

Class Learning Concentration Control Application as Teaching Support in Determining Learning Strategies

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Abstract—Concentration in learning process is important for students to be able to understand the learning materials. One of the factors that can reduce student's concentration in learning process is sleepiness. The teacher visually is not always able to distinguish the conditions of each student. Physical conditions that can indicate someone is sleepy is their pulse decreases from its normal condition. The purpose of this product is to help teachers knowing the real time concentration of their students using a pulse sensor that can measure the pulse rate. The results processed in a microcontroller and transferred using a wi-fi network to an Android-based application which is displayed in graphic form. In the case of a person who is sleepy and asleep based on the literature, it is found that the pulse has decreased from being awake. The characteristic of this product is it doesn't give any side effect such as electric shock which can make the students feel depressed. It is focused on how teacher to choose the best way to teach. Once the design is created in the future, it is expected to help the teachers to evaluate teaching methods in order to improve their student concentration at that time

Keywords—concentration, pulse sensor, application, learning method

I. INTRODUCTION

In order to help developing student's potential, teachers need to understand all learning concentration indicators in order to be able to choose teaching method. Concentration in learning process is important for students to be able to understand the learning materials [1]. One of the factors that can reduce student concentration in learning process is sleepiness [2].

Student's concentration is increased in the first 15-20 minutes then decreased in the second 15-20 minutes and then increased and decreased again. This will affect student's learning evaluations which means learning goal has not reached yet [3,4]. That is why the teacher visually is not always able to distinguish the conditions of each student. Physical conditions that can indicate someone is sleepy is their pulse decreases from its normal condition.

Therefore, there should be an item that can help teachers knowing the level of student concentration which in sleepy condition called Koko Berkelas.

The purpose of this product is to help teachers knowing the real time concentration of their students using a pulse sensor that can measure the pulse. This product is expected to help the teachers to evaluate teaching methods in order to improve their student concentration at that time.

II. METHODS

Preliminary studies is required to search for accurate data and information which is similar to the product. Then we do analyst the data. After that, we create draft design for the product. Next, we try to make the prototype and do the test, if the prototype works well or nearly the same as the literature that we read, then we create the final design for the product. If no, then we need to fix the prototype first, then do the test again. We only did a prototype test here to prove that this design can read the pulse and really help the teachers. This process can be seen from the flowchart in Figure 1.

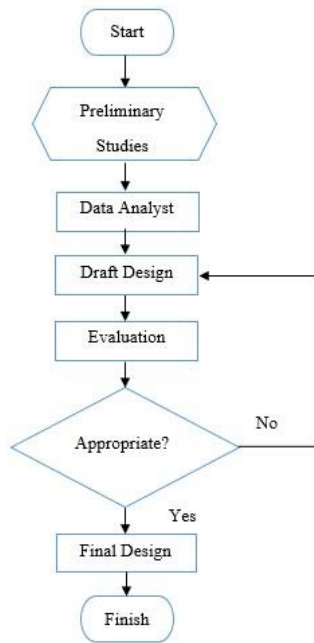


Fig. 1. Research flowchart.

III. RESULTS AND DISCUSSION

A. Koko Berkelas

Koko Berkelas is an application that is integrated IoT system by utilizing pulse readings as an indicator to determine the condition of student learning concentration. The pulse is an important sign that is useful evaluating a person's condition in general.

B. Design

We designed hardware parts such as case, required electronic components, wiring and schematics using several software such as fritzing and solid work. This process aims to simulate how the product works virtually to get the expected design and results. We This should be wear in student's wrist to detect. This can be seen in Figure 2.



Fig. 2. Koko berkelas device.

Next, we created user interface and user experience application design using adobe xd for getting the best view for it. This can be seen in Figure 3.



Fig. 3. Koko berkelas application.

Koko Berkelas has a pulse sensor several electronic components such as switch, wemos d1 mini as a controller and battery as a source of power supply. The application displays the results in graphic form of the concentration level of student learning based on the pulse reading in Koko Berkelas. This can be seen in Figure 4.



Fig. 4. Koko berkelas view.

C. How It Works

Koko Berkelas starts to work when the active device is put in student's wrist. This tool will read the student's pulse through a heart rate sensor for the first 10 minutes to find the average pulse for each student.

This sensor is connected to pin A0 on the Wemos d1 mini microcontroller to convert analogue data read by the sensor into digital data [5,6]. Furthermore, the result of the reading from the heart rate sensor will be sent to the application automatically with the IoT working principle to the teacher's android device in real time.

The Koko Berkelas concentration level display is shown in graph from each student as well as a cumulative graph of class concentration data. The display of the graph shows numbers

and colours. When student's concentration level decrease, the graph will decrease as well.

The advantage of Koko Berkelas is that it does not provide direct reactions to students such as shock effects or alarms which can disturb student's learning comfort. This is because the main purpose of the Koko Berkelas is to help teachers determine learning strategies that are appropriate to the conditions of students in the classroom so that an active and interactive classroom atmosphere can be created.

IV. CONCLUSION

Koko Berkelas will absolutely help the teachers to evaluate their teaching methods in the class. With the existence of this design, Koko Berkelas application can be created and implemented in learning system in the future. It also does not give any side effect to the student that makes Koko Berkelas must be considered to be created.

REFERENCES

- [1] Dimiyati and Mudjiono, *Belajar dan Pembelajaran*, Jakarta: Rineka Cipta, 2009.
- [2] A.A. Simanjuntak and B. Nurtjahyo, *Pengukuran Kelelahan Aktivitas Mengemudi Mobil dengan Pendekatan Fisiologis*, Depok: Universitas Indonesia.
- [3] Aunurrahman, *Belajar dan Pembelajaran*, Bandung: Alfabeta, 2014.
- [4] N. Hamiyah and M. Jauhar, *Strategi Belajar Mengajar Dikelas*, Jakarta: Prestasi Pustakarya, 2014.
- [5] Lab Elektronika, *Cara program Heart Rate Sensor Detak Jantung Menggunakan Arduino*, 2018. [Online] Retrieved from: <http://www.labelektronika.com/2018/01/cara-program-heart-rate-sensor-detak-jantung-menggunakan-arduino.html>
- [6] L.A. Majid, *Hand Exoskeleton Berbasis Arduino Sebagai Alat Bantu Rehabilitasi Fraktur Tangan*, Bandung: Telkom, 2019.