On-line test model for people with visual impairment using information technology and Braille

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ABSTRACT
The purpose of this paper is to find a new method for blind and visually impaired people to answer questions on-line like on-line test. With the tremendous development witnessed by most aspects of life in the use of information technology, it has become morally necessary to develop the aspects of caring for people with disabilities to keep up with that development to help them integrate into society. The researcher presents a paper that includes designing a test on the Internet for people with visual impairments using specific low cost techniques and tools that can be used in visual impairment test online.

Keywords: visual disabilities, blind, Braille, special education, on-line test

INTRODUCTION
With the tremendous development in the field of information and communications technologies, the dependence on the Internet has increased dramatically in all areas of life. Although many countries have joined the UN Convention on the Rights of Persons with Disabilities[1][2][3], many of them have not provided real and adequate support to people with disability. Since the middle of the 20th century, Braille has been used in the education of visually impaired people, “Braille is the foremost tactile reading and writing system and is considered the primary means by which people who are blind can become literate”[4]. This has been reflected in the development of education, the development of students’ abilities, the evaluation of their performance and the evaluation of the educational process. Is a modern way to assess the level of performance of people and test their abilities in the educational process or even employment tests or surveys, etc., and provides the researcher in this paper model for the online test for people with visual impairment similar to the English language test TOEFL [5] which provides an audio presentation of the program in advance of specific questions and answer them the recipient where the recipient usually responds to a special paper by choosing answers while the researcher provides the answer through special web pages answer through which the blind and sends his answer to the party that conducts test.

Related works
There are many methods used by people with visual disabilities to deal with information technology, but their use in the performance of evaluation and testing is impractical and inaccurate. The reason for this is that the level of the incidence of error means the lack of objectivity of the performance of the test on the Internet, and listed some of the modern methods used. With the accompanying error rate. Apple’s VoiceOver with On mobile devices previous studies have shown that this method supports very low text entry rate. and In their evaluation of the system, Bonner et al. showed that participants were able to input text using No-Look Notes with 11% error and VoiceOver with 60% error, Typing- and Tapping-based Methods like BrailleTap maps inputs from the phone’s physical keypad into dots in a Braille code. Guerreiro et al. showed that the error 6.55% with BrailleTap, Gesture-based Methods, for example, 8.43% error with EdgeBraille method. [6]

Method
Test implementation tools
Several tools must be provided for the implementation of an online test for people with visual impairments: Internet service suitable for testing In order to access the electronic test site on the Internet, the researcher suggests using QR code [7][8][9] with Braille [9] to encode the code with the barcode reader to open the site page, as in Figure 1. A previous article by the researcher on the use of bar code can be found in support of the education of visually impaired people[11]
The test page can also be accessed on the network with the shortcut mode representing an icon to access the test page. A website designed and designed for this kind of testing that takes into account the specificity of visually impaired persons: The person being tested is registered by the relevant employee to give his own QR code for the test with Braille on the code and the site is designed with tactile touch and listening to the person being tested.

The design of the tools to enter the answer to the questions using Braille, “Braille is the more convenient way for blind and VI students to access the documents”[12] and touchable screen with buttons Braille on the screen (buttons 1 to 4) and as in Figure 1 where the buttons are flexible and prominent with the use of Braille to teach each button with the symbol of A-D look at Figure 2.

After listening to the question begins to answer the test so that the answer to the questions are choices from one to four per question and the answer is recorded on-line after being sent by the person under test, and depends on the person tested on the buttons printed Braille letters to distinguish between...
the buttons from letter A to the letter C and clicking on the answer button and according to the question sequence and the answer to each question after hearing the number and text of the question voice. The person who is tested by pressing the answer button where one answer can be chosen for each of the four answers to each question and to achieve this we use radio buttons in the HTML language for the purpose of fixing one and only one answer out of four choices. - In the design of the site's page, the radio button in HTML should be considered as an answer to the flexible buttons on the screen cover look at Figure 2, and there is no defect in this match because this design is essential in providing answers. In front of each line is a number of Braille that represents the sequence of the question. More than one page can be used for this test or just one page with four radio button, buttons selected for each question by directing $<\text{div}>$/div>. After completing the answer to the questions, the person who is tested by pressing the button SUBMIT to send the answers to the supervisor of the test.

Design of answer tools
The blind person will not be interested in the form of the test site as much as the efficiency and effectiveness of the site to complete the test. The researcher will focus on using the HTML language to deal with the page format and the buttons' locations, which must match the Braille buttons printed on the silicon screen cover. Visual impairment is highly efficient to answer test questions.

![Flowchart of the On-line Test Process](image)

**Fig. 3. The on-line test process**

**Assessment of answers**
The evaluation of the answers is automatically done by a program to correct the results, which automatically gives an assessment to each person who has been tested according to the registration information installed in the database. This ensures transparency and objectivity in the assessment of the test course with the use of means of control during the test Figure 3 and Figure 4.
Fig. 4. The on-line test process

Conclusion
The online visual impairment test enables visually impaired people to interact with IT on the Internet and conduct both educational and employment testing. This will provide additional opportunities and open up new horizons for the integration of this important segment into society more efficiently. And we can use the same Application to test ordinary people after dispensing with flexible Braille cover.

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References