Haaga-Helia
University of Applied Sciences

Usability Evaluation Report for
VIEW – Virtual Interface Eyeglasses and Watch

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1 Introduction

CREATE is an augmented reality (AR) application aimed for graphic designers, fashion designers and video editors. The CREATE application is implemented by using a smart watch, smart glasses and optionally, a virtual smart board.

The smart watch has a function of capturing users' hand gestures. The smart glasses has a power button to turn on/off, a button to synchronize with the smart watch, and a front-camera, enabling the users to see the virtual screen – which is also the application's main interface. The smart board, on the other hand, allows the user to share the virtual screen with other people in specific situation.

The main goal of CREATE application is to combine the smart devices to help graphic designer, fashion designer and video editor save their time and do the jobs at anywhere and anytime through the virtual screen. Ultimately, our app also aims to increase the interaction between the user's design process and their clients.

2 Designing and prototyping

2.1 Scenario

User Profile 1: John, 35, Fashion Designer
Scenario: John is a fashion designer and he wants his client to see how his newest collection would look like on the client and be able to make adjustments right on the spot.

User Profile 2: Maria, 27, Graphic Designer
Scenario: Maria is a graphic designer and she is laying on her bed just about to go to sleep. All of a sudden she gets an inspiration for a design concept she is working on. She would want to be able to make her designs in bed without the need to go to her workroom and open her desktop.
The next morning, she presents her design to her client. She would like to project her design from her device to a bigger screen. She also wants to be able to make changes to her work in real time based on her client's feedback.

2.2 Developing the concept

System Interaction Paradigm: Based from the need of the user profiles in connecting their work from their devices to their presentation boards, we wanted to develop a system that interacts with each other.

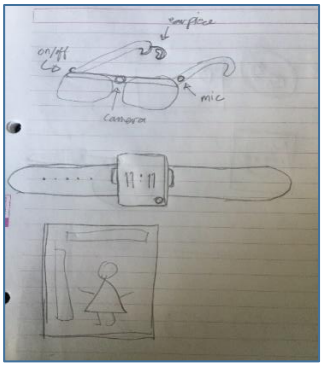


Figure 1. A paper mock-up of the system

We decided on a system that synchronizes smart glasses to a smart watch and to a smart board. There is also possibility later on of connecting other devices such as smart pens, 3D printers and the likes.

The smart glasses-watch combination would also address the need for immediate use of apps in creating and editing the user's designs and works. The user would not anymore be tied to a traditional desktop/laptop interface. The glasses would act as the screen. It would also feature a camera, headphones and microphone. This would give the possibility of using voice commands in the system. The watch would capture the hand gestures which would also serve as a way to interact with the system. This would give the user freedom from using the keyboards and the mouse.

A smartboard board can be connected to the system as well. It could function as a larger screen if the user wants to use that. It could also be a presentation device, eliminating the need to connect to a projector. The board could also take on other special functions such as the smart mirror mode for showing the fashion designs projected on the clients.

We gave our system a working name **VIEW** which stands for: Virtual Interface for Eye-glasses and Watch.

We also decided that our main application would be a sketching, a photo editing and a video editing tool. We called our app Create – an app for creatives.

Interface Metaphors: To help the users understand and be familiar with the system, we would try to relate some features with concepts that the users are already familiar with. For instance, we would use intuitive hand gestures ("clicking" gesture for click, "flicking" gesture for transferring the design from the "screen" to the model). We would also use icons that the users would easily recognize.

Interaction Mode: We would employ various forms of activity-based interaction between the user and the system. For instance, we could instruct the users to connect the devices to each other. Conversing would also be used and with the use of voice commands, literal conversation is possible as well. The gesture commands would be used to manipulate, navigate and explore the app and it's functionalities.

2.3 Concept demonstration

To illustrate if the system is theoretically plausible, we conducted a concept demo. We built a sample prototype of the glasses and the watch.

We also created an initial demo of the app using a Powerpoint presentation of the rough sketch of the possible modes and functionalities of the app.

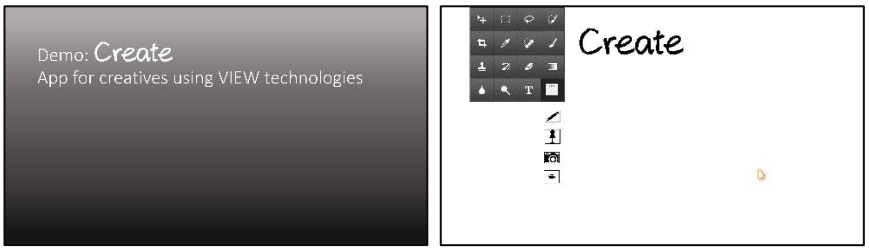
Figure 2. Sample prototype of the smart watch and eyeglasses.

Simple tasks were performed such as:

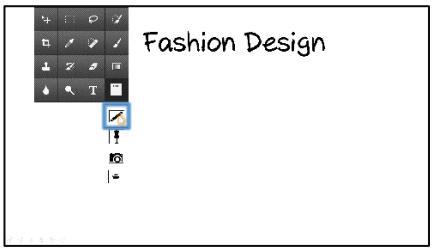
- Turning on the glasses.
- Putting on the glasses and the watch.
- Connecting the devices.

The demonstration showing how the system interacts with each other through the app was also performed.

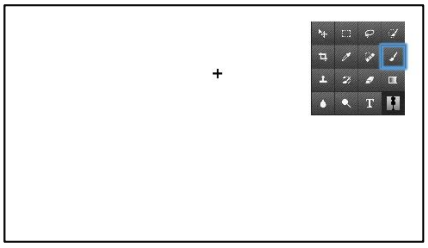
- Accessing the app and apps main menu

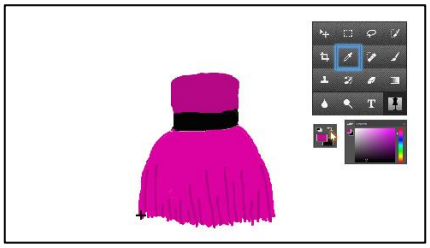


- Accessing the Fashion Design mode

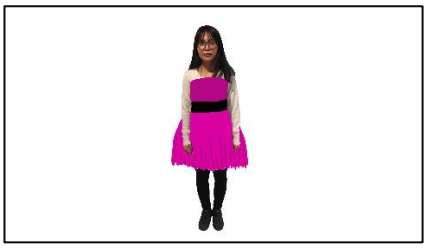


- Drawing and changing colors

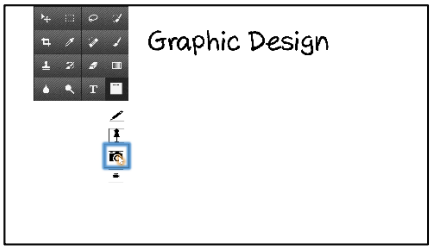




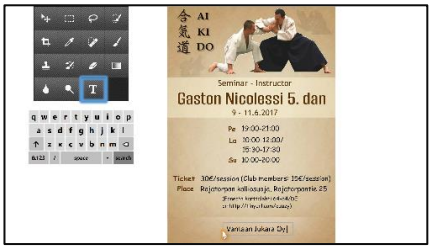
- Interfacing with the smartboard - “Mirror Mode”



- Accessing the Graphic Design Mode

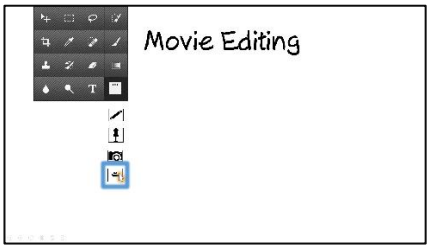


- Adding texts



- Inserting and cropping images

- Accessing the Movie Editing Mode



- Interfacing through voice commands, editing and playing video clips

2.4 Revising the Application Interface Prototype for Usability Testing

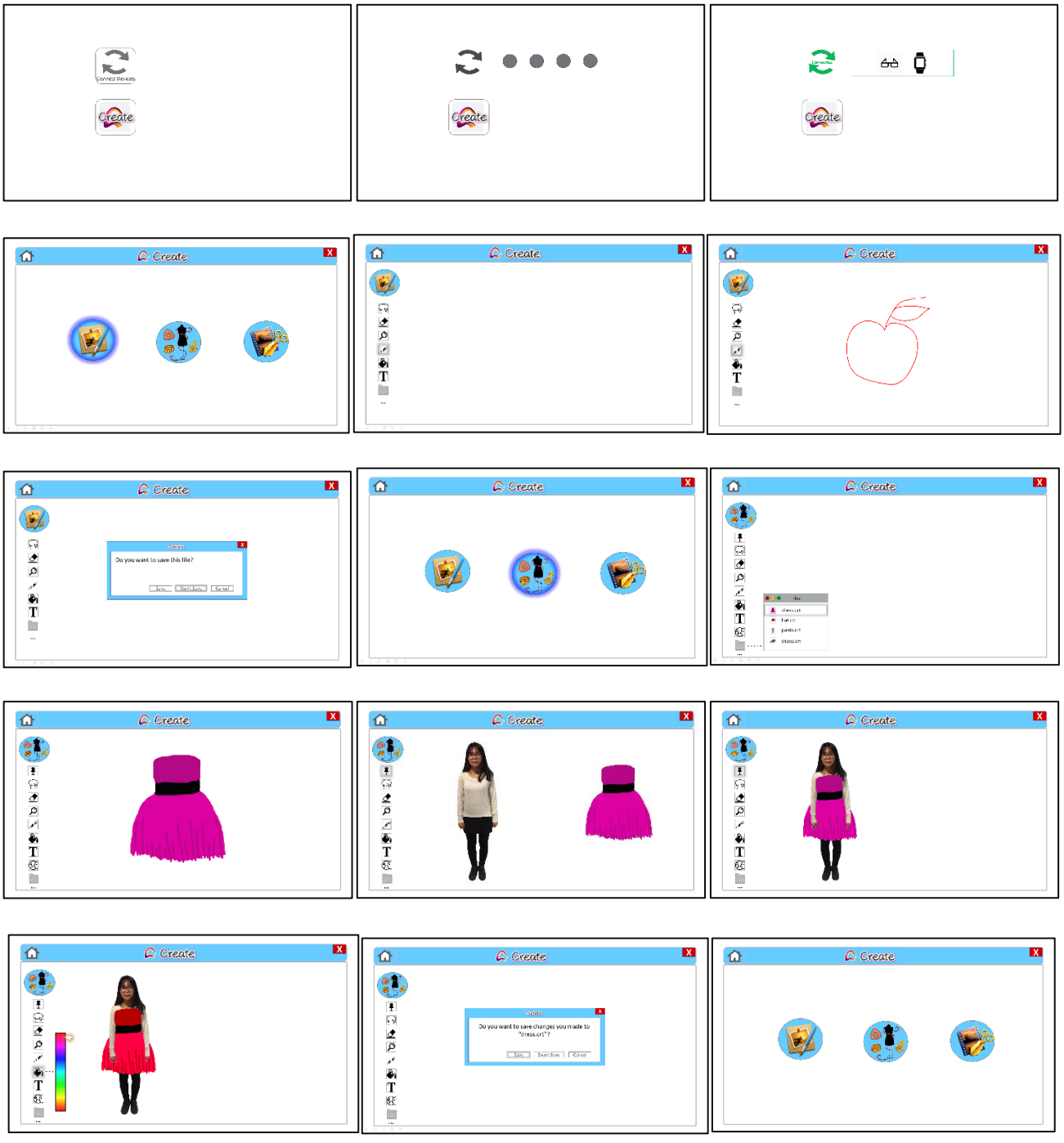
After demonstrating the system, we now revised our Application Interface prototype for Usability Testing. Improvements are made with emphasis on design principles.

Some of the things we considered were:

- The interface should be simple and clean.
- There would only be three main modules: Drawing, Fashion and Video Editing.
- There should be consistency in the look between the main menu and the different modules.
- Each module would have a number of functionalities grouped accordingly in the toolbars.
- The app would be able to accommodate a variety of users. Novice users can use the toolbars. Advanced users could use the hand gestures to perform the app's functionalities.
- There should be subtle but informative feedback through the use of highlights.

- The interface should be responsive depending on the type of screen used: eye-glasses, smartboard, computers, mobile phones, etc. Additional functionalities can be shown on the bigger screens.

Screencapture of the Create's Interface to be used during the testing:



3 Testing

3.1 Test plan

Planning the test	
Which users:	4 users including: novice, experienced, and expert users
Domain know-ledge:	Know the basic idea of the application and smart devices
IT knowledge:	Tester know to use basic photo editing tools, touch-screen, basic application interface
Finding test users:	Actual user, at school's lobby, school mates
Test site:	Usability lab at Aalto University and Haaga-Helia UAS
Facilitator:	Glasses, hand-band, touch-screen laptop, A4 blank paper
Log keeper:	Observer: Notes down the observation check-list – particularly the problems.
Test tasks:	Put on devices and inspect important functions Synchronize smart watch and smart glasses Open the application Choose Drawing mode and draw an apple, do not save the file Back to home page Choose Fashion design mode and try out new dress for the model, change the colour, save the file Explain.
Presenting tasks:	Tasks in printed papers. Exploration
User instruc-tion:	Observe one user at a time.
Test method:	Recorded video, written notes, short interview.
Data collection:	
Debriefing:	Do you think the system could…? Good things about the sys-tem? Bad things? Would you recommend this to your best friend?

Planning the time:	Welcome and intro: 5 min Test tasks 5 min Debriefing 5 min Reporting the problems 100 min
	Total, one user 15 min Time for 4 users 1 hour

3.2 Tools and methods

3.2.1 Tools

The test is conducted at Haaga-Helia University of Applied Science's usability testing laboratory. The test is recorded by using one overhead camera and one voice recorder. Each tester does not have to prepare anything in advance but the test is conducted by using a combination of glasses as smart glasses which has a front-camera, power button, and synchronize button, hand-band as smart watch in order to capture hand gestures, and touch-screen laptop as smart screen in order to simulate the screen the user will see from smart glasses.

3.2.2 Preparation

The touch-screen laptop is laid down on the table in which the overhead camera will film the whole screen, the voice recorder will record both the tester's and evaluator's voices. The prototype is created using PowerPoint installed in the touch-screen laptop for the whole testing process.

Each test will be conducted with the testing team of three people: one supervisor, one assistant and one observer. The supervisor will give instructions and explanation to the tester, the assistant will help controlling and assist evaluator with the flow of testing steps. The observer has the test case form and will observe the whole situation of the test.
The touch-screen laptop has PowerPoint slideshows ready for the test. Glasses and hand-band will be placed in front of the tester.

3.3 Test report

3.3.1 Test Case Reports

3.3.1.1 Test user 1

The first user test case was not recorded but it was observed and the test case form was filled by the observer. The first test user experienced the largest amount of problems such as having difficulties finding the buttons and pressing the wrong buttons. There was also some problems with the system not functioning as expected that caused confusion in the user.

a) Test case 1.1

Test Case #: 1.1

Test Case Name: Inspecting and connecting the hardware

Page: 10

System: VIEW - Virtual Interface Eyeglasses and Watch

Subsystem: Smart glasses and the watch and the interface of the main menu

Designed by: Group 8

Design Date: 20.04.2017

Executed by: Katariina Huttunen

Execution Date: 04.05.2017

Short Description: Testing how easily the user can locate the main functions of the hardware and connect it

Pre-conditions

The devices have already been synchronized once before.

The system displays the desktop.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Inspect the glasses and locate the front camera and the power button	User inspects the devices and successfully locates all the main parts	pass	
2.	Put on the glasses	The user successfully puts on the glasses and sees a blank screen in front of him/her	pass	
3.	Turn the glasses on by pressing the power button	The glasses will turn on and the user will see the desktop	pass	
4.	Put on the wristband	The user successfully puts on the wrist band	pass	
5.	Connect the devices from the screen	The connect icon will turn green and it will show the devices that have been connected.	pass	Confused the button

Post-conditions

The devices have been synchronized.

The user showed some signs of confusion when asked to connect the devices from the screen. Eventually she completed the task successfully.

b) Test Case 1.2

Test Case #: 1.2

Test Case Name: Testing the drawing function of the Create app

Page: 11

System: VIEW - Virtual Interface Eyeglasses and Watch

Subsystem: Create app

Designed by: Group 8

Design Date: 20.04.2017

Executed by: Katariina Huttunen

Execution Date: 04.05.2017

Short Description: Testing how easily the user can open the app, find its main functions and use them

Pre-conditions

The user is wearing the glasses and the watch.

The devices have been connected.

The system is displaying the home menu.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Open the "Create" app	The system will display the home menu of the Create app	pass	
2.	Click and open the drawing mode	The drawing mode will open and a tool bar will be displayed	pass	Changed hand for wristband
3.	Click on the pen tool	The pen tool will be selected	pass	
4.	Draw an apple	The system will display the apple the user has drawn	pass	
5.	Go back to the home menu	The system asks the user if he/she wants to save the file	pass	Touched wrong screen, confused
6.	Don't save the file	The apple will not be saved and the system will display the home menu of the Create app	pass	

Post-conditions

The system displays the main menu of the create app.

The user asked if she could switch the wristband to her right hand because it was difficult for her to use the left hand.

When asked to go back to home screen the user pressed the wrong button on the wrong screen.

c) Test Case 1.3

Test Case #: 1.3

Test Case Name: Testing the fashion design mode of the Create app

Page: 12

System: VIEW - Virtual Interface Eyeglasses and Watch

Subsystem: Create app

Designed by: Group 8

Design Date: 20.04.2017

Executed by: Katariina Huttunen

Execution Date: 04.05.2017

Short Description: Testing how easily the user can use the fashion design mode

Pre-conditions

The system displays the main menu of the Create app.

There are already some files saved on the cloud.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Click and open the fashion design mode	The fashion design mode will open and a tool bar will be displayed	pass	
2.	Open the folder	The folder will open and the files will be shown	pass	
3.	Select and open the "dress" file	The dress will appear on the screen	pass	
4.	Click on the mannequin tool	The model will appear on the screen	fail	Confused the icon
5.	Click on the dress to fit it to the model	The dress will appear on the model	pass	Confused the model And how to drag the dress
6.	Change the color of the dress by clicking the paint bucket tool	The paint bucket tool is selected and the color palette will appear	pass	
7.	Choose the color red	The dress will change its color to red	pass	
8.	Go back to the home menu	The system asks the user if he/she wants to save the file	pass	
9.	Save the file by clicking "Save"	The dress will be saved and the system will display the home menu of the Create app	pass	

Post-conditions

The edited version of the dress is saved.

The System displays the main menu of the create app.

The user got confused and pressed the wrong icon when she was asked to choose the mannequin tool.
The user was having problems dragging the dress on the model at first but completed the task successfully.

As a result of the first test case the team came to the conclusion that the double clicking function that required some of the icons being double clicked was unnecessary and confusing the user and thus it was removed.

Some of the users confusion was also caused by not explaining well enough the concept and the purpose of each device especially the wrist band. The mannequin tool icon was also edited to be more simple. The iPad as the second screen was also replaced with paper print of the interface to minimize confusion.

3.3.1.2 Test user 2

After the first test user the user interface was edited slightly based on the results of the first user test.

a) Test Case 2.1

Test Case #: 2.1	**Test Case Name:** Inspecting and connecting the hardware	**Page: 1**
System: VIEW - Virtual Interface Eyeglasses and Watch	**Subsystem:** Smart glasses and the watch and the interface of the main menu	
Designed by: Group 8	**Design Date:** 20.04.2017	
Executed by: Katariina Huttunen	**Execution Date:** 10.05.2017	
Short Description: Testing how easily the user can locate the main functions of the hardware and connect it		

Pre-conditions

The devices have already been synchronized once before.

The system displays the desktop.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Inspect the glasses and locate the front camera and the power button	User inspects the devices and successfully locates all the main parts	pass	
2.	Put on the glasses	The user successfully puts on the glasses and sees a blank screen in front of him/her	pass	
3.	Turn the glasses on by pressing the power button	The glasses will turn on and the user will see the desktop	pass	
4.	Put on the wristband	The user successfully puts on the wrist band	pass	
5.	Connect the devices from the screen	The connect icon will turn green and it will show the devices that have been connected.	pass	The system didn't respond right away

Post-conditions

The devices have been synchronized.

The system didn’t respond right away when pressing the connect icon.

b) Test Case 2.2

Test Case #: 2.2

Test Case Name: Testing the drawing function of the Create app

Page: 2

System: VIEW - Virtual Interface Eyeglasses and Watch

Subsystem: Create app

Designed by: Group 8

Design Date: 20.04.2017

Executed by: Katariina Huttunen

Execution Date: 10.05.2017

Short Description: Testing how easily the user can open the app, find its main functions and use them

Pre-conditions

The user is wearing the glasses and the watch.

The devices have been connected.

The system is displaying the home menu.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Open the "Create" app	The system will display the home menu of the Create app	pass	
2.	Click and open the drawing mode	The drawing mode will open and a tool bar will be displayed	pass	It was hard for the user to find the icon
3.	Click on the pen tool	The pen tool will be selected	pass	
4.	Draw an apple	The system will display the apple the user has drawn	pass	
5.	Go back to the home menu	The system asks the user if he/she wants to save the file	pass	
6.	Don't save the file	The apple will not be saved and the system will display the home menu of the Create app	pass	

Post-conditions

The system displays the main menu of the create app.

The user was confused and had problems choosing the drawing mode icon.

c) Test Case 2.3

Test Case #: 2.3

Test Case Name: Testing the fashion design mode of the Create app

Page: 3

System: VIEW - Virtual Interface Eyeglasses and Watch

Subsystem: Create app

Designed by: Group 8

Design Date: 20.04.2017

Executed by: Katariina Huttunen

Execution Date: 10.05.2017

Short Description: Testing how easily the user can use the fashion design mode

Pre-conditions

The system displays the main menu of the Create app.

There are already some files saved on the cloud.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Click and open the fashion design mode	The fashion design mode will open and a tool bar will be displayed	pass	
2.	Open the folder	The folder will open and the files will be shown	pass	
3.	Select and open the "dress" file	The dress will appear on the screen	pass	
4.	Click on the mannequin tool	The model will appear on the screen	pass	
5.	Click on the dress to fit it to the model	The dress will appear on the model	pass	
6.	Change the color of the dress by clicking the paint bucket tool	The paint bucket tool is selected and the color palette will appear	pass	The system failed. User Was confused.
7.	Choose the color red	The dress will change its color to red	pass	
8.	Go back to the home menu	The system asks the user if he/she wants to save the file	pass	
9.	Save the file by clicking "Save"	The dress will be saved and the system will display the home menu of the Create app	pass	

Post-conditions

The edited version of the dress is saved.

The System displays the main menu of the create app.

The system didn't work as expected when the user was asked to change the color of the dress which caused some confusion in the user.

The system didn’t respond when the user was choosing the paint bucket tool and she had to repeat the action.

The user felt all in all the software was easy to use but she didn’t fully understand the concept and the purpose of each device especially the wrist band. She was also confused about the video editing mode icon that had no functionality in the test.

3.3.1.3 Test user 3

After the second user the test executor made sure she explained the concept better and that the next user fully understood how the system works.

a) Test case 3.1

Test Case #: 3.1	**Test Case Name:** Inspecting and connecting the hardware	**Page: 4**
System: VIEW - Virtual Interface Eyeglasses and Watch	**Subsystem:** Smart glasses and the watch and the interface of the main menu	
Designed by: Group 8	**Design Date:** 20.04.2017	
Executed by: Hang Le	**Execution Date:** 10.05.2017	
Short Description: Testing how easily the user can locate the main functions of the hardware and connect it		

Pre-conditions

The devices have already been synchronized once before.

The system displays the desktop.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Inspect the glasses and locate the front camera and the power button	User inspects the devices and successfully locates all the main parts	pass	
2.	Put on the glasses	The user successfully puts on the glasses and sees a blank screen in front of him/her	pass	
3.	Turn the glasses on by pressing the power button	The glasses will turn on and the user will see the desktop	pass	
4.	Put on the wristband	The user successfully puts on the wrist band	pass	
5.	Connect the devices from the screen	The connect icon will turn green and it will show the devices that have been connected.	pass	

Post-conditions

The devices have been synchronized.

b) Test case 3.2

Test Case #: 3.2 — **Test Case Name:** Testing the drawing function of the Create app — **Page:** 5

System: VIEW - Virtual Interface Eyeglasses and Watch — **Subsystem:** Create app

Designed by: Group 8 — **Design Date:** 20.04.2017

Executed by: Hang Le — **Execution Date:** 10.05.2017

Short Description: Testing how easily the user can open the app, find its main functions and use them

Pre-conditions

The user is wearing the glasses and the watch.

The devices have been connected.

The system is displaying the home menu.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Open the "Create" app	The system will display the home menu of the Create app	pass	
2.	Click and open the drawing mode	The drawing mode will open and a tool bar will be displayed	pass	
3.	Click on the pen tool	The pen tool will be selected	pass	
4.	Draw an apple	The system will display the apple the user has drawn	pass	
5.	Go back to the home menu	The system asks the user if he/she wants to save the file	pass	Tried to save the file
6.	Don't save the file	The apple will not be saved and the system will display the home menu of the Create app	pass	

Post-conditions

The system displays the main menu of the create app.

The user automatically tried to save the file before given the instructions to do so.

c) Test Case 3.3

Test Case #: 3.3 — **Test Case Name:** Testing the fashion design mode of the Create app — **Page:** 6

System: VIEW - Virtual Interface Eyeglasses and Watch — **Subsystem:** Create app

Designed by: Group 8 — **Design Date:** 20.04.2017

Executed by: Hang Le — **Execution Date:** 10.05.2017

Short Description: Testing how easily the user can use the fashion design mode

Pre-conditions

The system displays the main menu of the Create app.

There are already some files saved on the cloud.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Click and open the fashion design mode	The fashion design mode will open and a tool bar will be displayed	pass	
2.	Open the folder	The folder will open and the files will be shown	pass	Finding the folder was difficult
3.	Select and open the "dress" file	The dress will appear on the screen	pass	
4.	Click on the mannequin tool	The model will appear on the screen	pass	
5.	Click on the dress to fit it to the model	The dress will appear on the model	pass	
6.	Change the color of the dress by clicking the paint bucket tool	The paint bucket tool is selected and the color palette will appear	pass	System didn't respond
7.	Choose the color red	The dress will change its color to red	pass	
8.	Go back to the home menu	The system asks the user if he/she wants to save the file	pass	
9.	Save the file by clicking "Save"	The dress will be saved and the system will display the home menu of the Create app	pass	

Post-conditions

The edited version of the dress is saved.

The System displays the main menu of the create app.

It took some time before the user was able to locate the folder.

The system didn't respond when the user was choosing the paint bucket tool.

According to the user the interface is confusing and she mentioned that the saving button was missing. She also said it would be good if some of the functions would show a description when clicked.

3.3.1.4 Test user 4

There was no significant changes in the test settings between the third and the fourth user.

a) Test case 4.1

Test Case #: 4.1	**Test Case Name:** Inspecting and connecting the hardware	**Page: 7**
System: VIEW - Virtual Interface Eyeglasses and Watch	**Subsystem:** Smart glasses and the watch and the interface of the main menu	
Designed by: Group 8	**Design Date:** 20.04.2017	
Executed by: Charlese Saballe	**Execution Date:** 10.05.2017	
Short Description: Testing how easily the user can locate the main functions of the hardware and connect it		

Pre-conditions

The devices have already been synchronized once before.

The system displays the desktop.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Inspect the glasses and locate the front camera and the power button	User inspects the devices and successfully locates all the main parts	pass	
2.	Put on the glasses	The user successfully puts on the glasses and sees a blank screen in front of him/her	pass	
3.	Turn the glasses on by pressing the power button	The glasses will turn on and the user will see the desktop	pass	
4.	Put on the wristband	The user successfully puts on the wrist band	pass	
5.	Connect the devices from the screen	The connect icon will turn green and it will show the devices that have been connected.	pass	

Post-conditions

The devices have been synchronized.

b) Test case 4.2

Test Case #: 4.2	**Test Case Name:** Testing the drawing function of the Create app	**Page: 8**
System: VIEW - Virtual Interface Eyeglasses and Watch	**Subsystem:** Create app	
Designed by: Group 8	**Design Date:** 20.04.2017	
Executed by: Charlese Saballe	**Execution Date:** 10.05.2017	
Short Description: Testing how easily the user can open the app, find its main functions and use them		

Pre-conditions

The user is wearing the glasses and the watch.

The devices have been connected.

The system is displaying the home menu.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Open the "Create" app	The system will display the home menu of the Create app	pass	
2.	Click and open the drawing mode	The drawing mode will open and a tool bar will be displayed	pass	
3.	Click on the pen tool	The pen tool will be selected	pass	
4.	Draw an apple	The system will display the apple the user has drawn	pass	
5.	Go back to the home menu	The system asks the user if he/she wants to save the file	pass	User tried saving the file
6.	Don't save the file	The apple will not be saved and the system will display the home menu of the Create app	pass	

Post-conditions

The system displays the main menu of the create app.

The user automatically tried not saving the file before she was asked to do so.

c) Test case 4.3

Test Case #: 4.3	**Test Case Name:** Testing the fashion design mode of the Create app **Page: 9**
System: VIEW - Virtual Interface Eyeglasses and Watch	**Subsystem:** Create app
Designed by: Group 8	**Design Date:** 20.04.2017
Executed by: Charlese Saballe	**Execution Date:** 10.05.2017
Short Description: Testing how easily the user can use the fashion design mode	

Pre-conditions

The system displays the main menu of the Create app.

There are already some files saved on the cloud.

Step	Action	Expected System Response	Pass / Fail	Comment
1.	Click and open the fashion design mode	The fashion design mode will open and a tool bar will be displayed	pass	The system failed
2.	Open the folder	The folder will open and the files will be shown	pass	
3.	Select and open the "dress" file	The dress will appear on the screen	pass	
4.	Click on the mannequin tool	The model will appear on the screen	pass	
5.	Click on the dress to fit it to the model	The dress will appear on the model	pass	
6.	Change the color of the dress by clicking the paint bucket tool	The paint bucket tool is selected and the color palette will appear	pass	
7.	Choose the color red	The dress will change its color to red	pass	
8.	Go back to the home menu	The system asks the user if he/she wants to save the file	pass	
9.	Save the file by clicking "Save"	The dress will be saved and the system will display the home menu of the Create app	pass	

Post-conditions

The edited version of the dress is saved.

The System displays the main menu of the create app.

The system didn't function as expected and the user had to start the test from the beginning.

The user completed all the task very fast and without much confusion. However she said some of the icons were unclear to her.

Summary

The most significant problems the users had were all related to the system not functioning as expected and because of that some of the tasks and steps had to be repeated. Other problems were about the icons especially the similarity of the mannequin tool icon and the fashion design mode icon that was located right on top of the mannequin tool icon. The users would have been more likely to locate the icons faster if they had been ordered by importance from bottom to top. For further testing some changes to the interface would have to be made and the instructions given to the user should be even more simple and the concept should be explained even better.

3.3.2 Heuristic evaluation

- The system has a simple and minimalist design. It is also easy to connect the devices to each other.
- The app uses simple language but it also uses terms that the target audience are familiar with.
- Some icons used are familiar and standard, although some of the icons are difficult to figure out for new users. The mannequin tool took a while for users to figure out. The users also needed a moment to look for the folder button.
- The app has a consistent look and uses a common color palette through all the modules.
- It provides the user with feedback like “Connected”. It also indicates which buttons were pressed by highlighting them.
- The home and exit buttons are clearly visible at all times. The “gestures” give the user control as to which actions to take.
- The novice user was satisfied with accessing the functions using the toolbars while the more advanced user is excited to see how the gestures would work in the system.
- The system presents the users with options on which actions they wish to perform: “Do you want to save changes you made to “dress.crt”?.
- There is no help and documentation yet. There is also no solution provided in cases of bugs/errors.

3.3.3 Revising the Application Interface Prototype for Usability testing

After the test, we asked the users to provide some comments about their experience in using the system, as well as suggestions for improvements.

All of the three users think that the system is easy to use, although some of the tool icons are quite confusing and/or the functions are difficult to guess.

User1:

- Was confused about the use of the watch.
- Commented that, it would make sense to turn the glasses on first before you put it on
- Was confused about the mannequin button.
- Asked if the three main modules are related to each other or are they separate.

User2:

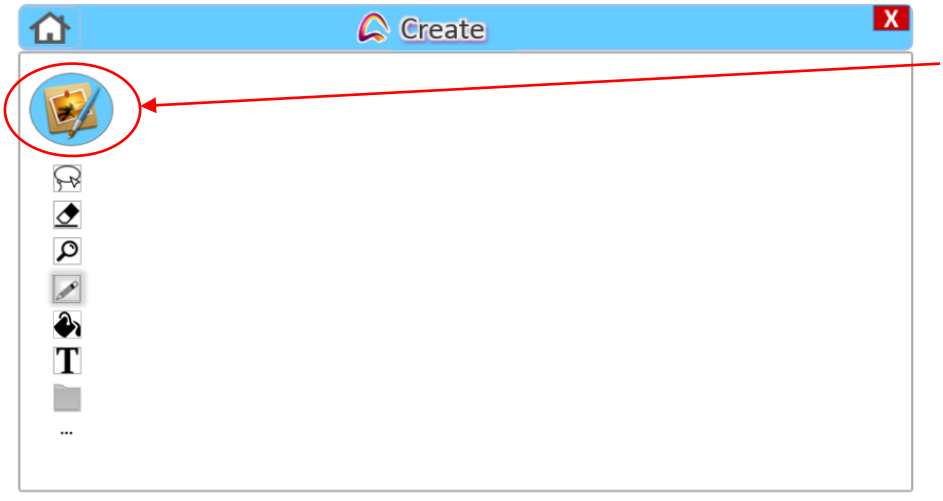
- Said that since there is no save button visible, it was confusing how to save your work.
- Suggested that since the system is quite a new concept, it would help if there are descriptions on the icons.
- Commented on the possibility of using the smart glasses and the watch, to gesture and scroll around 3D images.
- Considers taking 5-10 minutes of playing around the app to be able to get to know the functions of the tools and the features of the app.
- Said that it would be nice to test the functions using gestures.

User3:

- Commented that some of the icons are standard and familiar but some of the icons are also hard to guess.

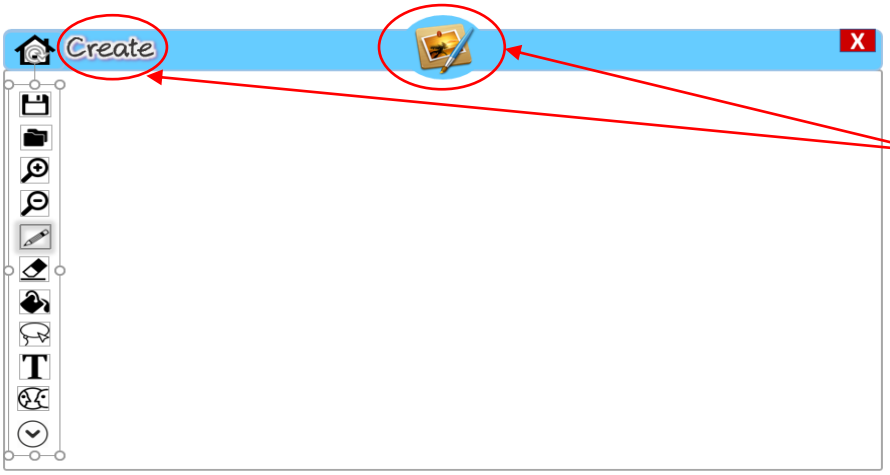
3.3.4 Improvements and Analysis of the Solutions

- Change the location of the module button and place it on top:



The Drawing mode icon was put there as an icon only in order to show the users that they are in the Drawing Mode/Page, but it confused user that it was one the Editing tool and a clickable button.

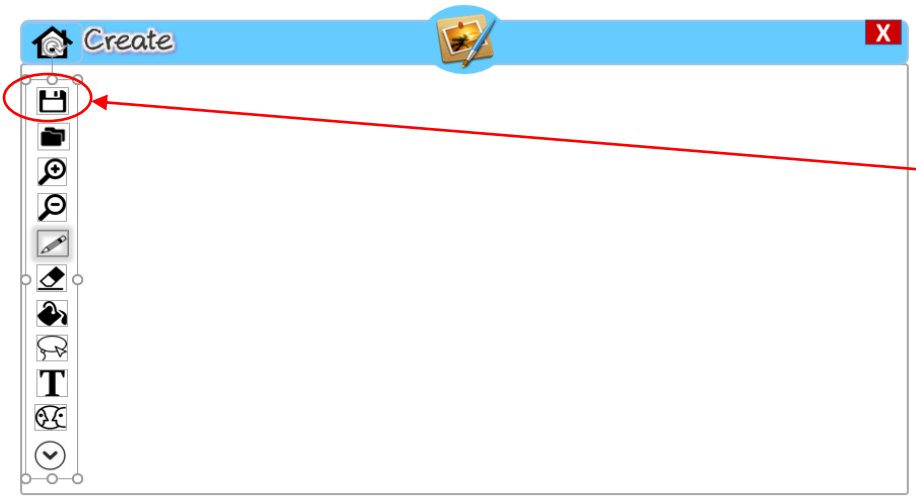
Improved version:



The CREATE logo is moved to near the Home icon to keep showing the name of the application. The Drawing mode icon is move to the middle of the toolbar, with no border-color and has the same background color with the toolbar so the user won't

- Put save button in the visible toolbar

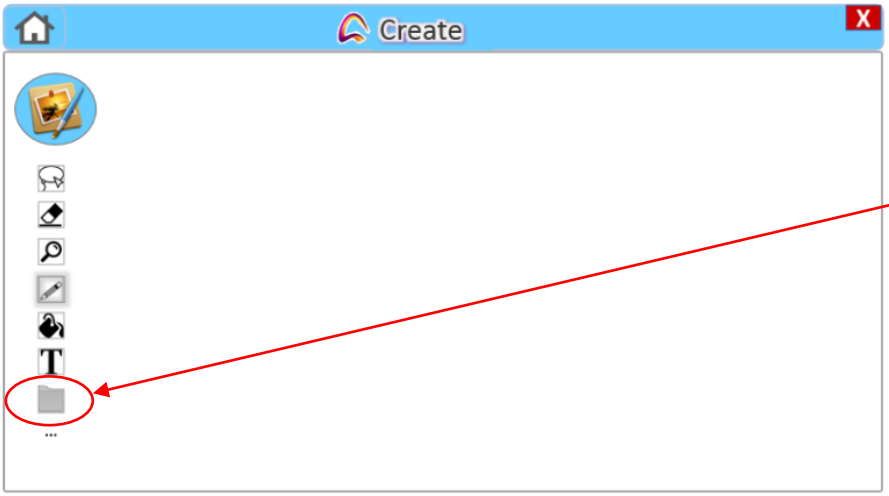
Improved version:



- In the test version, there is a task in which user needed to save the edited file, but there was not any Save icon/buttons for that.

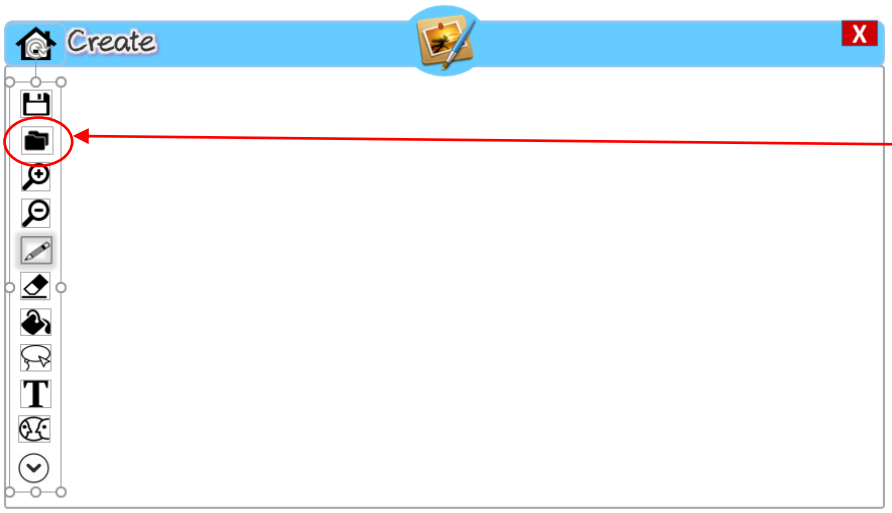
- In Improved version, the Save icon was put near the top left of the interface, above Editing tools, the same concept with other application so the users can easily find the button to Save.

- Replace folder button



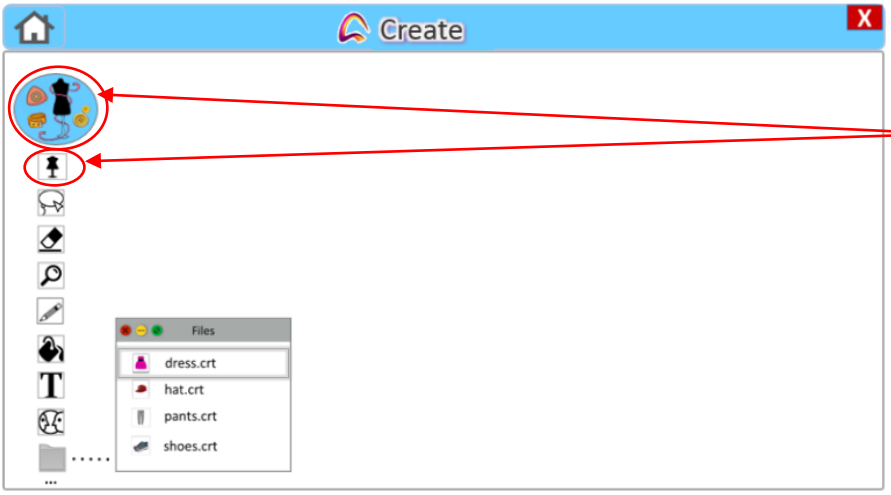
It took a short while for the user to recognize the Folder button to choose a file from there, which means it made users a bit confused when conducting the test.

Improved version:



The Folder button is changed to another symbol which indicates a clearer meaning of Folder. Also, the folder button is put on top just right below the Save icon so the user will feel easier to find it and won't mistake it with one of the Editing tools.

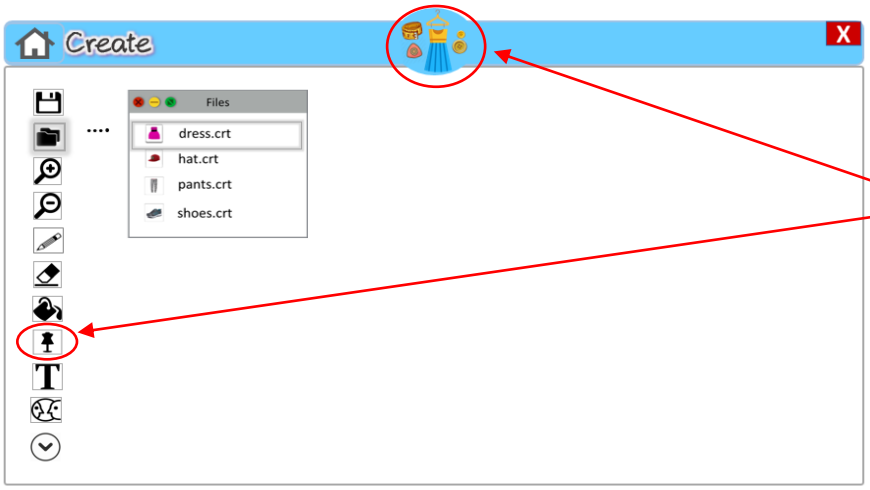
- Change the mannequin in the main fashion module to something like a dress sketch.



- Similar to the Drawing Mode, Fashion Designer mode icon made users confused that it was a clickable button.

- The Mannequin symbol inside the Fashion Designer icon was the same as the Mannequin for editing, and these two icons were close to each other, which made the users really confused and mistaken.

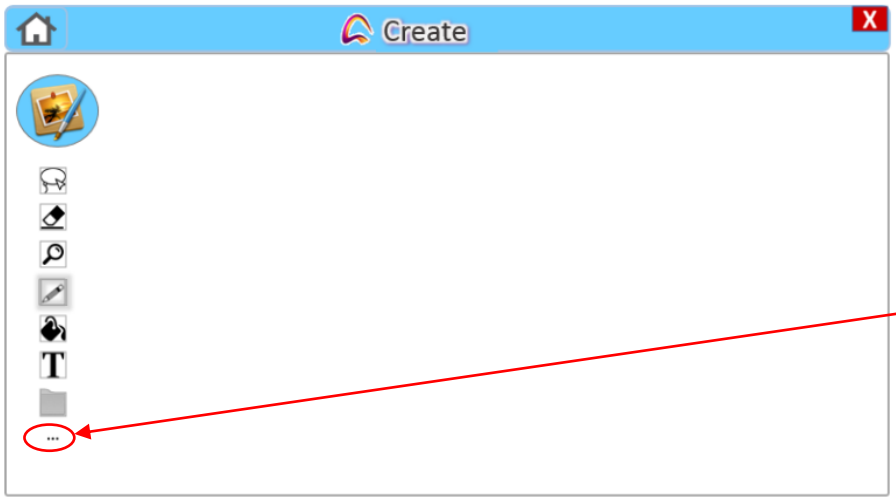
Improved version:



-The Fashion Designer mode icon is moved to the middle of toolbar and has the same characteristics as the Drawing mode icon.

-The Mannequin symbol in Fashion Designer icon is replace by a dress so it won't be confusing with the Mannequin editing tool.

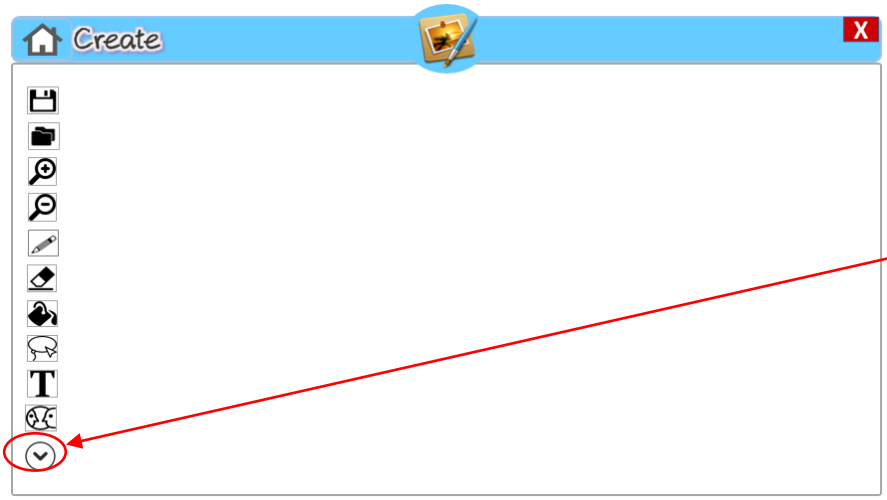
- Change the Expand button



The Expand button in Editing tool collection was originally a “three-dots” icon which somehow the users didn’t understand what it is and needed time to check it.

The Expand button means there are more editing tools which are not shown in the main Editing tool collection.

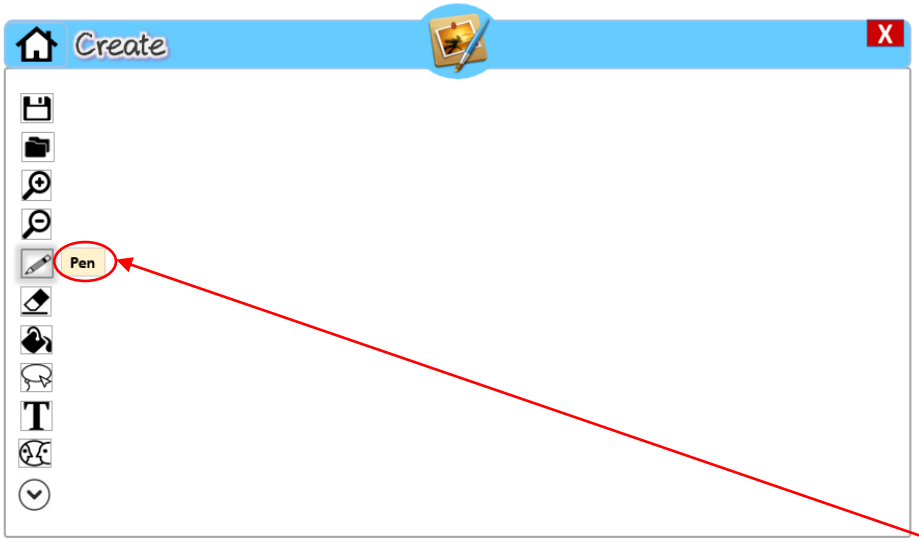
Improved version:

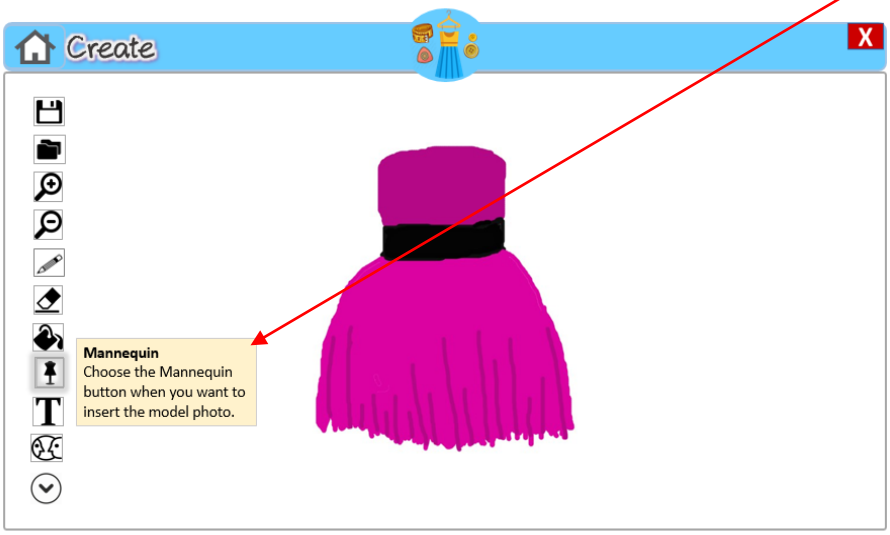


The Expand button is changed to another symbol which makes it clear that there are more tools to check.

- On mouse over, show a short description of the tool:

Improved version:





Since there are many tools the users don't know, the improved version updates the description for each tool when the mouse is over the icons so the users know the function.

4 Appendix

4.1 Appendix 1

Evaluating the team design individually:

Hang Le

Feelings of being	Concept	UI Design	Application Functionality
Empowered	5	4	4
Enjoyment	5	5	5
Adjustability	5	5	5
Trust	4	4	4
Security	3	4	4
Effective	5	5	5
Contributions	5	5	5
Engagement	5	4	5
Ownership	5	4	4

Charlese

Feelings of being	Concept	UI Design	Application Functionality
Empowered	5	5	5
Enjoyment	4	5	5
Adjustability	5	5	5
Trust	4	3	3
Security	4	4	4
Effective	5	5	4
Contributions	5	5	5
Engagement	4	4	4
Ownership	5	5	5

Katariina:

Feelings of being	**Concept**	**UI Design**	**Application Functionality**
Empowered	4	3	3
Enjoyment	5	5	5
Adjustability	5	5	5
Trust	3	3	3
Security	3	3	3
Effective	5	5	5
Contributions	5	5	5
Engagement	5	4	5
Ownership	4	4	4

Overall assessment:

The concept based on AR so it's still an area to be further discovered now and in the future so in our opinion the concept would bring a lot of enjoyment and since its functionalities do help a lot for the targeted users: fashion designer, graphic designer and video editor, it could bring the feel of empowerment, effectiveness, contributions, and ownerships to the users. We are currently in the middle phase of the prototype so more subjects to be concerned would be security, higher-fidelity prototype, design principles.

The design of the app is simple with the main interface only having 3 buttons for the 3 different main modes. We score high in adjustability because being able to use the app at convenient times and location was a main consideration we thought about when we came up with the app. We score highly in the feeling of empowerment and effectivity because the app helps the user enhance their skills by using the app. Contribution is also an item that the app does well with the interaction between the designer and the clients. Client involvement using the integrated smart mirror could answer well the feeling of being able to deliver important things to other people.

Security and trust could be some area of concern because the app would use mainly cloud services. Overall, we think the app design does well in the context presented in the project.

4.2 Appendix 2

Here is the link of our presentation for this report:

https://drive.google.com/file/d/0Bx30JdMQKjhUMHY3WEtZMzR0Rmc/view