

Feasibility of Online Video Lectures via Touch-Screen Mobile for Blind Users for Academic Purposes

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Abstract- The recent development of touch-screen based devices has given rise to unique and unstudied opportunities in the field of academics. This research was conducted to understand blind students' attitude towards the use of YouTube videos in an academic environment using a touch-screen mobile device. A prototype was developed for a course offered at the sixth grade level of primary school in Hail, Saudi Arabia. Ten blind students participated in the case study. Survey and focus group interviews were conducted: (a) to analyze blind students' perception of substitution of Braille course materials with YouTube video lessons and (b) to understand usability features of the prototype. The results show that the majority of blind students perceived YouTube course materials on a touch-screen based device (using an android app) to be equal to or better than Braille course materials.

I. INTRODUCTION

While it would be advantageous to identify academic uses of YouTube technology for blind users, very little is understood about the accessibility of YouTube videos using touch-screen (TS) mobile devices for blind students. Most modern educational programs that use YouTube videos have provided anecdotal feedback instead of rigorous academic research about the influence such use could have on education. Additionally, the adoption of touch-screen based devices for blind students in academic environments has not been thoroughly explored in research.

A better understanding of the functionality of mobile learning (m-learning) in an academic environment will improve future efforts in the replacement of print materials with digital materials. The purpose of this study was to explore what could be learned from pilot program participant perceptions in regard to YouTube lectures presented on an Android touch-screen device. To investigate this phenomenon, the researchers conducted a qualitative case study with the 10 blind student participants in a pilot study using a prototype. This research informs faculty, institutions, and mobile app developers on how to improve TS devices for future adaptation in academic environments. To shed light on the potential of TS devices and YouTube lectures, the following research questions were addressed:

1. How do blind students perceive video lectures on a touch-screen mobile device?
2. How do blind students perceive the usability of YouTube lectures using touch-screen mobile?

II. RESEARCH METHODOLOGY

This research explored what can be learned from a pilot program about the usability of video lectures via touch-screen mobile. This study was specifically interested in the pilot program's blind participants' perceptions. These perceptions are derived from their experiences using video lectures on a touch-screen device with a specific application within the social context of the pilot program. The details of participant responses describing their

unique experiences in the pilot program are significant in informing the proposed research questions. As a result, qualitative research methods were the most appropriate in approaching the questions involved in this study.

Multiple methods of data collection were utilized in this study in order to research the use of the Samsung Galaxy Touch-screen at the Public high School, Hail. The focus group included 10 blind participants. Data collection for this study occurred from April 8, 2014 thru May 3, 2014. We divided our research into three sections. First, a pilot test was conducted using the prototype (Figure 1). Secondly, questions were asked to blind students using questionnaires to satisfy the first research question. Thirdly, feedback was collected regarding the usability of our prototype.

The quantitative data collected through the survey are presented and analyzed utilizing descriptive statistics in order to inform the qualitative study. The student survey instrument was developed directly from the primary research questions and their supporting propositions. Each survey question was tied directly to one or more proposition.

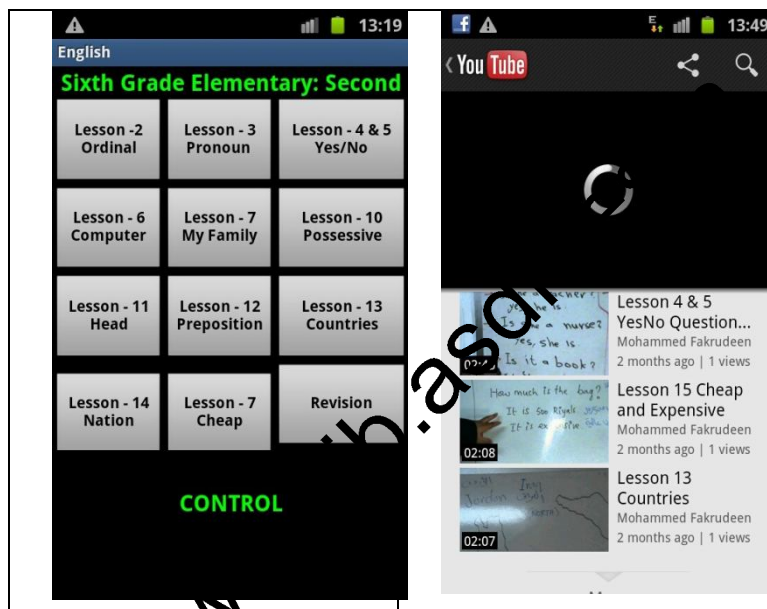


Figure 1: Prototype Design

III. RESULTS

Following is a presentation of the findings.

A. Research Question 1

Research question 1: How do blind students perceive video lectures on a touch-screen mobile? The first research question is supported by eight research propositions. These propositions act as a guide to inform the research questions and identify relevant data from across the research tools. The propositions were derived from the literature review and they have been referenced appropriately. Each proposition will be followed by relevant preliminary findings, all of which will be subsequently incorporated into a comprehensive finding for the first research question.

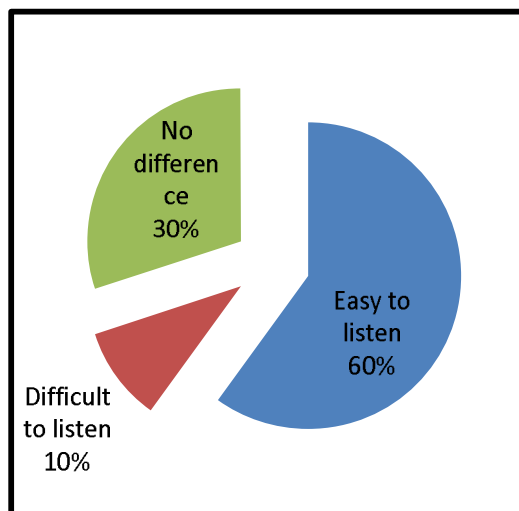


Figure 2: Frequency of listening

Proposition 1.1. How do students perceive the replacement of YouTube video lectures with Braille course materials with regard to their frequency of listening? [1]

The research asked respondents if they listen more or less often when using the prototype than Braille course materials and why they believed that they were listening more or less often. Four out of ten participants felt that they were listening more often than using the Braille materials (see Fig. 2). The reasons they gave indicated that they are more enthusiastic in exploring new ways of reading and it was easier to learn due to mobility in comparison to using Braille materials. A few of the respondents (3 of 10) felt that they listened less often, with two giving the reason that they worked in a secure facility in which they were not allowed to take the TS. The other respondents (3 of 10) felt that they were not very interested in exploring the device and they needed time to get used to TS to adapt to the culture of technology for academic purposes.

Finding 1.1. A clear majority of students (40%) perceived their frequency of listening to YouTube videos to be about the same or more often due to portability.

Proposition 1.2. How do students perceive the replacement of Braille course materials with YouTube lecture videos with regard to their duration of listening? [2]

The research asked respondents if they listen for longer or shorter periods of time when using the TS. Most of respondents (7 of 10) felt that their duration of listening to YouTube videos on TS is much shorter than actual lectures in the classroom (see Fig. 3). Some (2 of 10) felt that it took more time to listen to YouTube video lectures than classroom lectures. These two participants indicated that this was because in the actual classroom they can clarify doubts instantly whereas YouTube video lectures do not offer such a facility. In instances of needing clarity regarding a point in a YouTube video lecture, they would have to rewind and replay repeatedly until they understood the point. Only a minority of participants felt that there was no difference between the two modes.

Finding 1.2. A majority (70%) of the students felt that their duration of listening to course materials was shorter when listening using a TS device and YouTube.

Proposition 1.3. How do students perceive the replacement of Braille course materials with YouTube lectures with regard to their

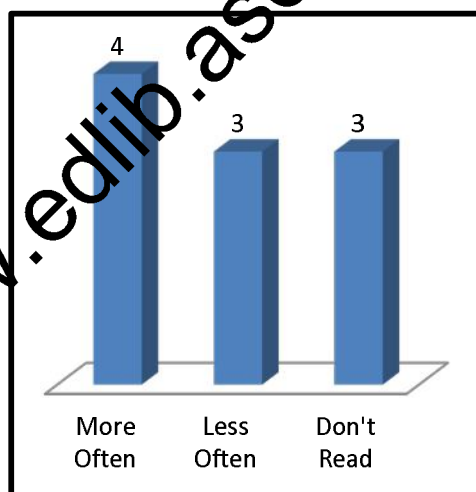


Figure 3 : Duration of listening

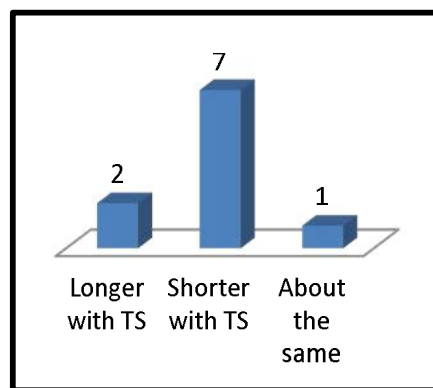


Figure 4 : Speed of reading

speed of reading? [3]. The research asked participants if they read or listened more quickly or less quickly when using the TS (YouTube lectures). Sixty percent (6 of 10) of the respondents listened more easily with TS while 20% listened with more difficulty and 20% felt that they didn't experience any significant difference (see Fig. 4).

Finding 1.3. 60% of the participants feel more comfortable listening to YouTube lectures than reading Braille materials.

Proposition 1.4. How do students perceive the replacement of Braille course materials with YouTube lectures with regard to understanding of course materials? [4]. The research asked participants if they find that they understand more or less of what they are reading when using YouTube video lectures in comparison to using Braille materials. Of the respondents, a clear majority (6 of 10) understood more, 20% felt that they understood less and the remaining 20% felt that did not

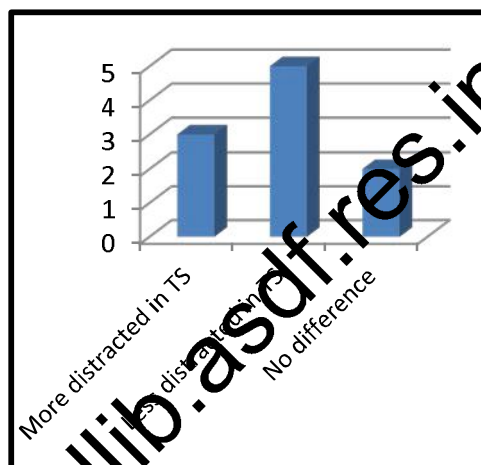


Figure 5: Comprehension

experience any difference between the two (see Fig. 5).

Finding 1.4. A majority (60%) of the students stated understanding is greater with YouTube lectures than with Braille because they can repeat the YouTube lectures more often than the Braille course materials. They also indicated that repeating Braille materials tends to be time consuming.

Proposition 1.5. How do students perceive the replacement of the replacement of Braille course materials with YouTube video lectures with regard to their class participation?[5]

The research asked respondents if they found themselves participating more or less in class after having listened to YouTube lecture videos with a TS. A majority (6 of 10) of the respondents found themselves participating more in class subsequent to listening to TS video lectures (see Fig. 6). However, 20% of participants felt that they participated less while the remaining 20% felt that their participation was the same.

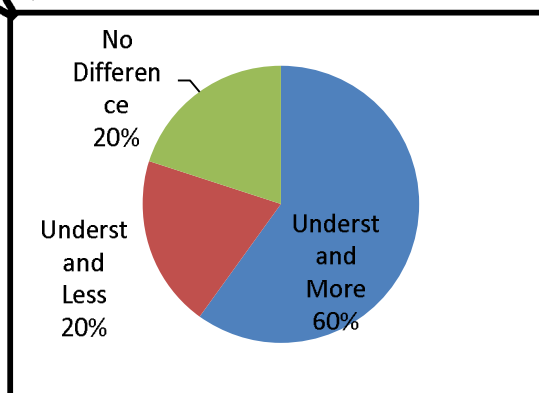


Figure 6: Class participation

Finding 1.5. The overwhelming majority (80%) of students participated the same amount or more after having YouTube lecture videos on TS.

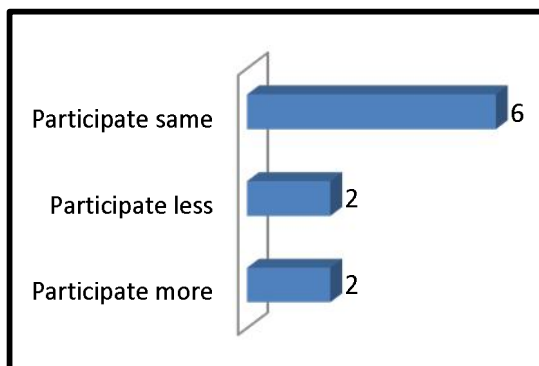


Figure 7: Class participation Page | 74

Proposition 1.6. How do students perceive the potential for distraction with a multi-modal device? [6]

The research asked participants if they found themselves more or less distracted with listening with the TS device when compared to Braille. Over half of the respondents (5 of 10) found that they were no more or less distracted when listening on the TS (see Fig. 7). The remaining respondents were almost evenly split between being more distracted (3 of 10) and less distracted (2 of 10). The research found that the ‘more distracted’ participants felt distracted due pressing the wrong target on the TS which resulted in additional time in order to return to normal operation.

Finding 1.6. A clear majority (50%) of students did not find themselves more distracted when reading on the YouTube lectures in TS. Some found themselves more distracted primarily by incorrect selection of target in TS.

Figure 6: Distraction

B. Research Question 2

Research question 2. How do blind students perceive the usability of YouTube lectures using touch-screen mobile? The second research question is supported by feedback on usability features with a Likert-scale (1-Strongly Disagree, 5- Strongly Agree) questionnaire. Each of the usability features will be presented with supporting findings from the research followed by an overall finding for the research question.

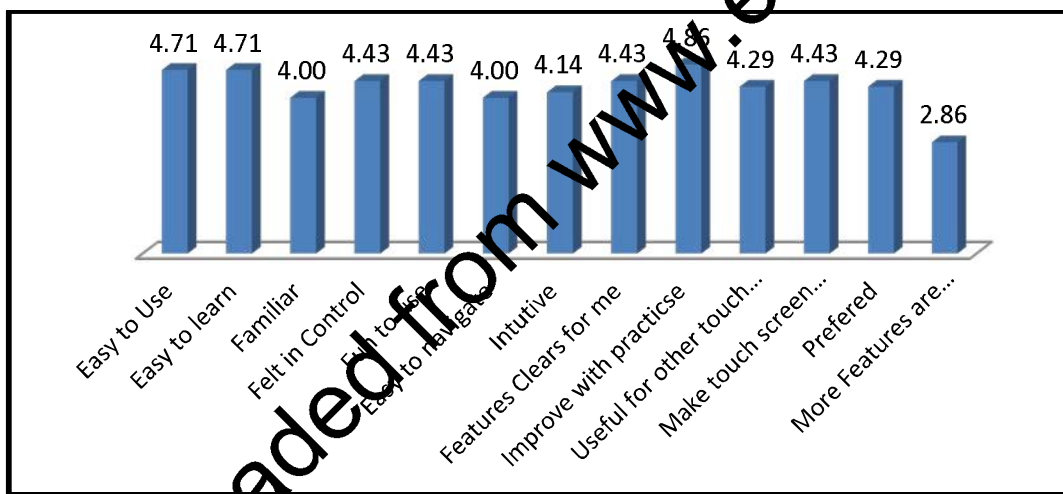


Figure 8 : Usability feature analysis for YouTube prototype

The research reveals that almost all blind users were satisfied with the accessibility features we applied to the YouTube lecture videos. Fig. 8 shows the average of the Likert-scale results for usability features. Most of the usability features were above 4. The last usability feature item asked the group if they need any more accessibility features for the prototype. Most of the blind participants felt that the prototype’s present accessibility features were sufficient and that there was no need for further improvement. The overall rating shows that they are very satisfied with the prototype.

V. CONCLUSIONS

The purpose of this study was to explore what could be learned from pilot program participant perceptions in regard to YouTube lectures and course related materials presented via touch-screen based mobile device as an

alternative to Braille course materials. The conclusions of this study in accordance to the research questions, findings and analyses specifically address the following areas: (a) touch-screen based mobile devices enhance learning experience and, (b) the usability of the touch-screen based mobile device for academic purposes.

A. *Touch-screen based mobile enhances learning*

The first major finding of this research is that the majority of students found that listening to course materials on a touch-screen based mobile device did affect their duration of listening, speed of reading, materials comprehension, and class participation. The majority of student participants in this study have an issue with a lack of variety in regard to Braille materials. In addition, a clear majority of students did not find themselves more distracted when listening to course materials on the touch-screen based mobile device. Also, most participants perceived their frequency of listening was more often due to portability and less reading difficulty when compared to Braille materials. Overall, this study concludes that the majority of students in the study perceived YouTube lectures in touch-screen based mobile devices to be as good as or better than Braille course materials.

B. *Usability of the touch-screen based mobile device*

The second and third major findings of this study are manifested in the multi-functionality of the touch-screen based mobile device accessibility for blind students. The majority of students perceived that the touch-screen based mobile device was easy to use, easy to navigate, controllable, intuitive and easy to learn. However, for academic purposes, the touch-screen based mobile device was primarily used as a content consumption device in conjunction with a personal computer. The third finding demonstrated that a clear majority of students found the touch-screen based mobile device personally useful, carried it with them more often, and found themselves using it more academically due to its convenience and portability. Therefore, this study also concludes in regard to blind students in this study, the portability and accessibility of the touch-screen based mobile device contributed positively to academic use of the device.

Acknowledgment

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