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The Restaurant Accessibility and Task Evaluation Tool: Development and Preliminary Validation

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Abstract

Objective : The purpose of this study was to develop and establish the preliminary validity of the Restaurant Accessibility and Task Evaluation Information Tool (RATE-IT), an electronic survey for evaluating restaurant accessibility for people with disabilities.

Methods : A multi-phase method was used to develop and validate the RATE-IT. The taxonomy was developed in phase one, while the validity of the content was tested in phase two. Finally, the validity of the constructs was assessed in phase three.

Results : The results indicated that appropriate items were included (relevance=0.99 and language level=0.99) and also supported that the RATE-IT evaluated the construct of restaurant accessibility (F=0.72, p=.40). When compared to a checklist of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for Buildings and Facilities questions, RATE-IT showed the potential to differentiate restaurants by their level of accessibility (p=.10). Further, the RATE-IT was also easy to use (p<.00), understandable (p<.00), and efficient (p<.00).

Conclusion : RATE-IT shows a promising methodology and is strongly preferred by users.

Key words : Architectural accessibility, Environment design, Validity

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Ⅰ. Introduction

Over 50 million Americans have a disability, and use countless public buildings in the community, including restaurants (U.S. Census Bureau, 2008). Restaurants represent an important type of building because dining out at restaurants is one of the most common and frequent activities for all people, including people with disabilities (Kaufman-Scarborough & Bakers, 2005). Restaurants provide a venue for many activities such as family gatherings, business meetings, social events, and recreation. In order to fully participate in dining activities, people with disabilities need equal accessibility.

However, not all restaurants are accessible to individuals with disabilities. As people with disabilities dine out at restaurants, they regularly encounter a broad array of inaccessible environments and tasks that "restrict choice, frustrate self-help, promote discrimination, and prevent integration" (Dejong & Lifchez, 1983). However, these barriers and experiences are highly variable due to an environment's different levels of accessibility and the specific impairments that person faces. So, people with disabilities often do not know what to expect when they dine out. In the last few decades, a paradigm shift on disabilities has revealed the importance of the environment as an essential factor affecting people with disabilities (Brandt & Pope, 1997; Imrie & Wells, 1992; Jette, 1994; Patla & Shumway-Cook, 1999; Pope & Tarlov, 1991; Satariano, 1997). In particular, occupational therapy places an emphasis upon the interaction between the person and environment (Canadian Association of Occupational Therapists, 1997; Christiansen & Baum, 1997; Dunn, Brown, & McGuigan, 1994; Kielhofner & Burke, 1980; Law et al., 1996). The Person-Environment-Occupation (PEO) model (Law et al., 1996) is a fundamental model that shows how the environment acts within the dynamic interactions between person, environment, and occupation when determining occupational performance. This model allows for changes to be made in the environment to enhance performance. When given a supportive environment, a person can function well within that environment. In contrast, when given a challenging or an inaccessible environment, one that cannot be controlled, the person becomes dependent on others to perform occupations. The environment affects people with and without disabilities in all aspects of life, including physical, social, cultural, economic, and organizational elements (Letts et al., 1994).

Physical barriers are one of the main obstacles in gaining independence (Pierce, 1998). The barriers of a building include poorly designed parking spaces, steps, narrow pathways, and high countertops. However, physical barriers include not only architectural limitations, but also functional inaccessibility of restaurant services. For examples, people run into barriers such as carrying food at a service line, navigating furniture temporally moved and in the way, placing orders, or finding the restroom. Together, physical and task barriers combine to impair social participation (Anson, Stanwyck, & Krause, 1993; Brandt & Pope, 1997; Fange, Iwarsson, & Persson, 2002; Frances, 1983; Imrie & Kumar, 1998; Kaufman-Scarborough & Baker, 2005; McClain, 2000; McClain et al., 1993; McClain & Todd, 1990; National Center for Medical Rehabilitation Research, 1993; Steinfeld & Danford, 1999; Swedberg, 2001; Tzonichaki & Kleftaras, 2002; WHO, 1980; WHO, 2009). Unfortunately, most accessibility assessments focus on the physical environment. The

ADA Guideline provides a primary example.

The Americans with Disabilities Act (ADA), enacted in 1990, is the most well known standard for requiring environmental changes. The ultimate purpose of the ADA was to prohibit and eliminate discrimination on the basis of disability (Americans with Disabilities Act, 1990). Revisions to the ADA Accessibility Guidelines for Buildings and Facilities (ADAAG) in 2010 (Department of Justice, 2010; U.S. Access Board, 1990) added improvements such as including more types of small public accommodations, requiring changes in policies and procedures of businesses (to allow people with disabilities to be provided more assistance), improving previous standards in the ADAAG such as lower heights for switches and more accessible parking spaces. However, accessibility standards remained limited in several ways. For example, while they include golf courses, they do not include many sports facilities.

Also, the ADAAG focuses on wheelchair access. A relatively small number of questions address people with impairments who do not use wheelchairs. Furthermore, the ADAAG only considers minimum access for public buildings (U.S. Census Bureau, 2008). These guidelines fail to optimize accessibility for people with disabilities. For example, according to the ADAAG, light switches must be installed between 15 and 48 inches off of the ground level. However, it is easy to see where 15 inch is too low. Accessibility issues also vary depending on the type of disability (Tharpar et al., 2004), requiring different access levels for different people (Reedy, 1993). Lastly, the ADAAG does not address all existing buildings. Buildings built before 1990 do not need to meet the ADA requirements until the buildings are remodeled.

There have been many attempts to evaluate and improve building accessibility and usability. However, they have several major limitations (Baker & Kaufman-Scarborough, 2001; Burnett & Paul, 1996; Lotito, Alvarez, & Pimentel, 1992). Firstly, hard to implement and interpret correctly because of technical terminology. Second, only focus on the architectural features and lastly, do not fulfill the needs of all people with disabilities. Thus, universal design is a possible solution.

Universal design (UD) is a concept that states products and environments should be equally usable for everyone (Center for Universal Design, 1997). According to the Center for Accessible Housing (1991), universal design can be defined as the design of products and environments that can be used and experienced by all people, without adaptation. The universal design approach requires the development of a new instrument for evaluating restaurant accessibility because the instrument is not only for people with a variety of types and degrees of disabilities, but also for those who have family members, friends, or colleagues with disabilities.

RATE-IT is an instrument used to evaluate the functional accessibility of restaurants in terms of universal design. It is more expansive than the ADAAG as it includes the functional aspects of dining at restaurant. The initial version of RATE-IT consisted of 965 statements and definitions including eight main categories 1) first entrance of restaurant, 2) second entrance of restaurant, 3) indoor pathways, 4) communications with restaurant staff, 5) dining areas, 6) women's restroom, 7) men's restroom, and 8) physical environment of restaurant and fifty two second level of sub-categories. The sub-categories had multiple questions that were used to describe

the restaurant features and reflected the descriptions of the restaurant features. Each main category provided a brief description of the domain and had a "Continue" button. This button did not have a function to score each main category. This option allowed users to proceed to the sub-categories. Other questions had five responses: "Yes" (no problem), "Partial" (some problem), "No" (major problem), "Not applicable" (The feature is not presented in the restaurant), and "Not examined" (Cannot examine the feature in the restaurant due to circumstance. For example, a man would not go into a women's bathroom. The women's bathroom is present, but it would not be examined by a man). Questions are organized in an outline hierarchy and scored with computerized questions branching similar to the OTFACT instrument. When the rater selects "Partial" in the response set, the question is broken down into sub parts. When the rater chooses "Yes" or "No", "Not Applicable" or "Not Examined" the software advances the users to the next subcategories on the same level without requiring the users to answer the follow-up questions in the given category (Smith, 2002).

The ADAAG Checklist was created to implement the ADA requirements. In the ADAAG, there are sections for general requirements and special facility types. For evaluating restaurants and cafeterias, general requirement checklists as well as restaurant and cafeteria checklists are provided. In this study the ADAAG Pro (Q90 Corporation, 2003) was used to provide ADAAG Checklist. This software has the same level of technology that RATE-IT does in terms of scoring restaurant accessibility. This program displays all questions and descriptions from survey forms. The ADAAG Pro has six main categories: 1) first entrance, 2) second entrance, 3) indoor pathways, 4) dining areas, 5) men's restrooms, 6) women's restrooms. Each category includes checklists regarding ramps, stairs, elevators, and so on according to the task that people might perform in the various environments. The ADAAG Checklist uses a dichotomous scale for response: only "Yes" or "No".

The purpose of this study was to develop and establish the preliminary validity of RATE-IT, a computerized restaurant accessibility survey for people with disabilities. This study tested three hypotheses: 1) Expert raters will rate the relevance and language level of items in the RATE-IT as appropriate (content validity); 2) When developing a list of inaccessible features of a restaurant, a novice group using RATE-IT will more closely match a list developed by experts than will a list developed by a novice group using the ADAAG checklist (construct validity); and 3) RATE-IT will discriminate poorly accessible restaurants from those more accessible (construct validity).

Ⅱ. Methods

RATE-IT was developed in three phases. Phase One consisted of taxonomy development. Phase Two included the content validation testing by a panel of experts using an electronic survey of the content validation tool. Phase Three ran an experimental design to test construct validity with an expert and two novice groups.

1. Study procedures

1) Phase One: RATE-IT Development (Taxonomy Development)

A three-step approach was implemented to develop hierarchical taxonomy of RATE-IT categories. Keys to all phases were considerations fundamental of accessibility, usability, and universal design features of restaurants. The first development phase included 1) a review of the literature, 2) iterative discussions with a taxonomy development team of specialists, and 3) integration of the RATE-IT taxonomy with a computer-based survey called xFACT. xFACT was developed by the R2D2 Center at the University of Wisconsin-Milwaukee, based on designs from the OT-FACT (Occupational Therapy Functional Assessment Compilation Tool) (Smith, 1995). The XFACT software presents the taxonomy in a branching outline. This stage led to an initial version of the RATE-IT software.

The comprehensive literature review was conducted for developing the taxonomy of RATE-IT by collecting appropriate items and questions from over fifteen of existing checklists and guidelines (e.g. DBTAC Northwest ADA Information Center, 2010; Stark, Hollingsworth, Morgan, & Gray, 2007; U. S. Access Board, 1990, 1992, 2004). Then, domains and categories were edited and added based on dining tasks and procedures. For example, ordering and retrieving food from service counter, accessible eating utensils, and pre-package meal items were added. Then, items that belong to the same environmental category were grouped together. Questions and definitions along with their detailed descriptions were revised according to specific conventions, such as using plurals, consistent tense and parallel grammar forms. Secondly, to edit and improve the taxonomy, a team of four accessibility expert members was created that included two experts. One expert was a professor and director of a research center related to assistive technology (AT) and UD at a university. The other expert was an instructor and associate researcher at the same research center. They have extensive experiences and substantial knowledge regarding assessment of accessibility, usability, and universal design. This team was supplemented with two graduate students working specifically in this area of accessibility measurement. In regular meetings, the team discussed conceptual edits and practical suggestions regarding branching, wording, and relevance of items. Based on these suggestions, the taxonomy was iteratively improved and refined.

The taxonomy was then loaded into the XFACT software as an electronic survey. As mentioned earlier the RATE-IT outline expands as necessary based on the user's responses, dictated by Trichotomous Tailored Sub-branching Scoring (TTSS). TTSS provides three response choices for scoring: (2) for "Yes" or "No problem"; (1) for "Somewhat" or "Some problem"; (0) for "No", "Major problem" or "Not applicable". This scoring system streamlines the process of scoring an assessment that is extensive (Smith, 1999).

2) Phase Two: Content Validity

The content validation of RATE-IT was performed in three stages. In the first stage, RATE-IT was alpha tested by the staff of the research center as they had experience with new instruments scoring accessibility. In the second stage, RATE-IT was thoroughly reviewed by the two experts. Both experts were professors and

directors at two different universities and research centers. Also, they had over 20 years of experience and expansive knowledge about assessment tools scoring accessibility, usability, and universal design. RATE-IT was updated and the taxonomy repeatedly revised based on their suggestions. In the third stage, an expert panel was used to judge the content validity of RATE-IT. The expert panel was consisted of three experts who were health professionals with a background in occupational therapy, accessibility, and universal design. They had at least master degree and conducted researches regarding the development of new instruments for people with disabilities. They have been specially trained and involved in several new assessments in terms of developing taxonomy for over 2 years.

A content validation tool, in the form of an electronic survey, was distributed to a panel of three experts with directions for using the tool. The experts rated 1) the relevance of each individual question included in the taxonomy for measuring restaurant accessibility based on the concept of universal design and 2) the understandability of definitions and labels for users with high school reading level using XFACT Validator tool.

The XFACT Validator was the tool used to solicit expert opinion question by questions to evaluate the appropriateness of items and language level of the RATE-IT. To avoid having neutral or ambiguous responses, this tool was devised as a 4-point ordinal scale; 4=highly appropriate, 3=quite appropriate, 2=somewhat appropriate, 1=not appropriate. Scores were acquired for each question on 1) relevance of the questions and 2) the language using a similar procedure to Lynn (1986) and Waltz & Bausell (1981).

The responses obtained from the experts were divided into "appropriate" and "not appropriate" with a dichotomous scale. A rating of either 3 or 4 was classified as "appropriate", indicating acceptable item relevance and appropriate level of language, and a rating of either 2 or 1 was classified as "not appropriate", indicating need for a major revision or low item relevance and poor understandability of items (Polit & Beck, 2006).

3) Phase Three: Construct Validity

Construct validity was assessed using a convergent validity process through an experiment with two groups of novices (a total of thirty four college students without disabilities studying occupational therapy or architecture) and an expert group (two experts). Two experts with over 35 years of experience in evaluating building accessibility and universal design areas assessed the restaurants' accessibility. (They are not the same experts as those who served on the panel of experts for content validation.) One expert was a faculty member in an occupational therapy and an assistive technology program at a university. The other one was a staff member of an independent living center in the city and the Disability Rights/Access Specialist. Following IRB approval, participants were recruited via flyers, invitation letters, and emails. The experts were solicited by individual contact through email and phone.

① Experimental procedure for the novice group: Participants were divided into two groups; Group A used RATE-IT and Group B used the ADAAG Pro (Q90 Corporation, 2003). The ADAAG Checklist (ADAAG Pro) was selected because this was a standard for evaluating building accessibility, most

assessment tools were based on the standard, and this tool had the same level of technology for scoring. Then, participants from each group were assigned to one of the two Milwaukee restaurants (Old Restaurant built before 1990 (Pre-ADA) and New Restaurant built after 1990). Both restaurants were considered "casual", in that people order their meals at a service counter and sit down in the dining area to eat their meal. Participant group composition was balanced by academic major and level. Student participants went to an assigned restaurant and ordered a meal. While dining at the restaurant, the participants considered the accessibility and inaccessibility of the restaurant using the Restaurant Accessibility Notes form.

② The Restaurant Accessibility Note: This open ended form was developed based on the categories from both the RATE-IT taxonomy and the ADAAG Checklist. The purpose of the notes form was to solicit observations from participants about the restaurant's accessibility when they dinned. The Restaurant Accessibility Notes form was intended to prompt memories of their experiences when they later scored the restaurant's accessibility using the RATE-IT or the ADAAG checklist.

After dining out, the student participants came to the research center to score accessibilities of restaurants using one of instruments (RATE-IT or ADAAG Pro). RATE-IT and ADAAG Pro were installed in each of four laptops. The participants were given the instruction by a data collector (trained undergraduate student) about how to use the instruments. Then, they were given the feedback survey and task procedure document and asked to follow and complete the survey independently.

③ Feedback survey and task procedure: The survey consisted of three parts: demographic information, task instructions, and feedback survey for using an instrument. Participants filled out basic demographic information (gender, school year, and the level of knowledge related to universal design), then recorded time of using instrument, scored the accessibility of the restaurants, and listed inaccessible features of the restaurants. Following their accessibility scoring of the restaurants (using one of the two instruments), they listed inaccessible features of the restaurant based on what they learned while using either the RATE-IT or the ADAAG Checklist. Participants could compare their own Restaurant Accessibility Notes with what they reported using the instrument that they used and write about inaccessible features in the survey. For the final step, students were asked to complete a feedback survey regarding experience of using instruments.

④ Experimental procedure of the expert group: The two experts independently evaluated the accessibility of restaurants. The experts were blind to the research questions, but were aware of the general purpose of the study. They received the Restaurant Accessibility Notes form for taking notes and visited the same two restaurants. They evaluated the accessibility of each restaurant and listed inaccessible features of both restaurants on the form. To develop a list representing experts' judgments about restaurant accessibility, all inaccessible items listed by an expert were selected.

4) Data Preparation and Staging

① Content Validity: Content Validity Index (CVI) ratings and comments from the previously described XFACT Validator software were translated into a spreadsheet, the item-level CVI was calculated, as

the proportion of three experts who rated it as 4=highly appropriate and 3=quite appropriate, and the scale average CVI. Item-level CVI of 0.67 or 1.00 was acceptable (0.67=the item was rated as appropriate by two raters; 1.00=the item was rated as appropriate by three raters), whereas a score of 0.33 or 0.0 (0.33=the item was rated as appropriate by one rater; 0.0=no raters indicated appropriate) was unacceptable.

② Construct Validity: Four steps were used to analyze the data set from novice and expert groups: 1) Lists were generated from novice and expert groups, 2) coded by two coders, 3) averaged judges from two coders and establishing inter-rater reliability between two coders, and 4) analyzed the averaged data using ANOVA procedure and an independent sample *t*-test using Microsoft Excel and SPSS 17.0.

The acquired lists from novice groups were typed for two coders (graduate students who are acquainted with concepts of building accessibility and universal design) to eliminate misinterpretation due to handwriting. They were asked to conduct a task, indentifying matched inaccessible items between the participants and experts. They were blinded to information about participants to avoid any bias in data coding (such as instruments used, majors, and participants' knowledge level about accessibility.) and were given the same RATE-IT data coding protocol to ensure consistent coding. The two coders performed the coding task independently.

The data set from each coder was averaged and then calculated for inter-rater reliability, which was established through analysis using the Spearman-Brown correction formula. The formula was used to produce a more reliable data set and describe a more accurate estimate because this study used the average of two sets of rater judges (Tuckman, 1978).

Prior to hypothesis testing, inter-rater reliability between the coders was evaluated using intra correlation coefficient (ICC) and obtained 0.702 by using a Type 3 intraclass correlation coefficient with an overall significance level of 0.05. This level was considered a strong agreement, but was not sufficient (〈0.075). However, using the Spearman-Brown correction formula with a Pearson correlation of 0.739 for the two coders, the corrected reliability presented 0.85 (considered a sufficient level for inter-rater reliability) (Portney & Watkins, 2009).

To test the primary hypotheses, the averaged data of two coders were analyzed using ANOVA (Analysis of Variance). First, two restaurants and two instruments were compared using the coded data (the number of matching inaccessible items) identified by each of the two groups (RATE-IT or ADAAG Checklist) across the two restaurants. Also, an independent sample *t*-test was used to compare two restaurants using the coded data identified by the group using RATE-IT. Finally, a descriptive statistic and an independent sample *t*-test were used to compare two instruments using the survey results regarding experience of using each of the two instruments.

Ⅲ. Results

1. Content Validity of RATE-IT

The CVI was calculated with two questions: relevance of items and language level of items. Also, modified kappa statistic was used to adjust the chance of agreement of item-level CVI (Polit, Beck, & Owen, 2007). For relevance of items, the results indicated all of the RATE-IT items revealed a

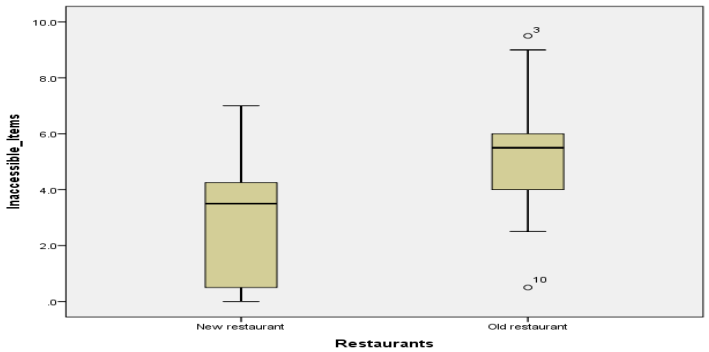

Figure 1. Number of Matched Inaccessible Features Between Restaurants (RATE-IT)

hypothetical acceptable item-level CVI of ≥ 0.67. 98.6% of the items had an item-level CVI of 1.00 (k*=1, Excellent), and 1.4 % (13 items) had an item-level CVI of 0.67 (k*=0.47, Fair). For language level (understandability), all of the RATE-IT items had an acceptable item-level CVI of ≥ 0.67. 97.7% of the descriptions had an item-level CVI of 1.00 (k*=1, Excellent), and 2.3% (22 items) had an item-level CVI of 0.67 (k*=0.47, Fair). For item relevance, the scale average CVI was 0.996, and for language level, the scale average CVI was 0.992.

2. Construct Validity of RATE-IT

1) Differences between two instruments and two restaurants.

Thirty four participants (n=34) completed the task, and the averages of the coded data were analyzed using ANOVA (Table 1). The test resulted in a significant difference (p=.001) at a .05 alpha level between the two restaurants with the two instruments: the old restaurant built before the ADA (n=18) and the new restaurant built after the ADA (n=16). A statistical significance was not reached for

Table 1. ANOVA for Two Instruments and Two Restaurants

	Sum of Squares	*df*	Mean Square	*F*
Instruments	3.533	1	3.533	0.716*
Restaurants	64.708	1	64.708	13.119**
Instruments Restaurants	1.945	1	1.945	0.394
Total	718.75	34		

* p=.404, ** p=.001

Table 2. *t*-Test for Two Restaurants (RATE-IT)

	Restaurants		*t*	*df*
	Old restaurant	New restaurant		
Inaccessible features	5.22(2.88)	2.94(2.44)	- 1.750*	15

* p=.101, Standard Deviations appear in parentheses below means.

the two groups using different instruments (p=.404); the RATE-IT Group A (n=17) and the ADAAG Group B (n=17).

2) RATE-IT's ability to determine levels of restaurants' accessibility

An independent t-test was used to compare the number of matching inaccessible features identified by the group using RATE-IT in the two restaurants (Table 2). Despite an obvious difference in the means, the results of the t-test indicated that statistically significant differences were not found (p=.101) between the restaurant built before the ADA (n=9, M=5.22, SD=2.88) and the restaurant built after the ADA (n=8, M=2.94, SD=2.44) (Figure 1).

3. Participants' Ease of Use Ratings for RATE-IT or the ADAAG Checklist

An independent t-test was used to compare the two groups of participants regarding the experience of using each instrument with the result of the feedback survey. Thirty four participants completed the feedback survey exploring the participants' use of the appropriate instrument. For all but three questions, the group using RATE-IT reported significantly higher scores than the group using the ADAAG checklist (Table 2). Furthermore, in terms of taking time on scoring accessibility with each instrument, the group using RATE-IT spent significantly less time than the group using the ADAAG checklist (Table 3).

Ⅳ. Discussion

The results of this study report aspect of the content, construct, face, and administrative validity of RATE-IT, and suggest that RATE-IT is a promising instrument based on the results of novices and experts.

The results indicate that the content validity of RATE-IT is very high with regard to two questions: 1) relevance (average scale of CVI=0.996), and 2) language level/understandability (average scale of CVI=0.992). For both questions, the item level and the average scale of CVI are above the acceptable scale average of 0.8 (Davis, 1992). RATE-IT appears to have appropriate items for evaluating the accessibility of a restaurant based on the concept of universal design. As RATE-IT was developed carefully with iterative stages with several cycles, the

Table 3. Score of the Feedback Survey on Using Instruments: RATE-IT and ADAAG Checklist

Questions(5 point scale)	Instruments	n	Mean	SD	t	p
Q1: The instrument was intuitive to use and user-friendly.	ADAAG	17	2.41	1.37	-4.81	.00
	RATEIT	17	4.18	0.64		
Q2: The instrument covers all features important access for using a restaurant.	ADAAG	17	3.88	0.99	0.65	.52
	RATEIT	17	3.65	1.11		
Q3: The instrument interface was easy to navigate.	ADAAG	17	3.00	1.32	-4.31	.00
	RATEIT	17	4.53	0.62		
Q4: The questions were easy to understand.	ADAAG	17	2.00	1.00	-4.08	.00

Questions(5 point scale)	Instruments	*n*	Mean	SD	*t*	*p*
	RATEIT	17	3.62	1.29		
Q5: The instrument provides sufficient understandable information for scoring restaurant accessibility.	ADAAG	17	2.35	1.17	-4.67	.00
	RATEIT	17	4.00	0.87		
Q6: The definitions were helpful.	ADAAG	17	2.82	1.55	-3.50	.00
	RATEIT	17	4.29	0.77		
Q7: The definitions were easy to understand.	ADAAG	17	2.59	1.46	-4.05	.00
	RATEIT	16	4.25	0.77		
Q8: The instrument is easy to score.	ADAAG	17	2.82	1.33	-3.45	.00
	RATEIT	17	4.12	0.78		
Q9: I felt I had enough knowledge about accessibility to answer the questions.	ADAAG	17	2.18	1.01	-5.12	.00
	RATEIT	17	3.88	0.93		
Q10: Training would have helped me answer the questions better.	ADAAG	17	4.06	1.03	1.63	.11
	RATEIT	17	3.41	1.28		
Q11: The instrument took an appropriate time to score.	ADAAG	17	2.65	1.27	-4.85	.00
	RATEIT	17	4.29	0.59		
Q12: The instrument reflected comprehensive aspects of restaurant accessibility for people with a variety of disabilities.	ADAAG	17	3.53	1.33	-0.80	.43
	RATEIT	17	3.82	0.73		
Q13: The instrument is a useful assessment tool for evaluating restaurant accessibility.	ADAAG	17	2.71	1.36	-3.92	.00
	RATEIT	17	4.12	0.60		
Q14: I would use this instrument for providing information about restaurant accessibility for people with disabilities.	ADAAG	17	2.53	1.37	-4.25	.00
	RATEIT	17	4.12	0.70		
Q15: I would answer the same if I were to score it again.	ADAAG	17	3.41	1.12	-2.45	.02
	RATEIT	17	4.17	0.64		

Scale: 5=Strongly Agree; 4=Agree; 3=Neutral; 2=Disagree; 1=Strongly Disagree

content validity of RATE-IT was expected to be high.

A convergent validity method was used to establish construct validity. RATE-IT was compared to the ADAAG Checklist. The results indicated that there is no significant difference between the two instruments: RATE-IT (n=17, M=4.15, SD=2.85) and the ADAAG Checklist (n=17, M=3.53, SD=2.29) based on the number of matching inaccessible features (F=0.716, p=.404). As the ADAAG Checklist was developed to measure the accessibility of buildings, the results of the differences between the two instruments serve as evidence that RATE-IT has a similar underlying construct to the ADAAG Checklist in terms of accessing and reporting building accessibility. Although the results did not support the second hypothesis of the study that RATE-IT group would identify more inaccessible features found by experts than the ADAAG group would, this lack of

significance is consistent with both instruments measuring a similar construct.

Results of the users' survey suggest that RATE-IT is a promising instrument compared to the ADAAG checklist in terms of time requirement, ease of use, and clarity of items and descriptions. Specifically, participants spent less time when using RATE-IT (n=17, M=18.85 min.) than the ADAAG checklist (n=17, M=44.65 min.)(Table 4).

The branching system of RATE-IT likely resulted in the significant difference regarding time requirement of using instruments even though RATE-IT has 965 scored questions compared to 749 of the ADAAG Checklist. Although ADAAG Pro provided the similar format and the number of questions, RATE-IT was more efficient than ADAAG Pro (Table 5). The results of the t-test supported this, showing that there was a significant difference between two groups (t=5.61, p<.000).

In addition, for the twelve questions related to ease of use and understandability of definitions, the results indicated that RATE-IT is significantly different from the ADAAG Checklist, the exceptions being three questions (Q2, Q10, and Q12). Both Q2 and Q12 asked about the content of the instrument. Q10 asked about training requirements. RATE-IT suggested similar and perhaps less training required than for using the ADAAG checklist. Overall, in terms of the practical use of each instrument, RATE-IT appears to be the preferred instrument based on this user sample.

The results from using both instruments (RATE-IT and the ADAAG checklist) indicated that there is a significant difference between the two restaurants in the number of inaccessible items: the older restaurant (built before the ADA) and the newer restaurant (built after the ADA) (F=13.12, p<.001). This would indicate that the two restaurants have different levels of accessibility. The newer (n=16, M=2.345, SD=1.92) had better accessibility than the older (n=18, M=5.14, SD=2.40), as indicated by the lower mean number of matching inaccessible items.

RATE-IT was developed to evaluate restaurants with various accessibility levels. Thus, to provide evidence of validity, RATE-IT must be able to determine the different accessibility levels of the two restaurants as evidence of test validity is obtained if there is a significant difference between the

Table 4. Required Time to Use Instruments(RATE-IT vs. ADAAG)

	Instruments	n	Mean	SD	t	p
Time(minutes)	ADAAG	17	44.65	16.95	5.61	.00
	RATE-IT	17	18.65	8.87		

Table 5. Comparison of the Efficiency of RATE-IT and ADAAG Checklist

	RATE-IT	ADAAG
The number of categories	8	6
Total number of questions	965	749
Branching system	Yes	No
The minimum number of categories for scoring	52	749

performances of two groups with known characteristics (Dunn, 1989). Unfortunately, while there were obvious differences in the means, a statistically significant difference between the restaurants were not found (p=.101); the older restaurant (n=9, M=5.222, SD=2.8843), the newer restaurant (n=9, M=2.9438, SD=2.4413).

This could be due to the relatively small number of participants. Based on a priori power analysis (a power of .08, α=0.05), thirty six participants would have been needed to obtain a statistical significance between the two restaurants by the RATE-IT group (The sample included seventeen). However, the lack of participants was likely not the main reason for non-significance. When participants developed lists of inaccessible features of the restaurants, they did not receive a clear and specific explanation about the way to list inaccessible features. Consequently, there was a wide range of types of inaccessible features. In addition, when coders matched inaccessible items between novices and experts, they were not provided a detailed step by step guideline for matching items.

This study investigated only two restaurants that have obvious differences in their levels of accessibility. The aim of using RATE-IT is to evaluate various types of restaurants with different levels of accessibility. Thus, for future research, more restaurants with varying accessibility levels should be evaluated using RATE-IT. In addition, the experiment central to this study was performed by college students without disabilities. They were asked to evaluate the restaurants' accessibility considering all types of disabilities. People with disabilities might offer both more read and more focused assessment of restaurants' accessibility. Thus, future studies should also recruit participants with different types of disabilities. However, an instrument such as RATE-IT is intended as an overall accessibility and UD assessment, not an impairment focused assessment measurement to be completed by a person with a disability from their unique perspective. Lastly, participants did not use the instruments while dining at restaurants. They had to rely on their notes and memories when scoring accessibility and listing inaccessible features after they had completed dining and left the restaurants. This procedure could have impacted the recording of the number of inaccessible features. If RATE-IT was provided through convenient methods to score restaurants' accessibility while dining such as smart phones, laptops, or notebooks, participants may have been able to provide more comprehensive information about the features they observed and could report more details about the restaurants' accessibility.

V. Conclusion

Based on the findings of this study, It is evident that RATE-IT presents a promising methodology with a strong preference by users.

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Abstract

식당의 접근성과 활동 평가 도구: 개발과 예비 타당성

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목적 : 본 연구의 목적은 식당의 접근성과 활동 평가 정보 도구(RATE-IT)의 예비 타당도를 확보하고 개발하고자 하였다. 장애를 가진 사람들을 위한 식당의 접근성을 평가하기 위해 전자 설문지가 사용되었다.

연구방법 : RATE-IT의 타당성을 확인하고 개발하기 위해 다양한 방법이 사용되었다. 연구 1단계에서는 관련 문항을 분류하였고, 2단계에서는 내용타당도를 검증하였다. 3단계에서는 구성 타당도를 측정하였다.

결과 : 연구결과에 따르면 적절한 문항들이 본 검사 도구에 포함됨을 알 수 있었다(relevance=0.99 and language level=0.99). 또한 이러한 결과는 RATE-IT이 식당 접근성의 구성 문항을 적절하게 평가할 수 있음을 시사한다(F=0.72, p=.40). 건물과 시설에 관한 문항을 검증하기 위해 Americans with Disabilities Act Accessibility Guidelines(ADAAG)의 체크리스트와 비교하였을 때 RATE-IT은 접근성 수준에 따라 식당을 분류 할 수 있는 잠재성을 보여주었으며(p=.10), 사용하기 쉽고(p<.00), 이해하기 쉽고 효과적인(p<.00) 것으로 나타났다.

결론 : 연구결과 RATE-IT은 사용자 관점에서 사용하기 쉽고 편리한 효용성을 가진 도구로 보여진다.

주제어 : 건축적 접근성, 타당도, 환경설계