DESIGN BRIEF
THE UNSLEEPABLE ALARM

Group: *Sick Name*

Creating & Making Course Q2 2019

Group members:

Nguyen Nho Thuc Khang

Phan Canh Minh Phuoc

Le Ngoc Uyen Nhi

Le Hoang Dac Khoa

Khang A Tua

Product name: The Unsleepable Alarm

Background research

I. Area of concern

- We aim to produce a special alarm named The Unsleepable Alarm which can help people who have problem with their waking up on time – the heavy sleeper – who cannot wake up easily.
- Constraints:

  1. Using bamboo as the main material
  2. Applied automation and technology
  3. Provide practical solution for a social problem.

- Traditional clock's constraints:

Categories	Strength	Constraints
Digital alarm	- Variety of choice settings on multiple times. - Multiple sounds. - Portable design.	- Lessen users' autonomy when they think about the backup plan, or they can turn off the alarm and go to bed again.
Analog alarm	- Single-time. - Only one digital sound (usually). - Variety of designs.	
On-app alarm	- Multiple sounds and multiple choices of time. - Equipped with special function such as making user solve maths problem to turn off the alarm *(Alarmy)*.	- To activate the alarm app, user must let their phone in the reasonable distance with them (without turning off) so that its radio waves are harmful for human's brain (The World Health Organization - WHO).

➡ As a result, we found out that most of the alarm gives users autonomy to turn off and sleep again or the demerit of on-app alarm is its toxic to users' health. Hence, we want to build mechanic alarm that haves the automatic system to detect whether users go to bed again or not.

II. Customer survey and market research

There are two groups of target users that we would like to concentrate on:

1/ Students from K12 to universities.

Reason: these customers generally do not have effective time management, usual heavy workload may mess up daily schedule.

2/ Busy adults with sleeping problems.

Reason: these customers are willing to try a solution for their problem to improve their productivity.

A. Initial idea

- Firstly, we want to design an alarm which have two sensors including Passive Infrared Sensor(hereafter referred as PIR) Sensor and Temperature Sensor so that it can detect one go to bed again or not, and then it automatically ring again. PIR Sensor detects human's movements and Temperature Sensor detects human's temperature to maximize the alarm's efficiency. The sound-making mechanism is bamboo-based so that it can create beautiful sound, which bring comfort for users.
- We also conduct two different methods to justify our ideas: the qualitative method – market research to understand the competitive market and the quantitative method – customers' feedback about the efficiency of their current alarm to understand customers' demand.

B. Market Research

- According to Apartment Therapy, there is a mere 0.32 percent of people who feel awake after hearing the alarm in the morning, which lead them to turn off the alarm or press the snooze button (Morgan 2017). Therefore, we aim to reach the remainder of the market to recommend the more effective alarm.
- After researching on the online shopping channel, we found many alarms which are equipped with sensors to cover many special functions. Here is one example from "No Brand" (China) that we found on Lazada which is similar to our ideas:

  Led Wake Up Light Alarm Clock Table Lamp with 5 Light Modes Sunrise Simulation Snooze Function for Kids Heavy Sleepers Temperature Humidity Display
  Features: Human Body Recognition
  When people are present, time automatically displays. When people are not present, time does not display.
  Stepless Dimming + Soft Lighting + contact Dimming

- However, there is no data recorded about available alarm which used PIR Sensor to detect human; therefore, we can conclude that our product will become a pioneer in the market.

C. Customers' Demand

After distributing our survey for 5 days, there are 60 people responded (refer in Appendix).

77.8% of them indicated to be Heavy Sleepers – who are also our target users.

- Ways to get up:
  - 77.8% of them use the alarm to wake up
  - 14.8% of them let their friends call them to wake up
  - 7.4% others
- Most of them confessed that the alarm sounds are annoying, and light.

"*Mostly, I turn off the alarm after hearing this annoyed sound. Also, although I have turn to the largest volume of my phone, I cannot hear the sound, which leads to sleep and arrive late. I am looking forward for the alarm with the louder but comfortable sound*"

(Hoang Tu, 1st year student at International University Vietnam).

➡ Therefore, about the sound-making mechanism, we aim to balance the comfort and the quality of the sound, which makes The Unsleepable Alarm more effective to users.

III. Suggesting features

Categories	Content
Strength	• Large market: students and busy worker • Special function: automatic sensor which can detect one whether they sleep again or not • Beautiful sound: sound from bamboo • Eco-friendly: bamboo-based framework which can be reused • User-friendly
Weaknesses	• The size of the alarm • Not friendly with users who have movement disorders • It can detect again for one time and then stop alarming
Opportunities	• Introduce to Fulbright Community to collect feedback and update new versions • Introduce the product in three selling channels: traditional channel (traditional retailers), modern channel (supermarkets, bookstores) and digital channel (Lazada, Tiki, Shopee) • Have more functions such as alternative sounds
Threads	• Compete with other alarms in the market • How to make our product more special which cannot be easily replicated?

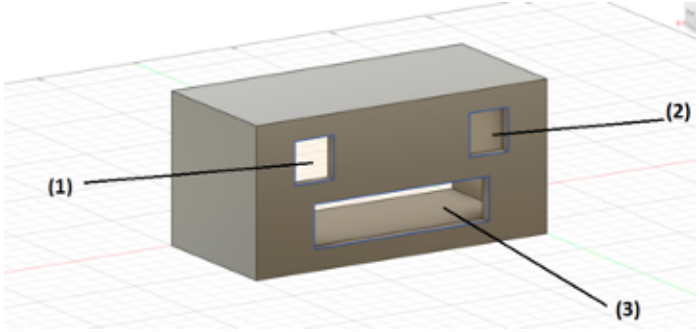
IV. Ideation solutions

1. The interior: *(on November 25th 2019)*

- Using sound as the signifier, **the sound-making mechanism** is the bamboo-based which has two bamboo pieces hitting each other. We are inspired by the beautiful sound from the bamboo; therefore, we decide to have the bamboo-based sound-making system. Also, this decision leads to **the need of the motor** to run this system.
- **A motor** spins an attached piece of bamboo so that it hits another bamboo stick hung on the top to generate sound. Because this alarm clock is specifically designed for heavy sleepers, those who have little motivation to get out of bed and usually end up oversleeping to the point where they're late, the alarm sound is made to be loud and sporadic, creating a non-repetitive sound cycle that disrupts the sleep instead of soothing the users back into their dreams.
- At first, we intended to use the fan's motor because of its USB cable, which we think it could be convenient for the users. Nowadays, customers use smartphone so that they get used to the docker charging or they can connect the alarm directly to their laptop or the electricity supply.

  ➡ Since the fan is large, we have to make the large alarm, which is inappropriate with the portable alarm.
- **A PIR Sensor** is the specialty of the clock because it helps to detect one that has left the bed or not, then it sends the signal to the clock and it will ring again.
- Inspired from some models of Casio's digital clocks that are widely used in Vietnamese community, **Temperature Sensor** detects human's temperature to increase the efficiency of the clock: detect whether users go to bed again or not.
- Both the sensor will be placed inside the alarm.

2. The exterior



Picture 2: the first version of the alarm from the front view

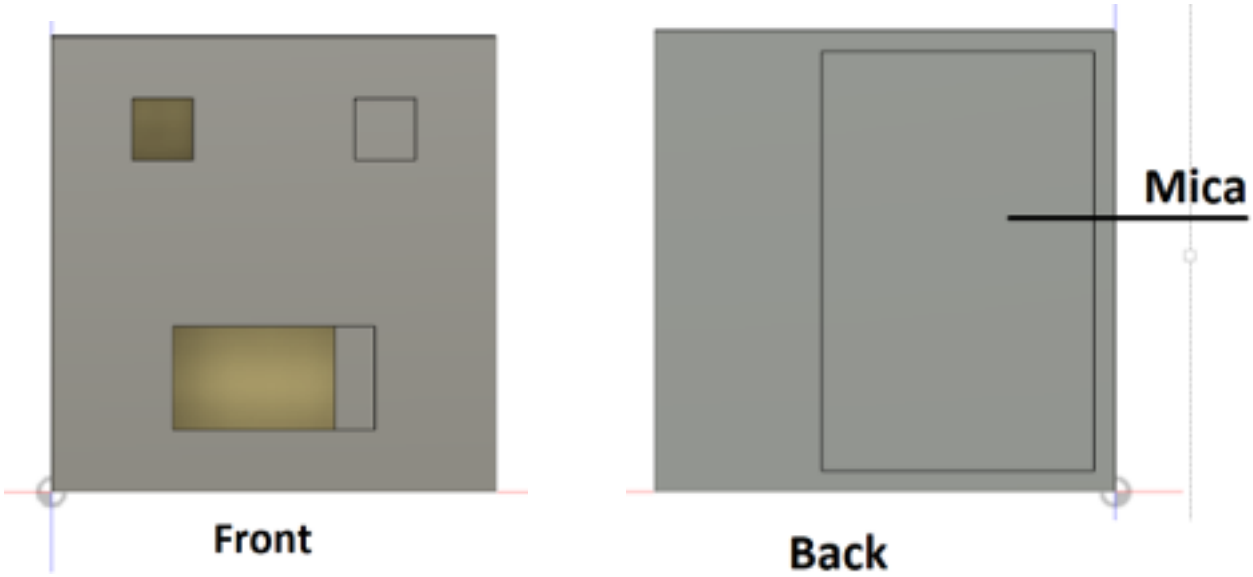
Note: (1): PIR Sensor

(2): Temperature Sensor

(3): LCD Screen

- LCD Screen displays the time and temperature.
- Initial size: 35cm x 25cm x 25cm.

3. Updated Second Version (from *December 1st 2019)*



Picture 3: The second version of the alarm.

No	Categories	Component	Details	Purpose	Reason to change
1	The motor (updated on December 2nd 2019)		-The 12V Direct Current Battery Charge	-To sustain Electricity Supply and unified all the Electricity Supply within the system	-To make the size of the framework smaller
2	The sound-making mechanism	A bamboo stick, a bell and a motor (mentioned aboved)	-The bamboo stick is attached to the motor -The bamboo hit the bell => making sound	To make the sound louder => more effective to wake up users	Based on the survey, we realize the efficiency of the old clock: not loud enough => we change to more annoyed sound to meet customers' demand.

3	Sensors	PIR Sensor, Temperature Sensor, Arduino, LCD Screen, wires	-Both sensors display outside the alarm	-PIR Sensor detects immobile human -Temperature Sensor detects room temperature and it will be displayed on the LCD Screen with the time.	We realize that the Temperature Sensor cannot detect human's temperature correctly, we change the purpose of this sensor to notify user room's temperature and weather.
4	Framework	Bamboo, mica, glue stick	-The framework is bamboo-based that covers Mica at the back -Framework's size: 20cmx20cmx20cm	-Mica makes in interior (sound-making mechanism) is transparent for user to observe	
5	Buttons	Plastic buttons and number keyboard	-The button is on the top of the alarm	-The plastic button represents the stop button -The number keyboard is used to set timer	

4. **Updated Third Version** (from *December 15th 2019*)

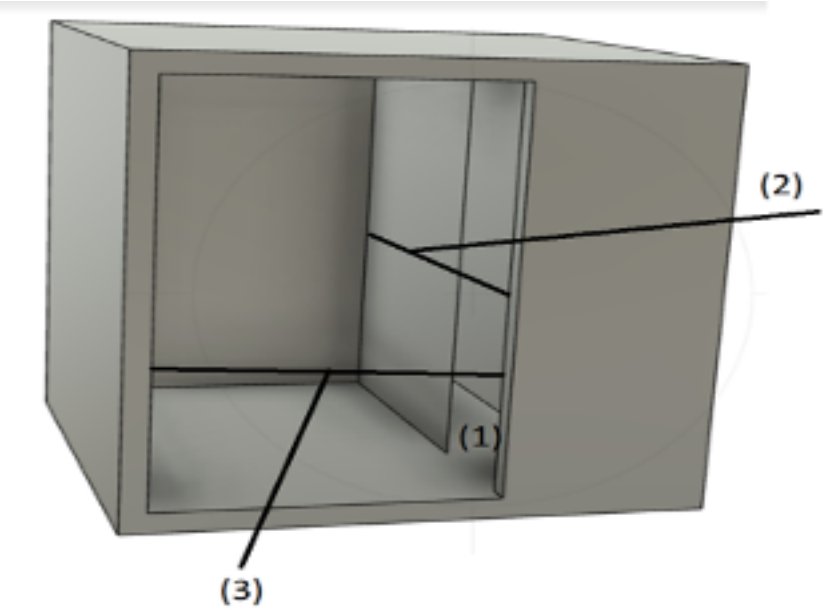
- We realized that the PIR Sensor only detect movements; however, users may not have any movement instead of laying on bed => we make the PIR Sensor move to detect immobile human.
- This also leads to us to add one more motor to make it move.
- We also add mica on the front of the clock so that users can observe the movement of the sensor => to make the clock livelier.
- The Mica's size is 20cmx13cm.

5. **Updated Fourth Version** (from *December 22nd 2019)*

- We complete the code of the Arduino and placing all the components inside
- We created the bamboo wall inside the clock to hide the arduino part so that users only observe the sound-making mechanism.

- We found that because the clock is large, it is possible to hang it on the desk or table => it is inconvenient to add mica on the back since users have to rotate the clock

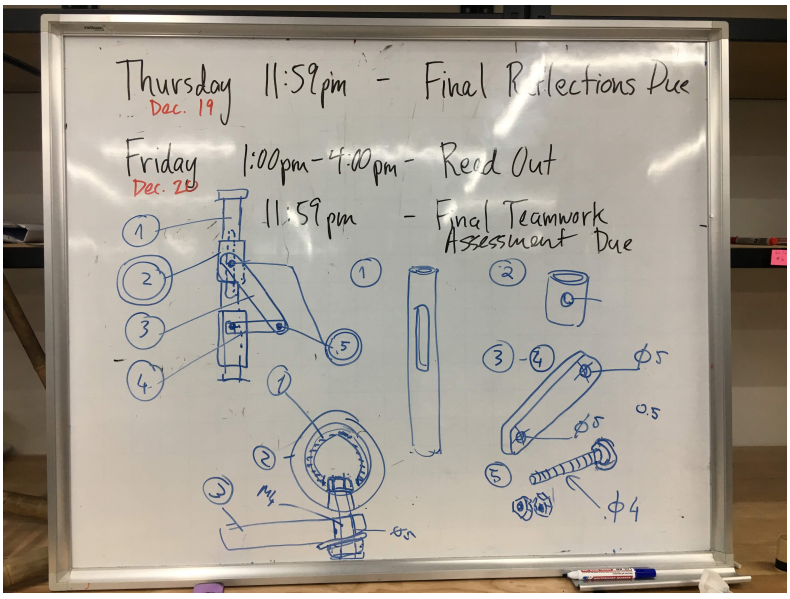
➡ Decided to add mica on the front of the clock



(1): space to connect wires

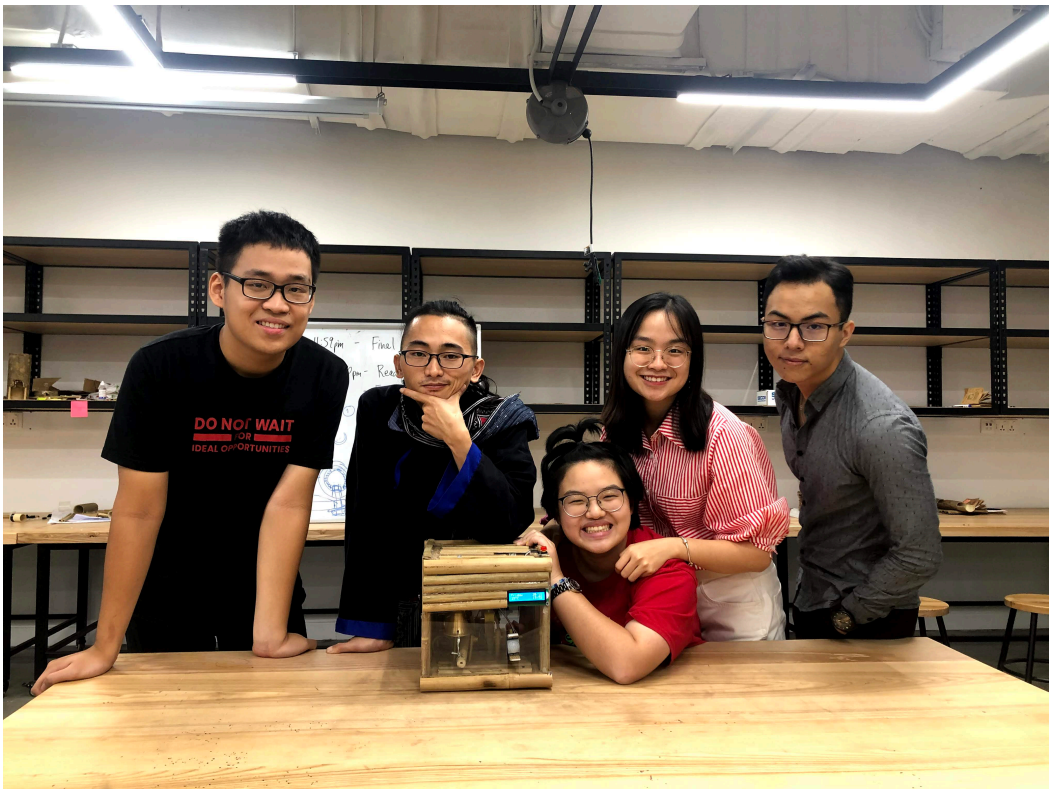
(2): Bamboo wall

(3): Mica



Picture 4: Interior mechanism outline

6. Final version images



Reference:

Morgan, B. (2019). How Many Times Do Most People Hit the Snooze Button? (And More Fascinating Alarm Clock Stats). Retrieved from https://www.apartmenttherapy.com/how-many-times-do-most-people-hit-the-snooze-button-and-more-fascinating-alarm-clock-stats-243011.

Appendix: Customer Survey

1/ Are you a light sleeper or heavy sleeper?

2/ How do you wake up everyday? Let friends call you or use the alarm?

3/ How often do you get late for work?

4/ What do you feel about the alarm's sound? Does it help you stay awake?

5/ How often do you turn off the alarm then sleep again or press the snooze button?