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Bridge Builder My School Day Online Scheduler

A Fully Accessible Platform for Website Development

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Bridge Builder, which is in its alpha version, provides a user friendly platform through which any one with minimal computer knowledge can build an accessible educational web pages and/or websites. The scheduler portion of the *Bridge Builder,* known as *MySchoolDayOnline*, provides a format through which teachers, administrators, and students can access a calendar, task list, and schedule. This study investigated the accessibility and usability of the *MySchoolDayOnline* for students with visual impairments and teachers who work with students with visual impairments.

A. Student testing

Participants.

The alpha version of the *Bridge Builder* scheduler was field tested at the Tennessee School for the Blind, a day and residential school for children who are legally blind. Twelve students participated in the field testing: ten students were blind (light perception or no light perception) and used a screen reading program (JAWS) to access their computers, and two students had low vision and accessed the computer screen visually. Students worked individually or in dyads at eight computers. Each computer was coded

as a single subject for N=8. Students were paired based on equivalent computer skills and students frequently commented about their progress and frustrations sharing hints with each other so students working individually still had the opportunity to receive help from their peers.

Methodology.

In the first session, students were asked to find and input information in the most commonly used accessible electronic scheduler, Microsoft Outlook®. On the second day of testing, students were asked to find and input similar information in the *Bridge Builder My School Day Online* scheduler. The students were asked to complete eight items with Outlook® and ten items using the scheduler; the additional two items were logging in and out of the system. No instruction was given in using either system, and some students had limited experience with Outlook®. When students requested assistance, the researcher would provide hints and suggestions for completing the task, but she did not give direct instruction on using either program. Students were given one hour to complete the items during each session. Three to four research assistants coded the student's performance indicating which items were attempted, the level of assistance needed (independent, partial assistance, repeated assistance), and the accuracy of the students' answers and inputted data. At the end of the session students were asked in a group to give feedback on the experience including what they liked about each program, what they disliked, and what could be improved. Their answers were transcribed by the researcher.

Analysis.

The percentage of items attempted was computed by dividing the number of items attempted with the total number of items the students were asked to complete for each session. The percentage of items completed correctly and percentage of items completed independently were figured based on the number of items attempted rather than the total number of items requested. Matched sample *t*-tests were completed on the percentage of items attempted, the percentage of items completed correctly and on the percentage of items completed independently.

Interobserver agreement was measured for 19% of the participants in both sessions. Interobserver agreement ranged from 80-100% with a mean of 90%. All disagreements were on a student's level of independence. When disagreements occurred, the coding for the higher level of assistance was used in an attempt not to overestimate the students' success with the programs.

The interview responses were divided into units and categories were identified. Each unit was coded into a category and themes were identified.

Results.

There was a statistically significant difference in all comparisons. With the *My School Day Online* scheduler, students attempted to complete more items (X=100%) than with Outlook® (X=69%) (t=2.91, p<.05, two-tailed, df=7). Of the attempted items, students were able to find the requested information or enter the correct information more frequently using the *Bridge Builder* scheduler (X=90%) than with Outlook® (X=31%) (t=2.00, p<.05, one-tailed, df=7). Of the attempted items, students were able to complete

the items independently more frequently using the *Bridge Builder* scheduler (X=83%) than with Outlook® (x=50%) (t=2.13, p<.05, one-tailed, df=7).

The comments received during the interview were grouped into three main categories, positive statements about the functionality of the *Bridge Builder My School Day Online* scheduler*,* concerns identified with *Bridge Builder*, and ways to improve or expand *Bridge Builder.* The majority of responses were positive statements about the *Bridge Builder* (64%) with fewer responses that identified concerns with the program (18%) and offered suggestions for improvement (18%).

The positive comments primarily revolved around the *Bridge Builder's* easy to navigate layout without use of drop down menus. One student said, "I'm not very bright but it was easy for me to find stuff and that's really saying something." Another student commented, "I didn't get lost. It was so easy to navigate, I *couldn't* get lost!" For the users who are blind who accessed the site with JAWS screen reader software, specific comments focused on having an html based program that made good use of links. One user stated that the html programming was good because "JAWS understands that" and other users commented that the labeling and link organization was "really well done." Another JAWS user explained as "Everything was sticking out on page asking you to click on it."

For the visual users, the main positive was the lack of visual clutter on the screen. Neither visual user chose to use the color or size options during the testing. When these options were demonstrated during the interviews, the students thought these options were "cool" and they stated they wish they had used them.

The negative comments and suggestions for improvements all came from the JAWS screen reader users. Some of the participants stated that the calendar was difficult to navigate and that the form field boxes for inputting dates were not as well labeled as they could be. They also stated that when links begin with punctuation marks it is difficult to find them. The suggestions for improvement mainly dealt with adding features such as a search engine and an email account with an address book.

Discussion.

The students unanimously preferred and were more successful using the *Bridge Builder My School Day Online* scheduler than Microsoft Outlook®. One student stated that "If it (*Bridge Builder)* was a person, I would hug it." Despite the difficulty experienced with Outlook, one student was able to complete all tasks using Outlook® indicating that the program is accessible but not very usable. One student summarized the opinion of the group when he said "…the calendar in Outlook is quote fried." It was interesting to note that the students with low vision who accessed the Outlook visually had as many problems and performed equivalently to the students who were blind and used JAWS screen reader software to access Outlook.

The difficulties encountered by the students with the calendar and date form fields were directly related to their skill level in using JAWS. The students who had not learned how to navigate tables had difficulty with the calendar and students who were not familiar with combo boxes had difficulty determining the nature of the form fields in the dates. Students who were more proficient JAWS users did not have difficulty with the *Bridge Builder* program, but all students had difficulty using Outlook.

B. Teacher testing.

Participants.

Eight teachers, all of whom are certified in teaching students with visual impairments, participated in the testing: four teachers with typical sight, three teachers with low vision, and one teacher who is blind.

Methodology.

The teachers participated in one 90 minute session in which they were asked to complete 12 items using the *Bridge Builder* scheduler. When teachers requested assistance or appeared to be frustrated, the researcher would provide hints and suggestions for completing the task, but she did not give direct instruction on using the program. Three research assistants coded the teacher's performance indicating which items were attempted and the level of assistance needed (independent, partial assistance, repeated assistance). After completing the items, teachers participated in a group interview about their experience with the program. Their answers were transcribed by the researcher.

Analysis.

The percentage of items attempted was computed by dividing the number of items attempted with the total number of items the teachers were asked to complete. The percentage of items completed independently was figured based on the number of items attempted rather than the total number of items requested. Due to the small sample size, only descriptive statistics are reported comparing the performance of teachers with typical sight with teachers with visual impairments on the percentage of items attempted and on the percentage of items completed independently.

Interobserver agreement was measured for 25% of the participants. Interobserver agreement ranged from 92-100% with a mean of 96%. All disagreements were on teacher's level of independence. When disagreements occurred, the coding for the higher level of assistance was used in an attempt not to overestimate the teachers' ability to use the program.

The interview responses were divided into units and categories were identified. Each unit was coded into a category and themes were identified.

Results.

In the time allotted, all of the typically sighted teachers completed 100% of the requested items, while the teachers with low vision completed 83-100% of the items with a mean of 93%, and the teacher who is blind completed 67%. Of the items attempted, the typically sighted teachers completed 92% of the items independently with a range from 83-100%, the teachers with low vision completed 82% of the item independently with a range from 75-92%, and the teacher who is blind completed 13% of the items independently.

The teacher comments during the focus groups were grouped into two main categories: positive statements about the *Bridge Builder* and ways to improve or expand *Bridge Builder* with equal numbers of comments in each category. The positive comments were grouped into three main topics: the program was simple to use without needing instructions, the visual layout contained necessary information without unnecessary clutter, and there were good options for font sizes and color that did not require left-right scrolling. Even the teachers with typical sight appreciated options for adjusting the font size and color. Suggestions for improving and expanding *Bridge Builder* primarily focused on providing more information about class schedules and incorporating additional features such as gradebooks and attendance reports.

Discussion.

Though not as excited about the *Bridge Builder* scheduler as the students, the teachers were positive about the current features in the program. They want to see more features in the final product so that they can have one program to complete all or almost all paperwork tasks that are required of them.

Teachers with visual impairments had more difficulty using the program than teachers with typical sight. The teacher who used JAWS screen reader software had the greatest difficulty and required extensive assistance. She was much less proficient in using JAWS than any of the students who participated in the testing. Though no formal measure of computer experience was taken, comments from the teachers indicated that the teachers with visual impairments had less computer experience and expertise than teachers with typical sight, possibly due to the lack of accessibility and usability in most computer programs. Despite the difficulties they experienced, all of the teachers who expressed an opinion found this program easier to use than the current scheduler programs used in their school.

Conclusions

Students and teachers had positive responses to the *Bridge Builder* scheduler program. All of the students, those using JAWS and those visually accessing the screen, found the program much easier to use than Outlook. The teachers expressed appreciation for a program that was intuitive to use. These results indicate that usability is as important as accessibility when designing sites to meet the needs of teachers and students with and without visual impairments. This research provided valuable information about the real world accessibility and usability of the *Bridge Builder* scheduler. The suggestions and critiques from the teachers and students are being incorporated into the beta version of the product.

Our Appreciation

We would like to express our deep appreciation to NCTI for providing the funding that made this research possible. Much has been learned through this process that is being integrated into *My School Day Online* and the *Bridge Builder*. It is also noteworthy that this NCTI-supported project fostered a 100% "virtual collaboration" between Wendy Sapp and Matt Kaplowitz. With literally hundreds of hours spent on this project, the first time Kaplowitz and Sapp met in person was at the NCTI Technology Innovator's Conference! Thank you, everyone at NCTI, for your continuing support and active participation that made this research project a reality.

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