------|----|----|----|----|
| -5 | -4 | -3 | -2 | -1 | 0 | +1 | +2 | +3 | +4 | +5 |

4. I am confident that I can manage participants' general problems related to their disabilities on the mountain.

| Much Worse | No Change | | | | | Much better | | | | |
|------------|-----------|----|----|----|---|-------------|----|----|----|----|
| -5 | -4 | -3 | -2 | -1 | 0 | +1 | +2 | +3 | +4 | +5 |

5. As a volunteer, when facing a difficult situation with a participant, I am confident I can make the right management decisions.

| Much Worse | No Change | | | | | Much better | | | | |
|------------|-----------|----|----|----|---|-------------|----|----|----|----|
| -5 | -4 | -3 | -2 | -1 | 0 | +1 | +2 | +3 | +4 | +5 |

Volunteer Satisfaction with Learning Modules

Instructions: This questionnaire is a series of statements about your personal attitudes and satisfaction about the instruction you received during your learning modules. There are no right or wrong answers. You will probably agree with some of the statements and disagree with others. Please indicate your own personal feelings about each statement below by marking the number that best describes your attitude or beliefs. Please be truthful and describe your attitude as it really is, not what you would like for it to be. This is anonymous with the results being compiled as a group, not individually.

Mark:

- 1 = STRONGLY DISAGREE with the statement
- 2 = DISAGREE with the statement
- 3 = UNDECIDED - you neither agree or disagree with the statement
- 4 = AGREE with the statement
- 5 = STRONGLY AGREE with the statement

| Satisfaction with Learning Modules | SD | D | UN | A | SA |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Overall, the teaching methods used were helpful for my learning. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| The information provided to me in the modules will be relevant to my work as a volunteer. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| The content in the learning modules was engaging and maintained my attention. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| The length of each individual module was ideal for maintaining my attention. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| The information in the learning modules was well organized. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| I prefer to learn about disabilities through the learning modules rather than traditional classroom lecture. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| The additional resources provided at the end of each learning modules were helpful. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |

Please provide any additional comments and/or suggestions below: