myAccessTools: Validation of Impairment-Weighted Scores

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ABSTRACT

Introduction: The myAccessTools accessibility application allows evaluators to conduct thorough building assessments to obtain valuable accessibility information without prior accessibility knowledge. A primary feature of the app is the ability to provide individual impairment scoring for 16 different types of disabilities. In addition, these scores possess weighted items based on the significance to an impairment. Although, the functionality of this feature requires validation for its intended purpose. Methods: Sixteen impairments were identified and examined using the myAccessTools app. Researchers completed two evaluations for a specific restaurant with a particular impairment. One evaluation required testers to examine the selected restaurant as fully accessible to an individual with no impairment and somewhat accessible to an individual with the impairment being investigated. The second evaluation would examine the restaurant as accessible for an individual without the impairment and not accessible for an individual with the impairment. Results: Expected findings are impairment-weighted scores function as designed and provide reliable and valid results to users. Discussion: While the functionality of the impairment-weighted scores is anticipated to work properly, further development should direct its attention to the inclusion of comorbid impairment-weighted score. Conclusion: The myAccessTools application has undergone validation testing that is expected to lead to the capability of providing individuals with reliable impairment-specific building accessibility information.

INTRODUCTION

In 1990, the United State government passed the American with Disabilities Act (ADA) and the ADA Standards for Accessible Design in 2010, to decrease discrimination encountered by people with disabilities (PWD) [1,2]. Despite the implementation of these legislations, environmental barriers remain a challenge for PWD due to buildings satisfying numeric standards over being functionally accessible [3]. Although, many buildings or restaurants can be labeled as “accessible”, while still being inaccessible due to not adhering ADA regulations since they were constructed before 1990 [4]. This can potentially create frustrating situations for PWD when they visit at a restaurant because they may not be able to access the building or the features it possesses [5]. Through interviews conducted by the Rehabilitation Research Design & Disability (R_2D_2) Center at the University of Wisconsin-Milwaukee, it was discovered PWD would like information regarding a restaurant’s accessibly prior to visiting [6]. To assist with this issue, the Access Ratings for Building (ARB) project was introduced as a solution to provide accessibility information for restaurants to PWD with the intention they would use this knowledge to determine if a restaurant was accessible for them prior to visiting the establishment.

myAccessTools

myAccessTools is an app within the ARB project that provides accurate building accessibility information without requiring prior accessibility knowledge or training. myAccessTools (Figure 1) is a measurement instrument that centers around of two elements, functions and features [8]. The functions section examines what actions are required by an individual to utilize a building feature. The feature section investigates what features are present at the building being assessed. Having these two elements emphasizes the PEO model, utilized in occupational therapy, that the ARB project has incorporated since its inception. The individual evaluating symbolizes the “Person”, the feature represents the “Environment”, and the function signifies the “Occupation”. Item descriptions are provided and guide the evaluator in appropriately allocating the correct score to the item. The scoring utilizes a Trichotomous Tailored Sub-Branching Scoring (TTSS) system that includes the options Yes [2], Maybe/Unsure [1] and No [0] with questions branching if more information is needed by the evaluation. Upon completion of an evaluation, total accessibility score and individual impairment scores of the building are provided. In addition, myAccessTools enables evaluators to include photos, videos and measurements during the evaluation by

collecting data using the MiniTools. These MiniTools are AccessRuler, AccessSlope and AccessSound and all gather data utilizing measurement system hardware within an iOS device.

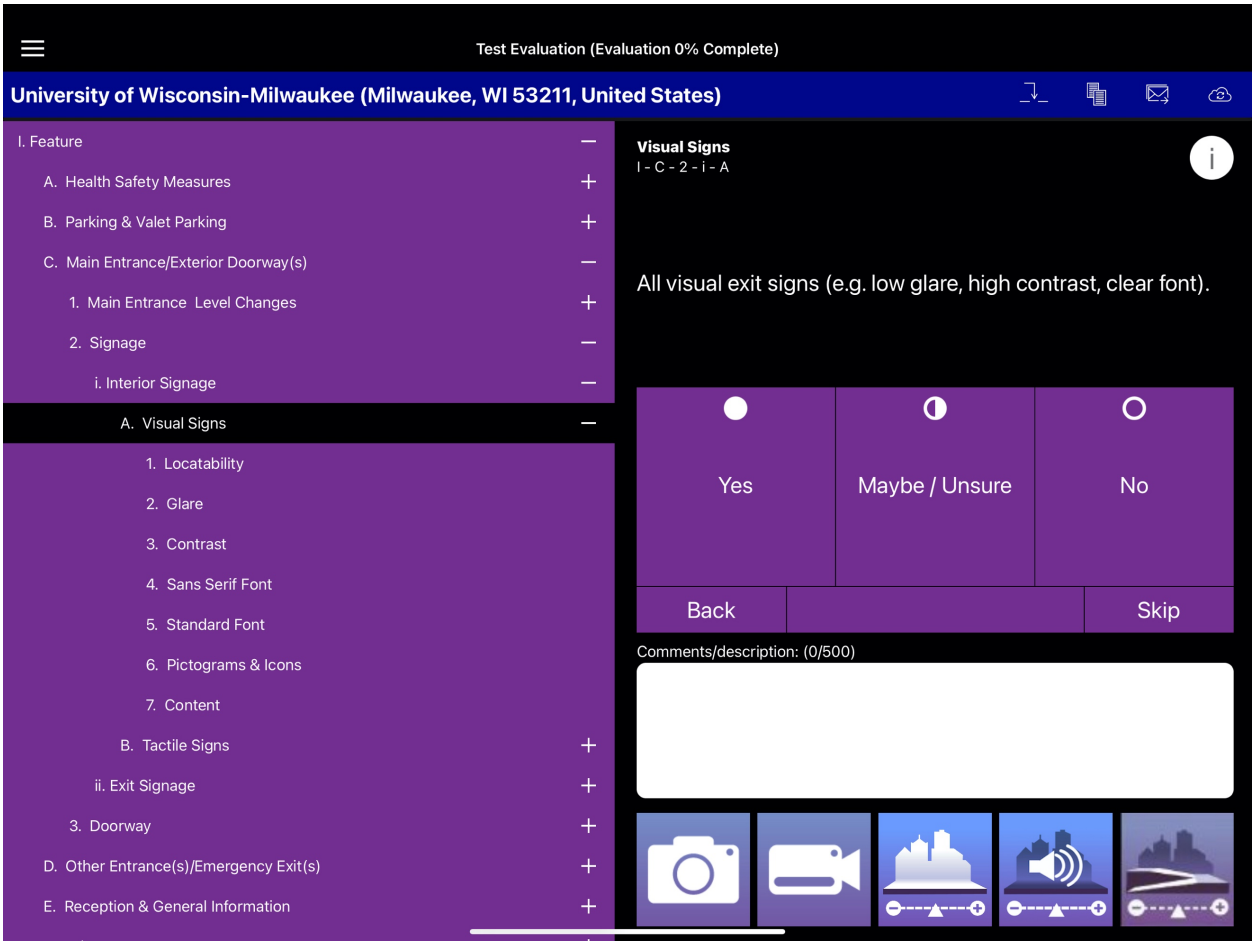

Figure 1: myAccessTools application

METHODS

The myAccessTools app impairment-weighted scores were investigating by requiring testers to examine 16 different impairments. Matrices were created containing every item within the app taxonomy and assigned weighted scoring for each of the sixteen impairments (Figure 2) examined based on how much the impairment is impacted by the item. Researchers were assigned a restaurant with a known accessibility score and completed two different evaluations for a specific impairment. The first evaluations were evaluating the restaurant as fully accessible for an individual without the impairment and only somewhat accessible for an individual with the impairment. The second evaluation was executed by assessing the restaurant as fully accessible to an individual without the impairment and not accessible to an individual with the impairment. The scoring for these evaluations was done using a trichotomous scoring technique that consisted of answer options of Yes [2], Maybe/Unsure [1] and No [0]. For fully accessible scoring with individuals without the impairment, Yes [1] was used. Scoring for somewhat accessible in the first assessment were completed using Maybe/Unsure [1] and not accessible scoring utilized the No [0] option. Once evaluations were complete, impairment-weighted scores are to e input into a scoring algorithm and compared to one another to ensure a differentiation. For example, the scores for lower limb impairment will be compared to the score for the mild to moderate visual impairment to confirm impairment-weighted scores were different. Evaluations will also be compared to each other in the same impairment category to certify a difference between somewhat accessible and not accessible scoring.

Categories of Impairment Types			
Hear of Hearing	Expressive Communication	Sensitivity Impairment	Upper Limb Impairment
Deaf	Comprehension Disorders	Lower Limb Impairment	Total Upper Limb Impairment
Mild to Moderate Visual Impairment	Other Cognitive Disorders (memory, executive functioning)	Total Lower Limb Impairment	Systemic Body Impairment
Blind	Behavioral Impairment	Head/Neck/Trunk Impairment	No Impairment

Figure 2: Impairment categories examined when validating the myAccessTools impairment-weighted scores.

RESULTS

Data collection has been completed and accessibility results are currently being implemented into a scoring algorithm that will provide impairment scores for buildings. These scores will account for the weighting of specific building features and combine them to provide a comprehensive impairment-weighted accessibility rating. It is expected the applied algorithm will function as intended and result in reliable and valid impairment-specific accessibility scoring within the myAccessTools app.

DISCUSSION

While development of the impairment-weighted scores for myAccessTools is in progress, it is anticipated the application will provide the targeted results. This would validate the myAccessTools app as a robust measurement instrument for collecting, interpreting and providing accessibility data that can be used by any individual. Upon confirmation the assessment provides the desired functions, further development of the app should be conducted, specifically advancement of impairment scoring and including comorbidities. This will allow users to have an even more personalized accessibility rating of a building if they have the capability of seeing multiple impairments scores averaged together.

CONCLUSION

The validation methodology of the impairment-weighted scoring was conducted and is expected to have myAccessTools operate as projected once results are input into the app's algorithm. This enables the app to be utilized by all individuals regardless of prior accessibility knowledge and provide comprehensive impairment-specific results. Due to the extensive taxonomy and features included, the impairment-weighted scores are expected to be reliable and valid positioning myAccessTools at the forefront of building accessibility measurements instruments.

ACKNOWLEDGEMENTS

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EqTDs

Figure 1.

Brief Description: Figure 1 is a screenshot of the myAccessTools application.

Essential Description: Figure 1 is a screenshot of the primary evaluation interface for myAccessTools that displays scoring items, their descriptions, scoring options, a comments section and optional MiniTools.

Figure 2.

Brief Description: Figure 2 is a table possessing the sixteen impairment categories examined.

Essential Description: Figure 2 is a four-by-four table exhibiting the sixteen impairment categories used by researchers.

Learning Outcome #1: By the end of this program, learners will be able to recite the purpose of the myAccessTools application.

Learning Outcome #2: By the end of this program, learners will be able to state the process for validation of the myAccessTools evaluation.

M/C Questions:

myAccessTools requires individuals to have _____ prior accessibility knowledge regarding building accessibility?

1. none (Correct Response)
2. little (Incorrect Response)
3. moderate (Incorrect Response)
4. extensive (Incorrect Response)

The validation methodology of the myAccessTools impairment-weighted scoring included two evaluations for each of the 16 impairments and _____?

1. no further development needed to be done (Incorrect Response)
2. a taxonomy update (Incorrect Response)
3. scores implemented into an algorithm (Correct Response)
4. user interface changes (Incorrect Response)