CREATIONS de UiTM

MEGA INNOVATION CARNIVAL 2020

For Knowledge and Humanity

PROCEEDING BOOK

6 - 8 MARCH 2020

CENTRE OF FOUNDATION STUDIES
UNIVERSITI TEKNOLOGI MARA
CAWANGAN SELANGOR KAMPUS DENGKIL

UNIVERSITI TEKNOLOGI MARA | Pusat Asasi

The Innovation of Rehal NEO Visual Disabled-Friendly

Siti Nor Azimah Sabaruddin*, Muhammad Haneef Taqiyuddin Mohd Hashim, Nur Anis Huda Aziz, Ain Nurfatehah Arupudin, Nurul Athirah Kamaruzaman

Centre of Foundation Studies, Universiti Teknologi MARA, Cawangan Selangor, Kampus Dengkil, 43800 Dengkil, Selangor, Malaysia

*E-mail: sitiazimah@uitm.edu.my

ABSTRACT

Rehal Neo is one of the innovations inspired by the original rehal available in the market. It is created for everyone especially for the disabled including the blinds to give convenience for them to read al-Quran. In the Quran in Surah Al-Qamar, stated that the Quran is a reminder for all mankind.

وَلَقَدْ يَسَّرْنَا الْقُرْآنَ لِلذِّكْرِ فَهَلْ مِن مُّدَّكِرٍ

With the creation of Rehal Neo, it will be easier for the visually disabled groups to place their al-Quran while reading it. This is because the Braille al-Quran is physically heavy, thick and big compared to the normal *cited* al-Quran. The design of Rehal Neo which is flexible, made with lightweight materials, is portable for the OKU groups to handle and carry around since the design is made similar to a briefcase. Moreover, Rehal Neo has the added values which the making of Rehal Neo uses the electronic component combined with a hinge that will simplify the uses of the rehal by only pushing the button to automatically open the briefcase into rehal shape and push the button once again to keep it back close as a briefcase when the are not in-used. This is contrary to the original available rehal in the market since the original one is usually heavy, making it hard for the OKU groups to carry them around everywhere. The results of this innovation are giving a big advantage to all types of groups, not only for the normal people but also for the OKU groups including those who are visually disabled.

Keywords: Rehal Neo; innovation; OKU; visually disabled group; lightweight; portable

1.   INTRODUCTION

In general, a rehal is an X-shaped foldable book rest used by Muslims to hold holy books for reading at home or in a mosque (Jim and Karan, 2018). Placing holy books such as Al-Quran on the table in your home, or somewhere on a low plane is so offensive and disrespectful as a Muslims. We should at least put the holy books above the knee level. So, it can be said that rehal is really crucial to be used for a Muslim as a symbol of respect during recitation.

However, we found that society nowadays is not really exposed to the use of rehal and it is eventually forgotten from time to time. It might be due to some physical factors of the rehal itself, as the shape of the rehal itself does not give a strain to the users- normal and disabled. But this Rehal Neo comes with other alternatives to solve these problems, where there are some innovations- Arduino and servo mechanism, so it will get a special place among society in the near future since people nowadays demand high on technologies and will ease the disabled people in their daily life.

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. In our innovation, Arduino is used to build up the coding and coded for the automatic-opening mechanism which applied to our Rehal Neo. At the same time, servo, which is an automatic device that uses error-sensing negative feedback to correct the action of a mechanism (Wikipedia, 2020) is used to move the rehal foot so that it can open automatically.

The combination of the Arduino's mechanism and feedback from the servo itself have improved the physical function of a traditional rehal. Hopefully, with these innovative features, it helps to achieve the main objectives of this project which is to help and improve the disabled people on their education system in daily life.

2.   INNOVATION DEVELOPMENT

Rehal NEO was designed to be used by all people but we give priority and focus on people with disabilities as they can use it in daily braille reading. Furthermore, this product can be easier to be kept on the shelves neatly and more organized as Rehal NEO can be folded into a box-shaped like a briefcase and has a handle for easy carrying. As an example, OKU people with visual disabilities can bring this Rehal NEO everywhere easily whenever they want to use it for their daily learning sessions. This thing can help people with visual disabilities because it has an innovative mechanism that allows automatic opening.

Next, how is the component of this system functioning? First, this system uses the Arduino uno board that acts as the microcontroller for this rehal. This Arduino board will be connected to the servo motor (L.Louis,2018). Then, the Arduino code used for controlling the servo motor. This combination will be functional if we connect it to a power supply. Thirdly, this rehal has a push button that will help to the automatic opening of this rehal. When it's button is pushed, the information is sent to the Arduino uno board and controls the servo motor in order to open this rehal. Pictures below is the pictures of product's development:

Figure 1: The first prototype of Rehal Neo

Figure 2: The testing process of Rehal Neo opening mechanism

Figure 3: The participation of Rehal Neo in KSTI at UiTM dengkil and won gold
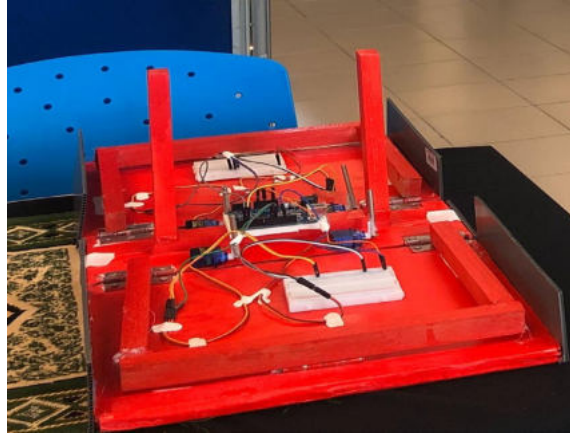
Figure 4: The product of Rehal Neo during the Creation De UiTM

Figure 5: The size comparison between the first prototype of Rehal Neo and the real product

Figure 6: The participation of Rehal Neo at Creation De UiTM and won gold

3.   COMMERCIAL POTENTIAL

Based on the data from KPM, in 2019 there are 88,419 students with special needs (OKU) that require special education and Selangor is the highest state with students with special needs with 15,127 students

(KPM,2019). Therefore, in order to cater the massive number of students, the ministry of education (KPM) will provide 1,109 classes of special Integrated Education Programme (PPKI) to about 7,591 students ' special Needs (MBK) throughout the country this year. Minister of Education, Dr. Maszlee Malik said the total involved 421 PPKI nationwide that would be an access to easier education and close to the MBK area. According to this, the performance expansion involved an allocation of RM54 million (Sinar Harian, 2019).

Therefore, by the increased number of schools for special needs students (OKU) it is clear that Rehal Neo could be the most significant product to be used to help the learning session for the schools due to its reasonable and considerate price per product. For the real product, we estimated to sell this product with a starting price of RM 55. The price of RM 70 could be explained by the integration of the special design body of Rehal Neo that roughly cost RM 45 that consists of 1mx1m HDPE sheet, 4 door hinges and few wooden blocks. As for the electronic part of Rehal Neo, it would cost around RM 25 by the usage of 1 Arduino Uno, 1 push button and 4 GT5kg servo to make the automated movement of this product. Although this product is slightly more expensive as compared to the traditional Rehal, we need to be clear that this product is a learning aid for the special needs student and due to this factor this product could be considered very significant as the learning aid for special needs students.

4.   CONCLUSION

In conclusion, our product innovation could manage to help every human in this world especially the OKU community since we are actually focusing on the OKU group's welfare by supporting the pure intention of our former Education Minister, Dr. Maszlee Malik to protect the OKU community's right in education and in the meantime to enhance the students welfare in Malaysia. The idea for innovation of regular rehal into Rehal Neo are made specially with the thoughts of giving comforts to the physically disabled people. The system's functionality aided by electronic components such as servo and arduino improve the movement to open the Rehal Neo from a briefcase into a usable rehal. The mechanism of this system works when a button on the side of the Rehal Neo is pushed, the coded information will be sent to the servo and arduino to help the Rehal Neo to function and will automatically open. Since we are using the mechanism of electronic components in order to function our product, the consumers will be given a 6 month warranty to get a free repair if there are minor faults occur on the product. The recommendation and improvement that we are planning to do is to be able to widen the space or to make more space in the briefcase so that the users will be able to keep their book or small belongings like stationeries in there. We are also planning on selling a next-6-month warranty after the previous free warranty expired. This is because if a fault occurs after a 6 month warranty, it will be more costly to buy a new rehal or to pay for the repair if there are minor faults that occur more than once after the first six month of purchasing. The reason we are suggesting this is to obtain our consumers' trust. We are hoping that the success of our product would be able to protect the rights of the physically disabled people and could increase their confidence level in education and also not to forget to give convenience to the students out there to study.

CREATIONS de UiTM
MEGA INNOVATION CARNIVAL 2020
For Knowledge and Humanity

ACKNOWLEDGEMENT

REFERENCES

[1]   Quran Al-Karim. Rasm Uthmani.
[2]   Jim and Kara. 2018. What is Rehal? Retrieved March 16, 2020, from https://www.lagrave.org/what-is-a-rehal/.
[3]   Sinar Harian. 2 January 2020. KPM perluas program pendidikan khas untuk MBK by Nurhidayah Hairom.
[4]   Data Pendidikan Khas Tahun 2019. Bancian Sekolah - Sekolah Khas Malaysia KPM.
[5]   Leo Louis. July 2018. Working Principle of Arduino and using it as a Tool for Study and Research (Conference Paper).

CREATIONS de UiTM

MEGA INNOVATION CARNIVAL 2020

For Knowledge and Humanity

CENTRE OF FOUNDATION STUDIES
UNIVERSITI TEKNOLOGI MARA
CAWANGAN SELANGOR KAMPUS DENGKIL