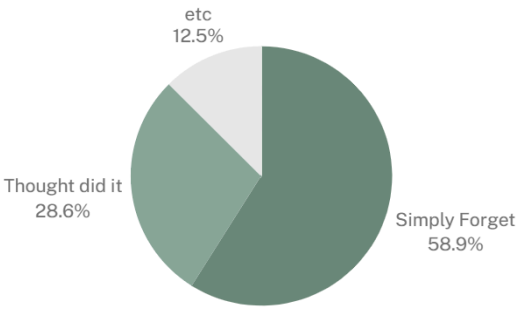
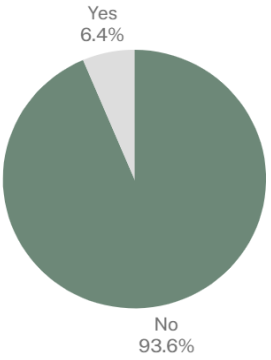
Introduction Report

1. Usability Problem:

The attendance system of UNIST faces usability issues, with students often failing to check their attendance due to the lack of motivation and certainty, which directly affects grading. The main reason stems from the current system cannot give any help not to forget attendance checks. A survey of 47 students supports this perspective, with over 87% attributing attendance failures to forgetfulness and 93% stating that the current system does not help prevent forgotten check-ins. To effectively support students' memory, the system must be revised to implement strong motivations and reminders.





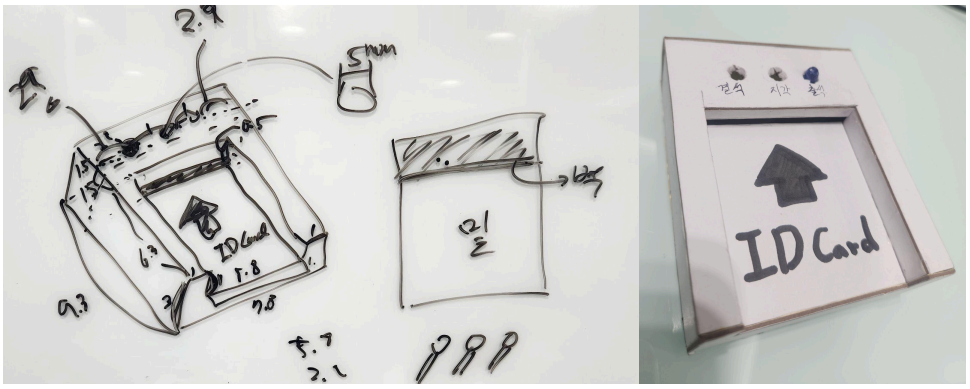
2. Existing Solutions:

Several existing solutions have been employed to make the attendance system smarter. The current method is the mobile attendance system using bluetooth system, which has serious flaws with forgetness. Another approach was using QR-codes for attendance verification, which did not significantly improve the users' ability to remember checking their attendance. Fingerprint scanning was also a well-known method to check attendance, but it faced limitations such as the inability to confirm whether users had checked in and its susceptibility to environmental factors. Detecting users' locations via GPS was utilized, eliminating the need for manual reminders, but this solution suffered from poor precision.

3. Proposed Solution:

The limitations of existing solutions led to the exploration of new solution proposals. Automatically displaying QR codes during class, which can avoid forgetting to attendance-check, was rejected due to potential disruptions and vulnerability to fake attendance. Enhancing the GPS system by recognizing Bluetooth devices, which can improve precision and eliminate forgetfulness, was discarded due to battery life and privacy concerns. As mobile phones increase the risk of forgetting(because of its multiple purposes!), alternative identification methods were needed. Student ID cards emerged as the most desirable tool. But the previous system, “recognizing cards at the entrance” was cumbersome, making long lines and prone to fake attendance. Drawing inspiration from hotel card key recognition systems, a new solution utilizing student ID cards was proposed.

Our proposed solution, inspired by hotel card key systems, is "student card slot attendance system" where each desk is equipped with card slots and LED lights. When students sit at their desks, they see card slots with red LEDs, indicating that attendance has not been checked. The student inserts their student card into the slot, and the LED turns green, confirming that attendance has been successfully recorded. If the card is inserted 10 minutes after the class has started, a yellow LED will turn on, indicating late check-in.



The blinking LED and buzzing beeper serves as a constant reminder, irritating the user's eyes and ears until they check their attendance. It is powerful enough to motivate users to check attendance. The LED provides continuous direct visual feedback, eliminating the need to recheck attendance. In fact, the article says that high degree of coherence of the color lights could result in new kinds of glares not considered in the current standards.[1] Additionally, there is no need to open a mobile app and wait for a Bluetooth connection. While potential disadvantages include lost student cards and cost, our project primarily aims to solve usability problems rather than evaluating business feasibility.

4. Conclusion:

In conclusion, the proposed solution addresses the critical usability issues of forgetfulness and uncertainty, providing a proper solution for improving attendance tracking in UNIST.

[1] Ixtaina, P., Presso, M., Rosales, N. *et al.* Glare by Light Emitting Diode (LED) vehicle traffic signals. *Int J Mech Mater Eng* 10, 1 (2015). https://doi.org/10.1186/s40712-014-0027-2