

Article Arrival Date**30.10.2020****Article Type****Research Article****Article Published Date****15.12.2020****Doi Number:** <http://dx.doi.org/10.38063/ejons.366>**BICYCLE SLIDING SYSTEM FOR THE VISUALLY IMPAIRED****Murat CANPOLAT**

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ABSTRACT

The visually impaired individual uses various special tools and devices while living her daily life, doing sports, performing her profession. These tools minimize the difficulties and disabilities caused by vision loss. The visually impaired individual who uses such special tools does not have to be dependent on others for many issues. S/he benefits more from educational, cultural, social and economic opportunities. The advantages of a system or tool made to a person can only be understood after starting to use it. Studies should be carried out to let visually impaired individuals do all the activities that normal people can do at the maximum rate.

The study, 'To test the effect of the developed system on the ability of visually impaired individuals to ride bicycles' was made to find the necessary solutions to the issue that 'Visually impaired individuals can ride alone without assistance'

In order for the system mounted on the bike to work smoothly, code was written with Arduino and uploaded to the arduino uno card. Since the system we have developed transmits the obstacle detected by ultrasonic sensors on the front and both sides of the bicycle with the help of the sound of the buzzer, the visually impaired can ride the bicycle without any problem.

To check over the premises foreseen in the hypothesis, the system was mounted on a bicycle and tested for functionality.

Thanks to the system mounted on the bicycle, the visually impaired will be able to determine the unimpeded route, they will be able to detect whether there is any obstacle on the transportation route, by turning the steering wheel to the right and left and continue to ride the bicycle without any problems.

Keywords: Visually Impaired Person, Bicycle, Arduino, Coding.

1. INTRODUCTION

Disability is mental-physical disorders that limit and restrict an individual's life activities. In other words, it is the state of limitation-deficiency in the abilities and power of the individual. World Health Organization (WHO) defines the disability as, "Lack or limitation in performing normal activities expressed as behaviors, abilities and duties expected from the person or the body as a whole",

"restriction or failure to fulfill the roles expected from the person due to an inability or disability depending on age, gender, social and cultural factors". (1)

Groups of disabled individuals are the largest minority groups in the society. These people experience many problems in every field and everywhere due to their disability. The main problems that they encounter are social exclusion, discrimination and prejudice. Unfortunately, disabled people lack the most basic rights. We may think that they have many problems and they are incapable of solving them. The problems of these people are based on many reasons. The most obvious of these are based on physical, social, cultural and economic reasons. They can participate in daily, urban and community life to a limited extent. They have serious and pending problems from education to health, occupational rehabilitation to culture and arts; improving sports and urban standards.

The condition when people's visual defects cannot be healed with glasses, lenses, surgery or medication; or in which the level of vision is very low or not at all is called as low vision or blindness. Visually impaired individuals are not pitiful, needy people. The visually impaired people have been abstracted by the others, pushed to the background for centuries, deprived of material and spiritual opportunities and they have not been socialized or given sufficient attention for ages, have been seen as a bleeding wound of society. Visually impaired is no longer a bleeding wound of the society, thanks to our state supporting them by taking educational and rehabilitative measures for these individuals, through improvement works both financially and socially.

Visually impaired individuals are categorised as; B1 blinds, B2 those with partial vision and B3 those who are within the legal limit of blindness to some extent. Impaired vision allocated to this category are participating in national and international competitions like futsal (b2, b3), athletics, goalball, weightlifting, chess, swimming, football, judo in 8 different branches with the help of Turkey Blind Sports Federation. Visually impaired athletes participate in time trial races with a visionary teammate, riding two-person bicycles. It is possible for B1 visually impaired individuals to ride a bike alone and even participate in competitions; however, it is necessary to work on this and create the necessary systems.

Sports clubs for the Visually Impaired; there are 252 visually impaired sports club according to Turkey Sports Federation. Visually impaired individuals benefit from these clubs. In the clubs, participation in competitions is ensured by training in athletics, football, futsal, goalball, weightlifting, judo, chess, and swimming sports branches, respectively.

In Turkey, physical education applicant teachers training does not involve how to teach coding to the disabilities students. Thus, the applicants don't have enough perspective on teaching visually impaired children (Köseler, 2012). Bülbül (2013) states that teachers must focus on "how to teach more than they can not learn". They are suggested to create their own materials to improve social

and physical competences of visually impaired students. In another study, Bayram and his friends (2015), highlights the problems that visually impaired students encounter during inclusive education. Difficulties about teaching mathematics is also experienced in other countries (Akakandelwa & Munsanje, 2012; Healy & Fernandes, 2011; Pritchard & Lamb, 2012).

Sport is an important pastime for a healthy and happy life which is essential for all people. However, sport has a great importance for disabled people. The authors, who philosophically evaluate the benefits of participating in physical activities for the disabled, emphasize its contribution to affective and psycho-motor development. Cited from Özer (2001), Brouwer, Ludeke (1995) and Atar (1995) stated that sports are extremely valuable for both physically and mentally healthy people and disabled people; however, disabled individuals have more needs for sports.

Sports teaches the disabled individuals how to cope with their disability and alleviate their barriers. It also gives them pleasure, provides communication and sharing atmospheres, increases their motivation for life, and helps them acquire positive personality traits such as honesty, tolerance and cooperation. (Vickermann, 2007).

Considering the conditions of the country, physical education classes are the first place where many disabled people encounter sports. Participation of disabled children in sports activities can be supported or directed by physical education classes in the schools they attend. Physical education classes, which are partially adhered to the National Education program but given some regulations according to the types of disabilities, are also very important in terms of the disabled students to become more independent and social in the future, and to meet and adopt sports.

2. GOAL

The study, 'To test the effect of the developed system on the ability of visually impaired individuals to ride bicycles' was made to find the necessary solutions to the issue that 'Visually impaired individuals can ride alone without assistance'.

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3. IMPORTANCE

According to the researches done in the framework of this study, no scientific publication found indicating that visually impaired people ride a bicycle alone or participate in competitions without any support.

4. METHOD

4.1. Model

Experimental and field observation data collection methods were used within this study. Experimental research approach is a research method created to reveal the relationships between stimulus and response. An empirical research approach can be used to identify causal relationships as it allows systematic changes in one or more variables to be observed. (Johnson ve Christensen, 2008: 292). For this study, a group of post-test designs were chosen. In only one group post-test design, a treatment is administered (or an independent discrepancy is affected) and then, as soon as the treatment is administered, the independent discrepancy is measured.

Materials can be used in all standard projects.

The integrated system was placed in a box and mounted on a quadricycle.(Figure 3)

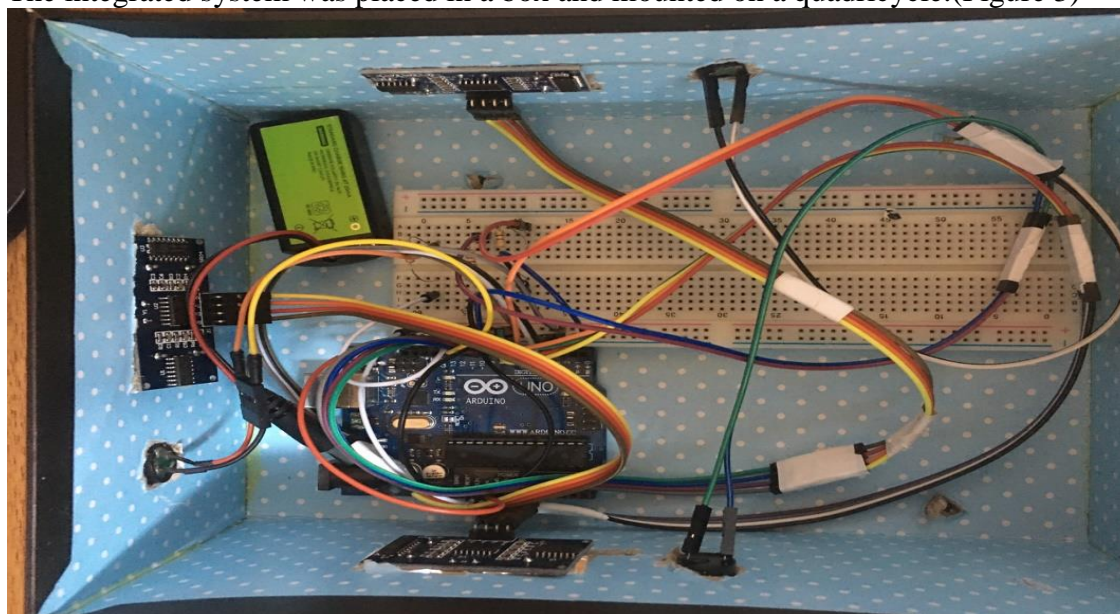


Figure 3: B1 system placed in the box

A field study was conducted to see the applicability of these materials. It was applied to 5 students from different age groups. In the field test, visually impaired students are expected to fulfill the task of using the System-installed four-wheeled bike alone. It was observed that the students could ride alone on the track. It was observed that they could not ride the four-wheeled bike before the system being installed.

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4.3 Participants

The students were chosen purposefully in this qualitative research to get reliable information (Lincoln & Guba, 1985). Purposeful selection is a method broadly used in qualitative study for the identification and collection of information-rich circumstances for the maximum operational use of partial means (Patton, 2002). It includes categorizing and choosing persons or clusters of individuals who are specifically familiar about or skilled with a phenomenon of interest (Cresswell and Plano Clark, 2011). Besides to familiarity and capability, Spradley (1979) and Bernard (2002) remind the significance of simple use and enthusiasm to take part in , and the communication skill that is, expressing ideas in an clear way and with deep meanings

The participants were a group of visually impaired students from secondary school level. A brief information is attached to the results section. Imaginary names are used to describe students.

In this study, 5 B1 group students with incomplete vision were included to test the B1 system. Three males and two females aged 11 years were involved..

The students tested received general school education. Ayşe (11 years old) 5th grade student, completely blind; Ayhan (11 years old) 5th grade student, completely blind; Murat (11 years old) 5th grade student, completely blind; Şahin (11 years old) 5th grade student, completely blind; Saadet (11 years old) 5th grade student, completely blind.

5. RESULTS

The B1 system was applied to the students and it was observed that each of them could not ride the "four-wheeled bike without the system". It was observed that the students could ride the "System installed four-wheel bike" alone on the track. According to this result, the B1 system can be used for individuals with disabilities who have never seen B1 group to ride a bicycle alone. In future, it can be developed and used in national and international competitions or can also be installed on any bike. The materials are cheap and ubiquitous, making them is economical. It can be used by teachers in schools by loading different codes.

REFERANCES

Bir sađlık sorunu olarak g rme engeli! En sık yařanan sorunlar ve   z m  nerileri. <https://www.medikalakademi.com.tr/bir-saglik-sorunu-olarak-gorme-engeli-bu-bireylerin-yasadigi-sorunlar-ve-cozuem-onerileri/> (Eriřim tarihi: 01.10.2019)

<http://www.gesf.org.tr/> (Eriřim tarihi: 14.10.2019)

<http://www.uslanmam.com/engelliler/528765-engellilerin-yaptigi-spor-branslari.html> (Eriřim tarihi: 15.11.2019)

Akakandelwa, A., Munsanje, J. (2012). G rme engelli  đrenciler i in  đrenme ve  đretme materyallerinin sađlanması: Zambiya'da yapılan ulusal bir anketin sonu ları. İngiliz G rme Bozukluđu Dergisi, 30, 42-49.

Johnson, B. ve Christensen, L. (2008). Eđitim arařtırmaları: Nicel, nitel ve karma yaklařımlar. Los Angeles: SAGE Yayınları.

Bernard, H.R. (2002). Antropolojide arařtırma y ntemleri: Nitel ve nicel yaklařımlar. 3. Alta Mira Yayınları; Ceviz creek