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A WEBPAGE DESIGN: ALSO BLIND STUDENTS MAY USE MOUSE

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Abstract: This study tries to indicate how blind students may use mouse tool via a web page prepared with Flash applications which gives a sound about force and motion, a unit of physics course, when you move mouse cursor to the buttons. After some comments had come from experts and blind students, this web page was developed. Data were collected by interviewing and messaging via e-mails. This system might be useful to integrate touchable technologies and blind students' internet accessibility without screen reader programs.

Key Words: Special Education, Physics Education, Using Internet

1. Introduction

Nowadays, technological developments are generally built on the touch-sensitive screens and Internet access. The new generations of mobile phones which have touch screens and Internet connection features are used by students, teachers who are working in education.

Similarly, touch-controlled screens and touch-based operating systems have always the same common point; touching.

Blind people can use programs which have screen reading feature to access the Internet (Akgul & Vercan, 2003). Those screen reader programs read the written parts of screen with digital voice. Thus, the visually impaired students are able to use the both Internet and the computer. Blind students may use their hands whether they don't want to listen the voice of screen with the help of screen reader software; however, the touch-controlled screens are not appropriate for them due to their two dimensional structure.

There may be some technical sounds but they are not for giving feedback to the user or directing for further usage. Those sounds are not functional for blinds, so they continue using screen reader software. Aydoğan, Cakir, Dilsiz and Özçakir (2006) suggested to transform the document on the screen to the Braille alphabet (tangible material with six points), but this method still put some interfrence for inclusive usage because there may be needed some special papers, hardware and software components. The method we suggest with this paper seems simpler than other supports.

The computer's mouse is an important part for most Internet users. It lets the user a fast access to the knowledge they look for via Internet. Some of users may prefer keyboard instead of mouse but those users are generally unusual comparing to the whole population. Contrary to sighted users, blind students use keyboard more frequent than mouse. It may be possible that they never use the mouse which general users prefer. For instance, they use 'tab' button on the keyboard to listen a sentence from different part of the screen with the help of screen readers. They have no chance with the mouse to do the similar activity, so they continue to use keyboard

with the help of reader software. In addition, any of mouse types have a feature to read the selected part and convert to voice. Wies, Gardner, O'Modhrain, Hasser and Bulatov (2001), are worked on the students' success are proven systems, such as computer graphics with numerous objects mounted on the motion of the mouse and feeling the effect of the magnetic force of feeling. The additional cost and the software requirements made this system uncommon.

This study aims to combine the contemporary innovation in computer technologies and blind students' rights about using mouse to access information. An audio record was prepared about common physics course in 9th grade to reach this aim, force and motion. 9th grade courses are contemporary for all students, so a blind student has to reach the behavioral objectives which were decided before to go on his or her high school education in Turkish high schools. Generally, force and motion unit is known as the most difficult subject matter in physics discipline.

Touchscreen as a contemporary innovation in computer technologies was chosen to design a web page for blind students about force and motion. This combination purpose of two cases includes the procedure of deciding the best way and directions for further studies. The research question for this study was stated that what the reflections of blind students are when they meet with the suggested design.

2. The Structure of Design

The design was based on a tree figure which has three main branches (figure 1). All branches of tree symbolize a main topic in force and motion unit; Newton's motion laws,

Motion, and Force. These three main branches have also three sub-branches. Each of sub-branch directs the user to a web page which sounds a helpful document for that subject matter.

Web page works with mouse's left click; one left click is used to listen related document and one left click helps to return the home page, so listening directions and moving the mouse (curser) is enough to use this system. All written buttons have sounds which read the same words written on. In other words, when the user moves the mouse to that button, they hear what is written on. The heart sound directs the blind students to choose a topic which they need to learn.

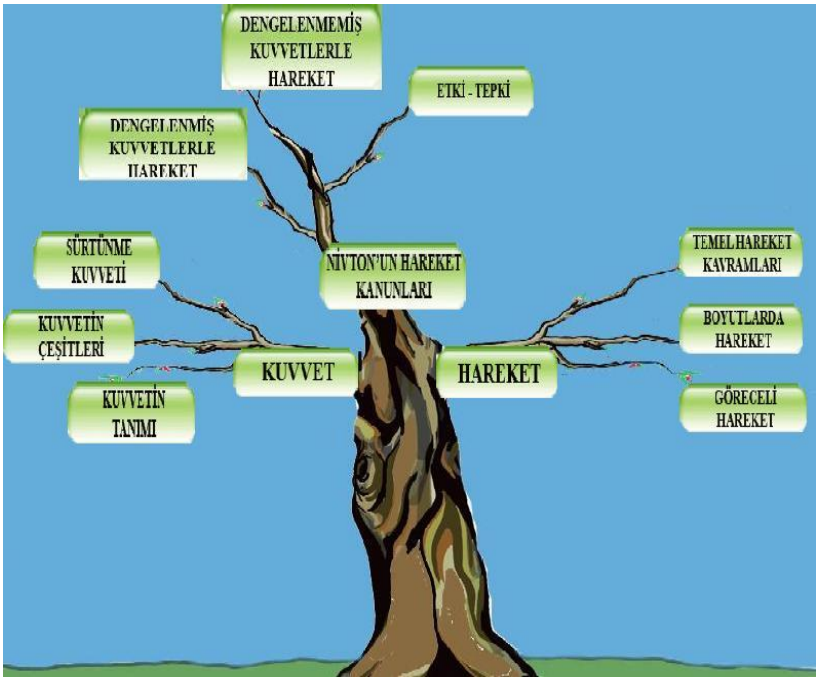

Figure 1. A look from the mentioned web page.

Designing processes was focused on blind students; however, sighted users are not ignored. It may be debatable in which level the design reached the universal design criteria (Howard, 2003) but the web page seems appropriate for all users. There is an automatic sound

which welcomes the user to guide. Screen resolution may be the insufficient point of the study; every user's screen size is different from others and a full screen flash web components which fits to the users screen has not been developed yet. Out of flash element, curser doesn't work for aimed purpose, so this screen size was the main problem to overcome before the research.

Web pages which were announced as 'blind friendly design' had been investigated to understand the important criteria before starting the current design. The summary from the investigation is that how screen reader programs work fast and without problem, it is appropriate for blind users in that level. There is only one assumption for this design's success that users have one computer mouse. Therefore, the criteria defined for blind friendly designs are not valid for this design. For instance; the label of a picture should be meaningful for blind users whether they use screen reader software because it sounds the name of picture while reading the screen. The user may not understand what is on the screen by the help of the sound from the screen readers' transform; however, the meaningful labeling of the picture is not necessary for this design; the sound which the user heart is loaded, planed and recorded file, not the name of picture, while moving the curser on the button.

While deciding the features of web page, the study developed by Yiğit, Altun, Alev, Dertlioğlu ve Bülbül (2007) was revised for blind users. For example; according to them, an educational web page should include help or support unit. This criterion was revised as guidance voice at the beginning of the usage. Additionally, used information in the web page was controlled by a specialist on physics education programme. He also checked the interview questions.

3. Methodology

After preparing the web page, it was reconstructed according to the specialists' and students' comments. One of the experts was blind and academician in education, the others were computer teachers. Students were randomly selected in Ankara Görme Engelliler Internet Café to ask the usability and to test the observable effect on achievement. Experts opinion was taken by the e-mail but interviews with students were done by face to face

Qualitative methodology was chosen for this study. Interviews and document (e-mails) analysis were two data collecting methods. The research problem of this study was about reflections of blind students, so the collected data on reflections was analyzed in terms of two categories; usability and effectiveness. For this purpose, some questions about force and motion were asked to the students to understand their achievement level before and after testing the web page. In other words, same questions were repeated to compare the differences.

4. Findings

There was meaningful difference with pre and post interviews. This difference was positive; it was observed that students' achievement levels were increased. There were no negative findings during the achievement interviews but for other category, usability, some recommendations were made and they were listed in table 1. The web page was reconstructed according to the six mentioned critics.

Some of participants expressed that the innovation should not be for just blinds because they don't want any special web pages for their usage; they want some methods which let them use internet more freely. Entrance to the web pages which all users can access is their choice. Essential point for this comment is that all pages will be transformed to this type whether they believe the importance it and some automatic web converters will be invented for this purpose. Changes in technology show that this defense is not a dream of future. Most of the companies finished they web pages' transformation or adaptation to the mobile phone and/or tablet usage.

Table 1. Some recommendations about the web page.

Recommendations
Tree figure is not meaningful for blind users.
It may be useful for the users with low vision if opposite colors are used on the entrance page.
There may be more audio buttons which were distributed on the page to direct the users; not for educational goals.
There should be a reference point which will help blind users to understand the buttons positions.
The web page should be useable soundless choice.
There are some miscoded pages and sometimes sound will be slower than the users speed.

Some other participants enjoyed the mouse. They said that they had heard the name of mouse before and could not match the animal and computer together. They explained that the new trail with mouse was exciting and seems that they may improve their mouse usage if they have more experience time.

5. Conclusion

It was tested that the web page design is usable and effective for blind students about force and motion. The mentioned designing process with additional recommendations, this study can be considered as guide for other educational studies on web pages and/or blind students. There are few studies on special education related to the educational technologies and this fact is one of the features which makes this study original. Therefore, similar studies may improve the understanding of blind's needs and usage of touch-screens and mousses.

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