

ABSTRACT

Poor sleep quality in college students can reduce learning productivity and affect physical and mental health. This research aims to design a technology-based sleep quality monitoring system for students by integrating sensors in the form of *DS18B20* as temperature detection, *MAX9814* as sound detection, *BH1750* as light detection and *PIR* as motion detection.

This approach is based on the method of evaluating sleep quality using *the Pittsburgh Sleep Quality Index (PSQI)*, where sleep quality assessment is subjective but integrated with sensor technology on IoT in limited objective monitoring. This method involves analyzing the needs of users through responses related to sleep problems.

Evaluate existing solutions such as non-wearable devices and mobile applications, as a guideline in the development of sleep quality monitoring products. The system is designed to monitor sleep parameters for temperature, noise, light, and movement through sensors connected to a microcontroller. Data is processed using a machine learning approach algorithm design to classify sensor accuracy data with actual data in the correlation of data accuracy obtained from the results of monitoring on sensors.

Functional testing on the website was carried out with whitebox (Cyclomatic Complexity 2) and blackbox testing, and showed the effectiveness of the *PSQI method* in the results of sleep quality for respondents to system accuracy. The implementation results include a prototype of an application on mobile with visual report features, sleep reminders, and cloud integration, as well as hardware with a production cost of IDR 1,387,700. The analysis showed that 67.2% of students experienced sleep disturbances, with 79.3% stating the importance of monitoring applications. This system is expected to be a comprehensive solution to improve student awareness and sleep quality through an affordable, accurate, and easy-to-use technology approach.

Keywords: *Sleep quality, IOT, PSQI, DS18B20, MAX9814, BH1750, PIR, microcontroller*