

SCSV 2113

HUMAN COMPUTER INTERACTION

(Session 2020/2021 Semester 2)

School of Computing
Universiti Teknologi Malaysia

P3 – CONCEPTUAL AND PHYSICAL DESIGN

SMART PLAYGROUND SYSTEM

LECTURER

NOR ANITA FAIROS BINTI ISMAIL

(Section 01)

GROUP 03 (Stark Inc)

Prepared by

| | |
|------------------------------------|-----------|
| ADAM WAFII BIN AZUAR | A20EC0003 |
| AHMAD MUHAJMIN BIN AHMAD HAMBALI | A20EC0006 |
| FARAH IRDINA BINTI AHMAD BAHARUDIN | A20EC0035 |
| GOO YE JUI | A20EC0191 |
| KELVIN EE | A20EC0195 |
| LEE MING QI | A20EC0064 |
| ONG HAN WAH | A20EC0129 |

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1.0 Interaction Metaphors

The icon of the smart playground application is a slide which is a facility in the playground so we know that this application is meant to be used in the playground and related to the playground.

The interface metaphor that the playground games used is the quiz. Quiz is fairly common where we just need to choose our answer from the provided options. The application will then reveal the correct answer and the score. The playground games also use colour metaphors that are red for wrong answers while green for correct answers.

The playground games and recycle task use play icon for start as the play button is on a remote control. Users have been familiar with the play icon on the remote control and thus can understand its meaning easily.

The report function uses the metaphor of a complaint report. Users can report broken equipment in the playground with its description and photo and submit it to the administrators or authorities through the application.

In the recycling waste materials task, the metaphor of food delivery is used. Users need to set their name, phone numbers, location and the types of waste to recycle. Then, they can choose whether pick-up at any location or deliver to the nearest centre.

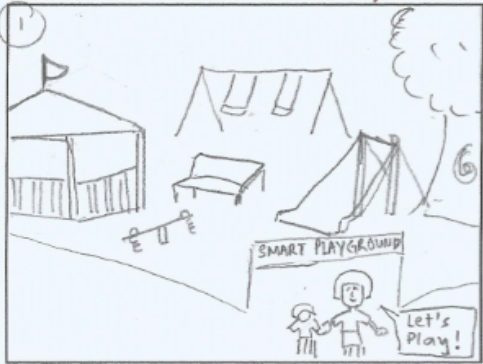
GPS location uses the interface metaphor of the map and the pin allows us to set the address and see the location easily.

The '+' button or icon is used as a metaphor for adding a photo or location. We know that the plus sign '+' means add. Thus, it is a good metaphor to add or upload new photos and locations.

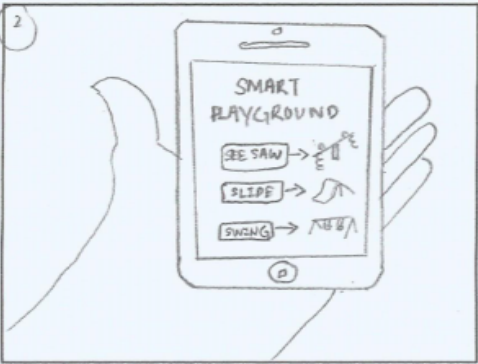
The toggle button for reminder uses the interface metaphor of a power switch. It is easy to understand and easy to use. Users just need one click to turn the reminder on and off.

2.0 Storyboard


2.1 Task 1: Access the smart playground application



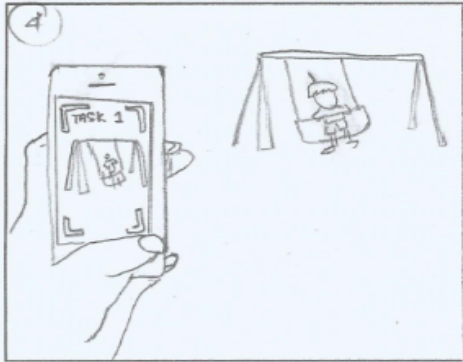
Parent enter the playground with his kid.




Parent turn on the app and choose the game




Parent and kid choose an equipment to play on




Parent helps to guide his kid to finish the task




Parent teaches the lesson on the app to his kid



Parent invite more kids to play the group games



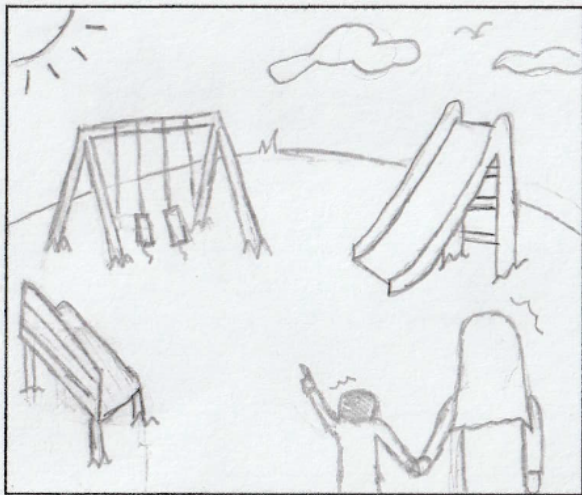
Kids playing on the equipments together



Kids finish the group task together

One day, Miss Sabariah brought her son to the smart playground. She wanted to make use of this time to let her son learn through playing. She downloaded the app and opened it once they reached the playground. After her son had chosen equipment in the playground, she guided her son to finish the task for that particular equipment. There was a lesson attached after all the tasks had been finished on the equipment. Miss Sabariah taught the lesson on the app to her son. Miss Sabariah also encouraged her son to invite more friends to play with him together. Her son invited some other stranger kids to play with him to finish the group task on the app. While finishing those tasks, he made friends with other kids in the playground.

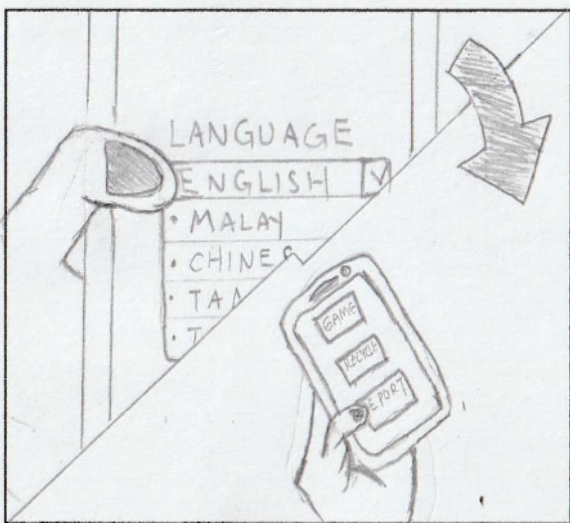
2.2 Task 2: Report the broken equipment



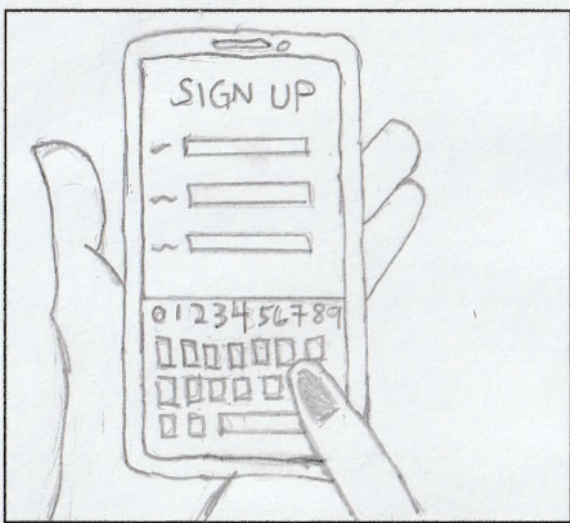
Mdm. Sabariah brought her son, Ali to the playground. Ali wanted to play the swing but it was broken.



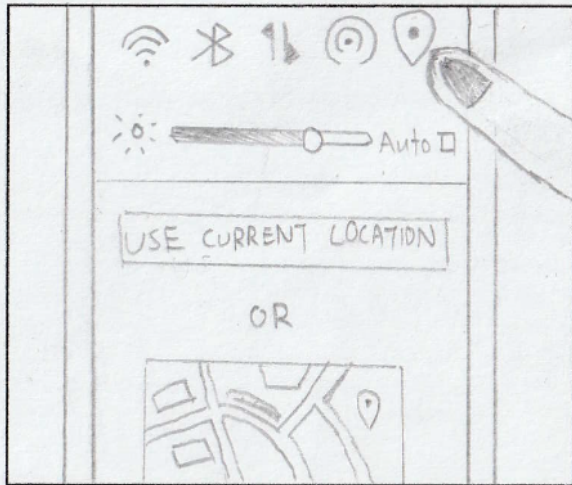
Mdm. Sabariah took out her phone from her bag and downloaded Smartplayground App.



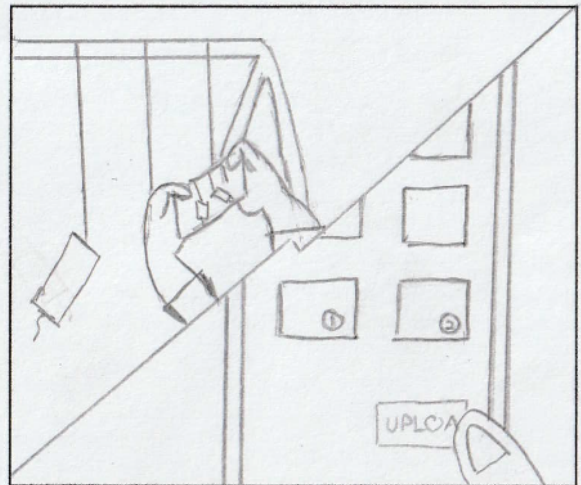
She chose "English" as the language and selected "Report" out of 3 functions in the app.



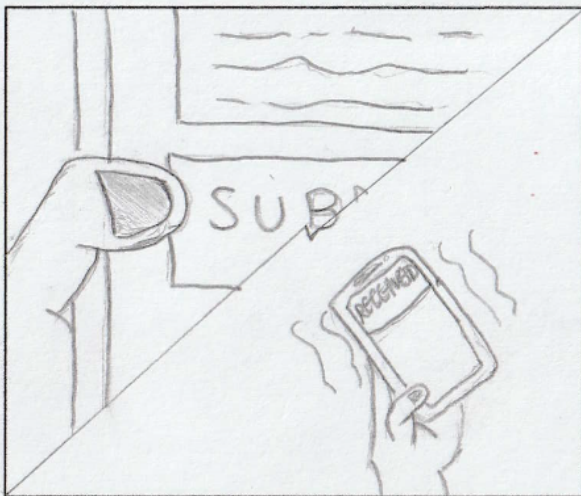
She filled in her details and signed up her own account in the app.



She enabled the GPS feature in her phone to locate her current location.

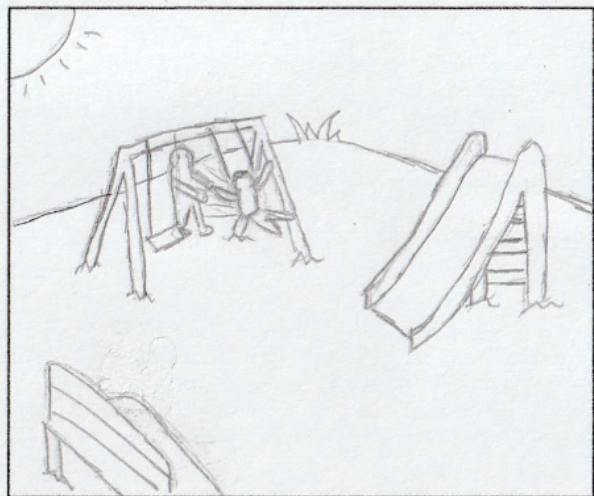


She took photos of the broken swings and uploaded them on the report.



After describing the situation, she submitted the report and received notification about her report has been successfully accepted


~ONE WEEK LATER~




Mdm. Sabariah brought her son to the playground and realised the swing has been fixed in a week time. Now, they can play the swing happily.

2.3 Task 3: Recycle any waste materials


Task 3→ Recycle waste material




The playground are dirty and smelly.



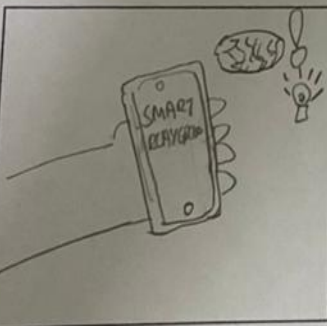
Children are not able to play the equipment as the playground is filled with glass bottle that might cause injury.




A spring clean held by the neighborhood to clean the surrounding



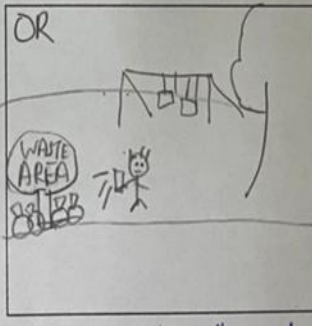
However, no one know how to handle the waste material.



We could use the smart playground app!!!

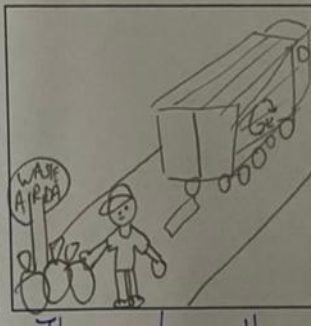


User can use the GPS track function to search for nearest center and send the waste there.



OR

User can place the waste at waste area and upload a photo on app.

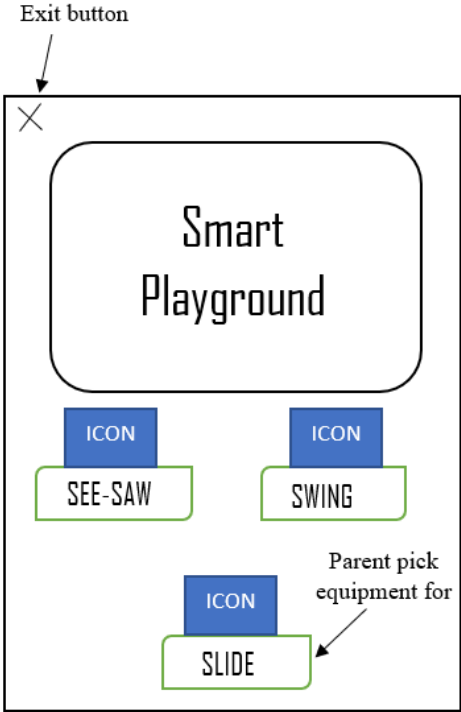
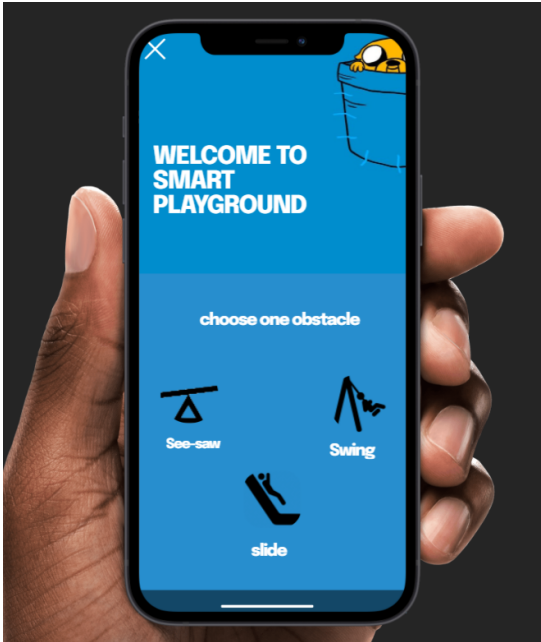
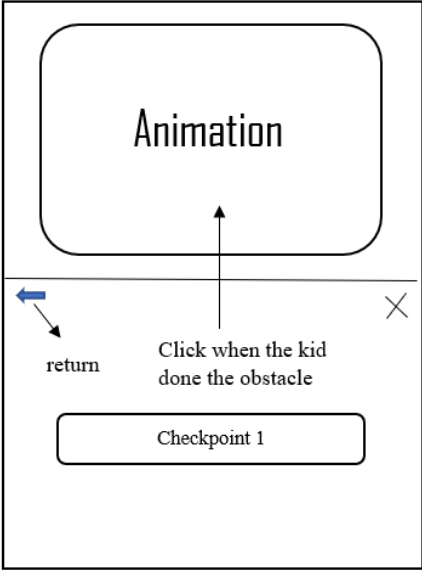
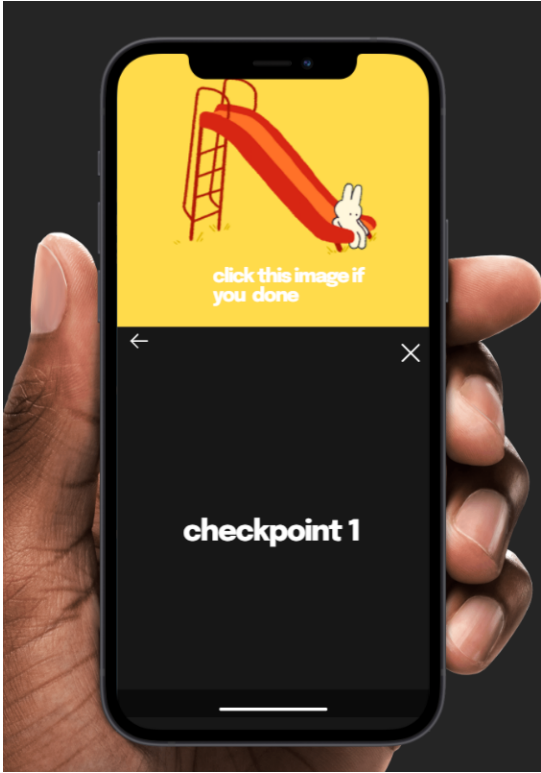


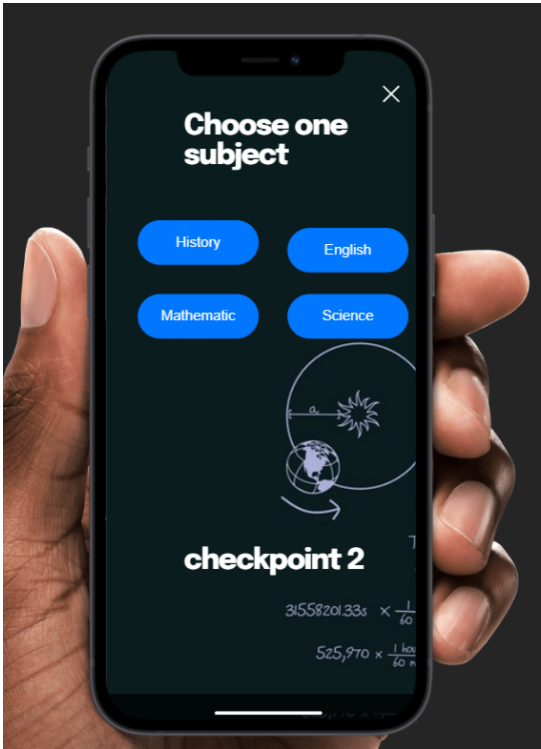
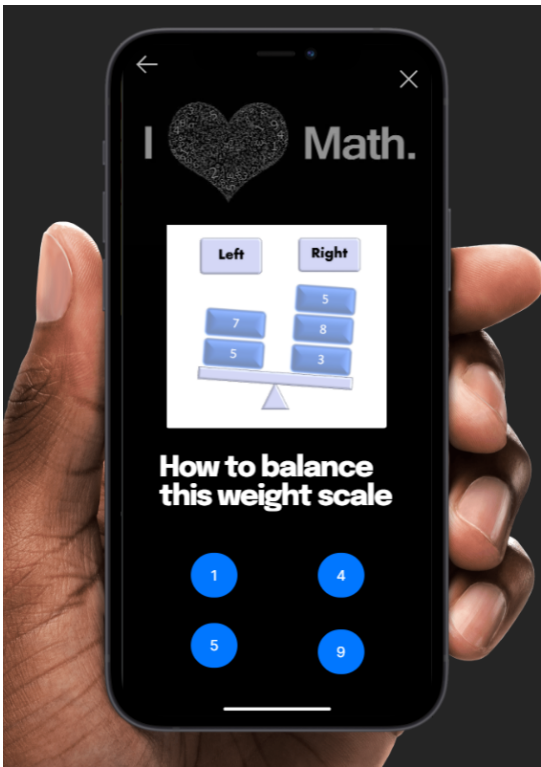
The worker will receive notification and the worker will go and collect the waste

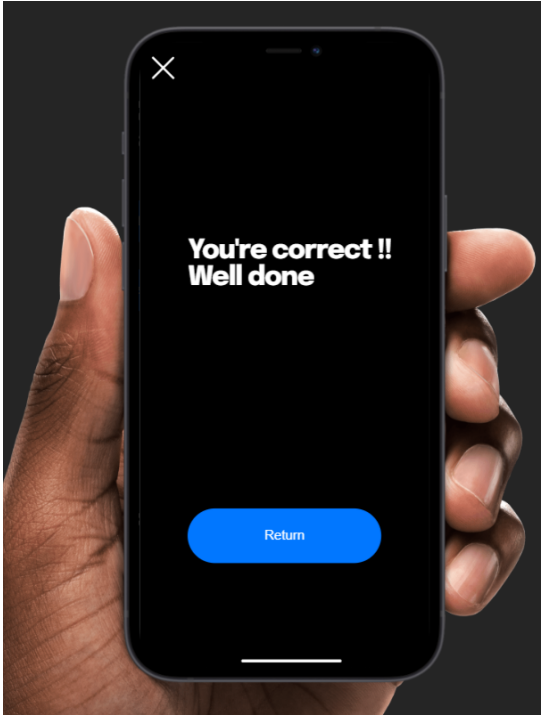
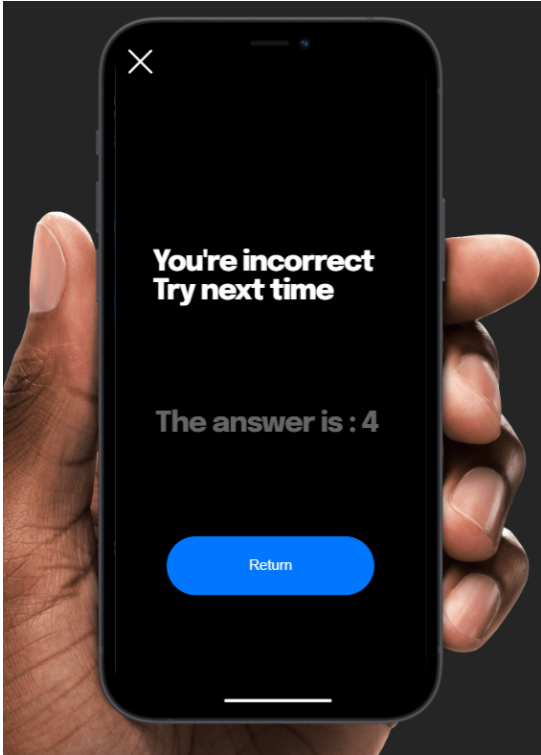
3.0 Interface Design

3.1 Task 1: Access the Smart Playground application

| Scene | Wireframe | Mock Up |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1 | <div><div>TimeSignal Wifi battery</div><div><div>APP</div><div>APP</div><div>APP</div><div>APP</div><div>APP</div><div>APP</div></div><div><div>Home button</div><div>Parent click the app</div></div></div> | |
| 2 | <div><div>SMART PLAYGROUND</div><div>GAMES</div><div>REPORT</div><div>RECYCLE</div></div> | |


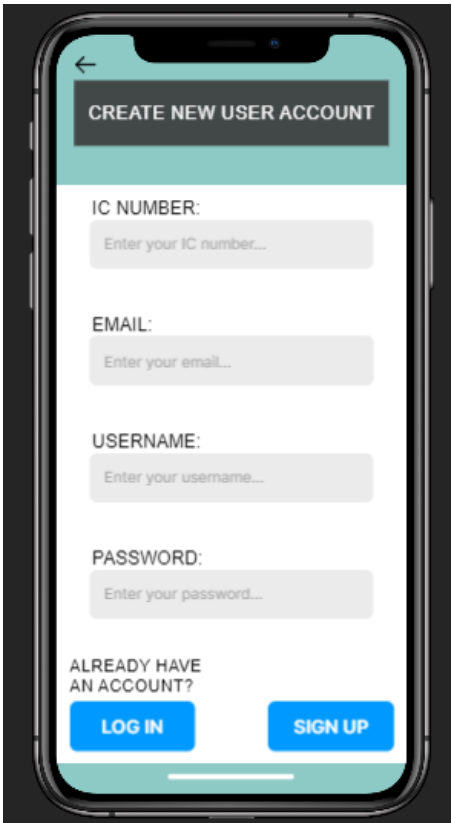
| | | |
|----------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>3</p> | <p>Exit button</p>  |  |
| <p>4</p> |  |  |

| | | |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 5 | <div data-bbox="414 241 800 762"><div>Choose subject</div><div><div>Mathematic</div><div>English</div><div>Science</div><div>History</div></div><div>Checkpoint 2</div><div>Parent choose one subject after their children finished one obstacle</div></div> |  |
| 6 | <div data-bbox="380 1056 802 1627"><div>←</div><div>×</div><div><div>Left</div><div>Right</div></div><div><div>7</div><div>5</div><div>5</div><div>3</div></div><div>How balance the weight scale</div><div><div>3</div><div>5</div><div>4</div><div>9</div></div></div> |  |



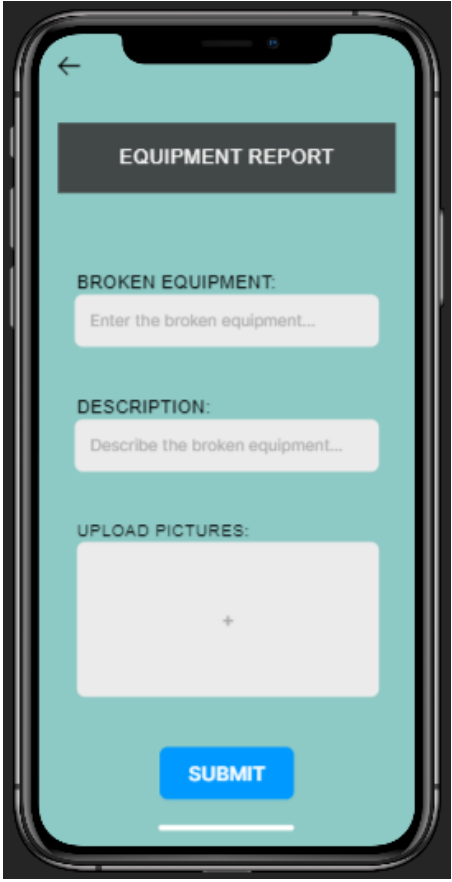
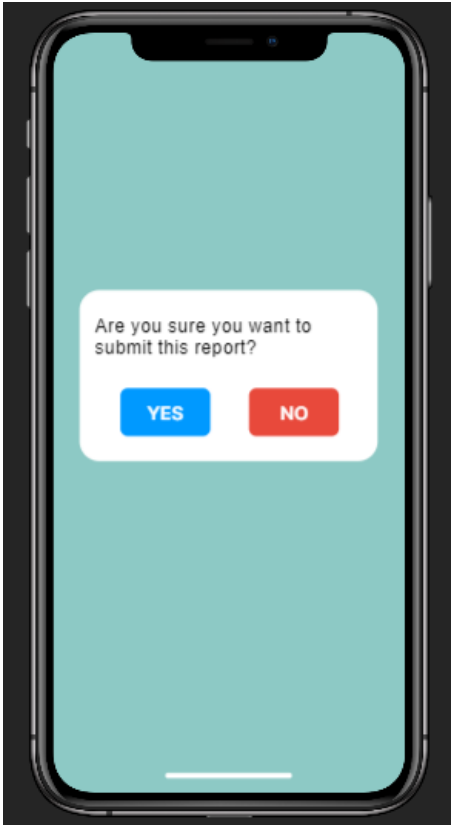
| | | |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | <div data-bbox="376 254 820 852"><div data-bbox="414 269 441 311">✕</div><div data-bbox="483 411 662 451">Description</div><div data-bbox="526 583 665 615">Return to main</div></div> |  A hand holding a smartphone with a black screen. At the top left is a white 'X' icon. The screen displays the text 'You're correct !! Well done' in white. At the bottom is a blue rounded button with the word 'Return' in white. |
| 8 | <div data-bbox="365 1014 782 1577"><div data-bbox="402 1029 430 1071">✕</div><div data-bbox="466 1093 636 1133">Description</div><div data-bbox="472 1260 555 1285">Answer:</div><div data-bbox="519 1393 652 1425">Return to main</div></div> |  A hand holding a smartphone with a black screen. At the top left is a white 'X' icon. The screen displays the text 'You're incorrect Try next time' in white. Below that, it says 'The answer is : 4' in a lighter grey. At the bottom is a blue rounded button with the word 'Return' in white. |

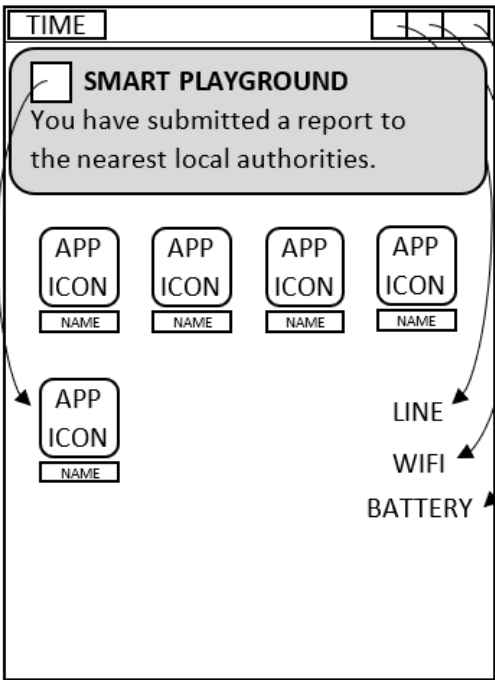
3.2 Task 2: Report the broken equipment

| Scene | Wireframe | Mock Up |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1 | <div><div>TIME</div><div><div>APP ICON</div><div>NAME</div></div><div><div>APP ICON</div><div>NAME</div></div><div><div>APP ICON</div><div>NAME</div></div><div><div>APP ICON</div><div>NAME</div></div><div><div>APP ICON</div><div>NAME</div></div><div><div>APP ICON</div><div>NAME</div></div><div><div>APP ICON</div><div>NAME</div></div><div><div>APP ICON</div><div>NAME</div></div><div><div>APP ICON</div><div>NAME</div></div><div>LINE</div><div>WIFI</div><div>BATTERY</div></div> | |
| 2 | <div><div>SMART PLAYGROUND</div><div><div>SELECT LANGUAGE: V</div><div>ENGLISH</div><div>BAHASA MELAYU</div><div>简体中文</div><div>日本語</div></div></div> | |

| | | |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | <div data-bbox="326 221 865 964"><div data-bbox="378 264 820 575">SMART PLAYGROUND</div><div data-bbox="462 608 732 672">GAMES</div><div data-bbox="462 707 732 772">REPORT</div><div data-bbox="462 807 732 872">RECYCLE</div></div> |  A mobile app interface for 'SMART PLAYGROUND'. At the top is a header image of a playground with the app's name overlaid. Below the header are three blue buttons labeled 'GAMES', 'REPORT', and 'RECYCLE'. A back arrow is in the top left corner. |
| 4 | <div data-bbox="326 1126 865 1871"><div data-bbox="381 1168 816 1243">CREATE NEW USER ACCOUNT</div><div data-bbox="381 1278 786 1348">NAME: <input type="text"/></div><div data-bbox="381 1383 786 1452">NO. IC: <input type="text"/></div><div data-bbox="381 1487 786 1557">EMAIL: <input type="text"/></div><div data-bbox="381 1592 786 1662">USERNAME: <input type="text"/></div><div data-bbox="381 1697 786 1766">PASSWORD: <input type="password"/></div><div data-bbox="354 1794 651 1819">ALREADY HAVE AN ACCOUNT?</div><div data-bbox="354 1821 444 1856">LOG IN</div><div data-bbox="683 1794 821 1819">SIGN UP</div></div> |  A mobile app interface for 'CREATE NEW USER ACCOUNT'. It features a title bar, followed by input fields for 'IC NUMBER', 'EMAIL', 'USERNAME', and 'PASSWORD', each with a placeholder text. At the bottom, there is a link 'ALREADY HAVE AN ACCOUNT?' and two blue buttons: 'LOG IN' and 'SIGN UP'. A back arrow is in the top left corner. |

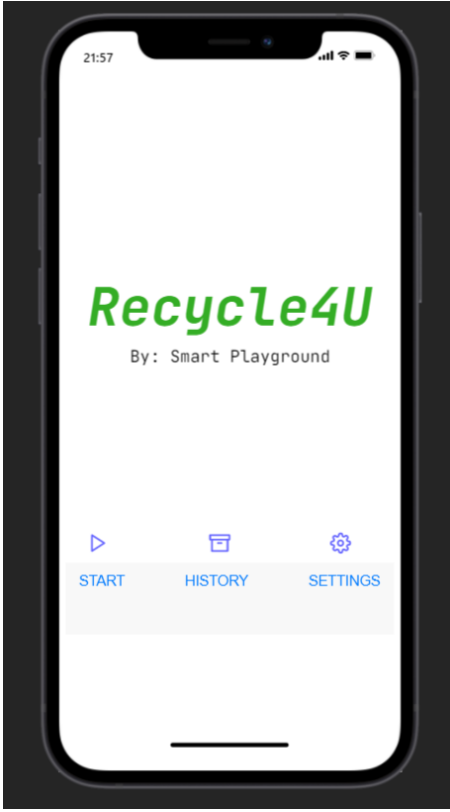
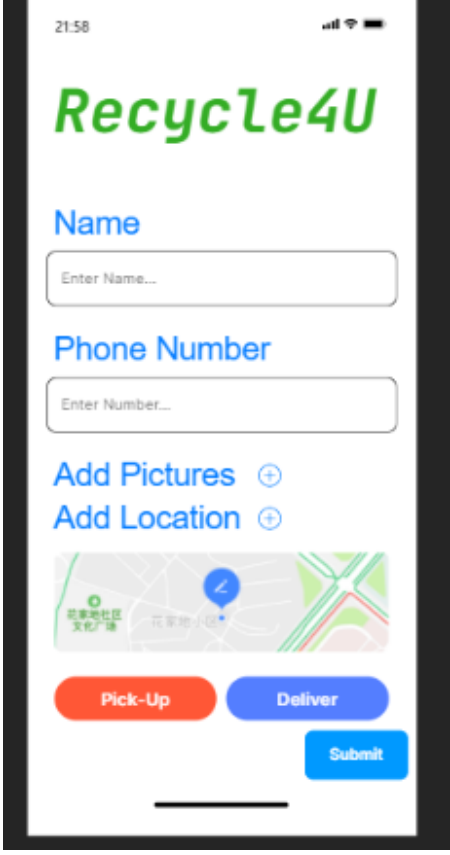
| | | |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | <div data-bbox="365 286 820 361">LOG IN TO EXISTING ACCOUNT</div> <div data-bbox="386 493 547 525">USERNAME:</div> <div data-bbox="383 525 786 565"></div> <div data-bbox="386 598 552 630">PASSWORD:</div> <div data-bbox="383 630 786 667"></div> <div data-bbox="506 750 660 807">SIGN IN</div> |  A mobile app mockup for a login screen. It features a teal background. At the top left is a back arrow. Below it is a dark grey header with the text "LOG IN TO EXISTING ACCOUNT". The main content area has two input fields: "USERNAME:" with a placeholder "Enter your username..." and "PASSWORD:" with a placeholder "Enter your password...". At the bottom is a blue button with the text "SIGN IN". |
| 6 | <div data-bbox="373 1191 828 1265">USE CURRENT LOCATION</div> <div data-bbox="587 1290 630 1323">OR</div> <div data-bbox="406 1348 706 1390">CHOOSE A LOCATION:</div> <div data-bbox="751 1348 807 1390"></div> <div data-bbox="406 1390 807 1801"><div data-bbox="558 1559 649 1602">MAP</div></div> |  A mobile app mockup for a location selection screen. It features a teal background. At the top left is a back arrow. Below it is a dark grey header with the text "PLAYGROUND LOCATION". The main content area has a blue button with the text "USE CURRENT LOCATION". Below that is the word "OR" and a light grey input field with the placeholder "Enter your location...". At the bottom is a map of a city area with various landmarks and street names in Chinese. |

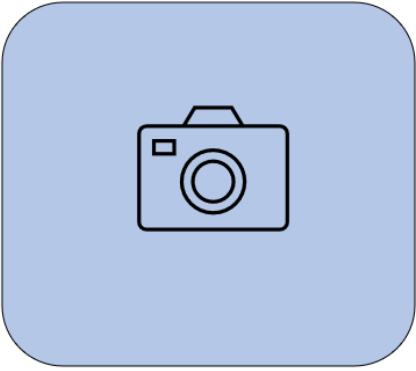
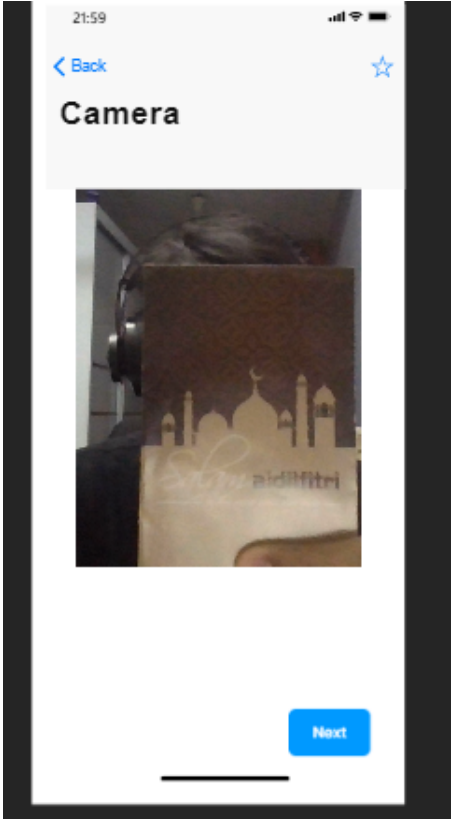

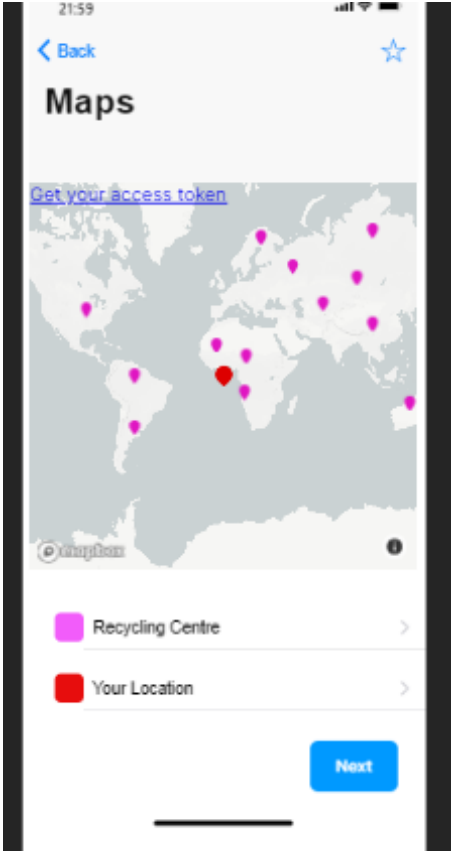
| | | |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | <div data-bbox="326 221 863 964"><div data-bbox="367 271 823 346">EQUIPMENT REPORT</div><div data-bbox="386 383 790 453">BROKEN EQUIPMENT: <div data-bbox="386 416 790 453"></div></div><div data-bbox="386 490 790 662">DESCRIPTION: <div data-bbox="386 520 790 662"></div></div><div data-bbox="386 692 766 854">UPLOAD PICTURES: <div data-bbox="406 727 573 854"></div><div data-bbox="599 727 766 854"></div></div><div data-bbox="508 879 673 939">SUBMIT</div></div> |  <p>A mobile app mockup showing the 'EQUIPMENT REPORT' form. The form has a teal background and a dark header with the title. It includes input fields for 'BROKEN EQUIPMENT:' (placeholder: 'Enter the broken equipment...'), 'DESCRIPTION:' (placeholder: 'Describe the broken equipment...'), and 'UPLOAD PICTURES:' (placeholder: '+'). A blue 'SUBMIT' button is at the bottom.</p> |
| 8 | <div data-bbox="326 1156 867 1901"><div data-bbox="380 1415 818 1617"><p data-bbox="412 1450 748 1525">Are you sure you want to submit the report?</p><div data-bbox="451 1540 581 1602">YES</div><div data-bbox="621 1540 751 1602">NO</div></div></div> |  <p>A mobile app mockup showing a confirmation dialog. The dialog is a white rounded rectangle with the text 'Are you sure you want to submit this report?' and two buttons: a blue 'YES' button and a red 'NO' button.</p> |



3.3 Task 3: Recycle any waste materials

| Scene | Wireframe | Mock Up |
|-------|-----------|---------|
| 1 | | |
| 2 | | |

| | | |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | <div><div>RECYCLE4U</div><div>BY: Smart Playground</div></div> <div><div>START</div><div>HISTORY</div><div>SETTINGS</div></div> |  <p>Mobile app mockup for Recycle4U. The screen displays the app name 'Recycle4U' in green, 'By: Smart Playground' below it, and three navigation buttons: 'START', 'HISTORY', and 'SETTINGS'.</p> |
| 4 | <div>RECYCLE4U</div> <div>NAME:</div> <div></div> <div>PHONE NUMBER:</div> <div></div> <div>ADD PICTURES +</div> <div>ADD LOCATION +</div> <div>MAPS</div> <div><div>PICKUP</div><div>DELIVERY</div></div> <div>SUBMIT</div> |  <p>Mobile app mockup for Recycle4U showing the registration form. The screen includes fields for 'Name' and 'Phone Number', buttons for 'Add Pictures' and 'Add Location' with plus icons, a map view, and buttons for 'Pick-Up', 'Deliver', and 'Submit'.</p> |

| | | |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <div>5</div> | <div><div>CAMERA</div><div></div><div>NEXT</div></div> | <div></div> |
| <div>6</div> | <div><div>MAPS</div><div></div><div>NEXT</div></div> | <div></div> |

| | | |
|---|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | <div><div>HISTORY</div><div><div>USER'S NAME</div><div>PICKUP/DELIVERY</div><div>USER'S NUMBER</div></div></div> | <div><div>21:59</div><div><div>< Back</div><div>☆</div></div><div>History</div><div><div>Abdullah</div><div>0123456789</div><div>PickUp</div></div></div> |
| 8 | <div><div>SETTINGS</div><div><div>REMINDER</div><div>ON/OFF</div><div>LANGUAGE</div></div></div> | <div><div>21:59</div><div><div>< Back</div><div>☆</div></div><div>Settings</div><div><div>Reminder</div><div><div></div></div></div><div><div>Language</div><div><div>Bahasa Malaysia</div><div>Tamil</div><div>English</div><div>Mandarin</div><div>French</div></div></div></div> |

3.4 Justification of the layout screen design based on Shneiderman’s Eight Golden Rules

1. Consistency

Consistency requires objects or actions to be the same as the situations. For example, we use an identical terminology which is playground’s slide to represent our ‘Smart Playground’s application icon.



Smart Playground’s application icon

2. Shortcuts

Shortcuts occur when users want to reduce the number of interactions as the frequency of use increases. It will also help users to increase the pace of interaction. For example, the home button is the simple shortcut created for users to go back to the home page.



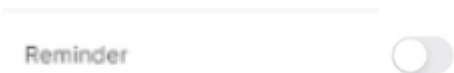
Return Button in Task 1

3. InformativeFeedback

An informative system feedback should exist for every operator action. For instance, when the users click any buttons or icons, the buttons and icons will be popped out to let the users know that they have been clicked.



Switch in task 3 toggles to the right when it is clicked by user



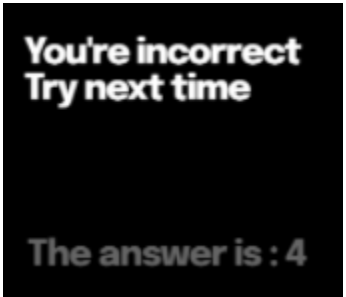
Switch in task 3 toggles to the left when it is clicked again by user

4. Dialogue

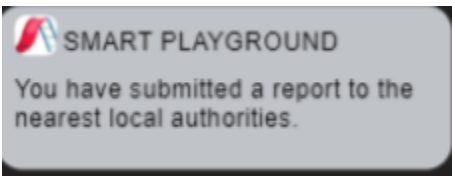
This rule is good to be applied when designing an interface. It is because the function is to keep users informed about what is going on. For example, in task 1, the application will let the users know if the answers are correct or wrong. Another example is in task 2, users will be notified after the report has been made through users' emails.



Dialogue shown in task 1 when user answered correctly



Dialogue shown in task 1 when user answered wrongly



Dialogue shown in task 2 when user submitted a report

5. Error Handling

If the users made an error, a good system should be able to detect the error and let the users know about it. For example, when users accidentally use letters to fill in the IC section, the system will notify the users about the mistake. This rule is good for the system to operate well without errors.



Only number is allowed to be entered in the IC section in task 2

6. Permit reversal of actions

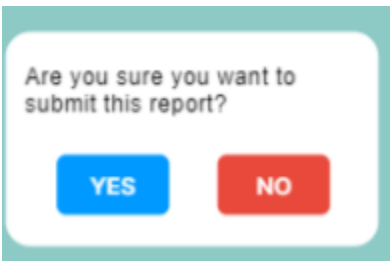
Permit reversal of actions refers to undo and redo functionality. Users often perform actions by mistake. This will require them an emergency exit to leave the action and go back to the previous action. For example, we use the ‘back’ icon at the upper left corner for users to leave the unwanted action without having to go through an extended process. The system makes sure that the mistake does not interfere with the workflow of the system.



“Back” icon in task 3

7. Support Internal Locus Of Control

Support internal locus of control means users are in charge of the system and the system responds to their actions. The system is designed to make users the initiators of actions rather than the responders. For example, in task 2, after the users clicked the ‘submit’ button for the report, they will be asked if they are sure to submit or cancel it.



Notification popped up for confirmation in task 2

8. Reduce short-term memory load

A good system design should be kept simple to avoid overload in terms of human memories. This is because there are limitations of human information processing in short-term memory. For example, we design the system to be simple as it could be to ease the users to use it. In task 1, we use visual pictures to represent the equipment options.



Visual pictures used to represent equipment option in Task 1

4.0 References

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