
PROTOTYPE AND EVALUATION

CS346: SOFTWARE ENGINEERING LABORATORY

Group 11
Project 7: Paint Application

Samay Varshney 180101097
Siddhartha Jain 180101078
Varhade Amey Anant 180101087
Pulkit Changoiwala 180101093

Department of Computer Science and Engineering
Indian Institute of Technology Guwahati

Contents

1	Prototype	4
2	Evaluation	5
2.1	Introduction	5
2.2	Methodology (Evaluation Process):	5
2.3	Preparatory (Understanding the user and what is his/her most important task)	6
2.3.1	Target User	6
2.3.2	Scenario	6
2.3.3	Core Tasks:	6
2.3.4	Importance of these tasks	6
2.3.5	The reviewer will then answer the following four questions during each sequence of the assigned task	6
2.4	Individual Steps	6
2.4.1	Task 1	6
2.4.2	Task 2	7
2.5	Analysis	7
2.5.1	Task 1	7
	Step 1	7
	Answer to questions	8
	Step 2	8
	Answer to questions	8
	Step 3	9
	Answer to questions	9
	Step 4	9
	Answer to questions	9
	Step 5	10
	Answer to questions	10
	Step 6	11
	Answer to questions	11
	Step 7	11
	Answer to questions	12
	Step 8	12
	Answer to questions	12
2.5.2	Task 2	13
	Step 1	13
	Answer to questions	13

	Step 2	13
	Answer to questions	13
	Step 3	14
	Answer to questions	14
	Step 4	14
	Answer to questions	15
	Step 5	15
	Answer to questions	15
	Step 6	16
	Answer to questions	16
2.6	Representative Use cases	16
2.6.1	Reason for choosing Game Mode:	16
2.6.2	Reason for choosing Delete Function:	17

1 Prototype

We have created a **Medium Fidelity** and **Vertical** prototype. We have created the prototype for two specific use cases of the application as defined in the SRS and Design Documents. The two use cases are

1. Usage of Game Module
2. Delete functionality in Gallery Module

We have made an video prototype of the mentioned use-cases.

[Prototype Videos](#)

[Prototype](#)

2 Evaluation

This report contains results from an evaluation performed using the **Cognitive Walkthrough** Method. This method is used to evaluate usability by assigning a task to an unfamiliar reviewer.

2.1 Introduction

The usability of the app was tested using the Cognitive Walkthrough method. Reviewers were given the task of using the paint app online meanwhile answering cognitive questions. The questions included matching the app to the target user's mental model, visibility, and ease of learnability.

2.2 Methodology (Evaluation Process):

1. What is the Cognitive Walkthrough?

It is a usability evaluation process that is used by the UX Team's evaluators to analyze the thoughts of users as they walk through assigned tasks and answer a set of 4 questions.

2. What is the purpose of the cognitive walkthrough?

The purpose of the cognitive walkthrough is to focus on the user's ability to learn and understand the software system either as a new user or an infrequent user.

3. Steps that we completed for the cognitive walkthrough

- a) To identify and define the users that were most likely to use the Paint App.
- b) To study and learn what tasks would be most important for most target users to accomplish their goal of learning and practicing how to draw by utilizing the Paint Application.
- c) To organize all of the major tasks as well as write out all of the steps needed to accomplish all of the major tasks.
- d) To walk physically through each of the major tasks and answer four questions that were outlined in Wharton's cognitive walkthrough white paper.

2.3 Preparatory (Understanding the user and what is his/her most important task)

2.3.1 Target User

The target user would be children, anywhere between 5-9 years of age who are able to use the mobile phones and have interest in painting.

2.3.2 Scenario

The Arpit (aged 7) just downloaded the app called Paint. The reason that he downloaded the app is because he wants to practice his drawing skills in the form of a game as he loves to play games. Now, Arpit is about to begin his own personal journey by learning and using the Paint App.

2.3.3 Core Tasks:

1. Using the game mode feature of the app to complete levels and gain rewards.
2. Deleting an existing drawing from the gallery.

2.3.4 Importance of these tasks

Every child that uses the app will have the intention of using the app for fun, so most of the time the child will be using the game mode to improve himself or herself and for gaining the rewards. In case of delete, it is important as without it, a large number of drawings will pile up inside the gallery and it will be difficult for the child to find some desired image from them.

2.3.5 The reviewer will then answer the following four questions during each sequence of the assigned task

1. Will the user try to achieve the right effect?
2. Will the user notice if the correct action is available?
3. Will the user associate the correct action with the effect trying to achieve?
4. If the correct action is performed, will the user see that progress is being made toward the solution of their task?

2.4 Individual Steps

2.4.1 Task 1

Using the game mode feature of the app to complete levels and gain rewards.

1. User presses the “Start” button.
2. User presses the “Game Mode” icon to enter the game mode.
3. Select the “Level Number” from the listed available levels.
4. Select one drawing board from the listed boards.
5. User draws the image on the drawing board and saves the image using the “Save” icon.
6. Submit the drawing by clicking the “Submit” icon and get rewards according to his/her drawing.
7. Share his/her drawing using the “Share” icon, multiple options to share drawing appears.
8. Select “Play next level” to play the next level.

2.4.2 Task 2

1. User presses the “Start” button.
2. User selects the “Gallery Mode” icon to enter the gallery.
3. Select any image from the gallery.
4. Click the “Delete” icon to delete the selected image, a dialogue box appears.
5. Click “No” in the dialogue box, if the user does not want to delete the selected image.
6. Click “Yes” in the dialogue box, the selected image will be deleted.

2.5 Analysis

2.5.1 Task 1

Using the game mode feature of the app to complete levels and gain rewards.

Step 1

User presses the “Start” button.

There were no main issues found with this step. Everything checked out clear and free.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, The user will attempt to find a button that allows the user to start the Paint App.

2. *Will the user notice that the correct action is available?*

Yes, because most of the children are familiar with how the “Start” button works.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

Yes, because there is no other button apart from “Start” on the screen.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, When the user clicks the start button, the user is taken to another page which contains different modes from which the user can choose.

Step 2

User presses the “Game Mode” icon.

Main Issue: The children of this age group are used to click the first option which they see on the screen. Hence it could happen that some of them might choose Practice Mode instead of Game Mode.

Recommended Improvement: Game Mode should appear above the Practice Mode as from user insights game mode is more preferable than practice mode.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user will attempt to find a button that allows him/her to start the game.

2. *Will the user notice that the correct action is available?*

Yes, because there are three different modes available including game mode.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

No, because the user will generally choose the Practice Mode as it is available on top, out of curiosity and lack of reading the icon name.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, the user will be taken to a screen where he/she needs to choose the level number for the game.

Step 3

Select the “Level Number” from the listed available levels.

Main Issue: At a particular point multiple levels might be unlocked or playable. However, the child can select levels which he has already cleared(or passed) which are futile. We would want the child to ideally work on the latest unlocked, unsolved level.

Recommended Improvement: The completed and uncompleted levels can be displayed differently in two sections so that the child doesn’t get confused and the last uncompleted level can be displayed separately.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user will attempt to find the particular/latest unlocked level to play.

2. *Will the user notice that the correct action is available?*

No, The user only sees the level numbers and is not able to distinguish properly between locked and unlocked levels. This reduces the user’s clarity on which level he/she should select.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

No, the user might select locked levels and get frustrated again and again, or he/she might select previously unlocked levels and play the same level again and lose interest in the game thinking it is duplicate in levels.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

No, after selecting a particular unlocked level, the user will be redirected to select the drawing board but he/she is still confused whether he/she has selected the correct level as there is no confirmation on the screen.

Step 4

Select one drawing board from the listed boards.

There were no main issues found with this step. Everything checked out clear and free.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user will attempt to find the drawing board of his/her choice.

2. *Will the user notice that the correct action is available?*

Yes, because the drawing boards are the only options to select and their proper images are also available.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

Yes, considering the children of age 5 to 9 years we have considered the lack of reading of the user, so we have user colour images rather than name of the colour, so the user will select the correct drawing board.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, the user will be directed to the screen where he can draw the given image.

Step 5

User draws the image on the drawing board and saves the image using the “Save” icon.

Main Issue: Currently the “Save” icon is present in the toolbox which makes it difficult for the child to find the save option. Also there should be an instruction which directs the child how to save the drawing.

Recommended Improvement: The “Save” icon should be explicitly placed on the top right corner of the screen.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user attempts to find the save button to save the drawing.

2. *Will the user notice that the correct action is available?*

No, the save button is hidden inside the toolbox which is in turn hidden inside the navigation menu. So, the user has to open the navigation bar to save the image again and again. So, for better usability, icon can be made explicitly available outside the toolbox.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

No, the user being of age 5 to 9, will have difficulty in identifying the save icon. As the icon is inside the toolbox, he/she will misunderstand it for the toolbox icon and never think of it as an icon to save the image.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, a short message is displayed indicating the image is saved.

Step 6

Submit the drawing by clicking the “Submit” icon and get rewards according to his/her drawing.

Main Issue: Most of the children didn’t have knowledge of how the “Submit” icon looks like. Hence it becomes difficult to submit the drawing and get rewards.

Recommended Improvement: The submit icon can be replaced with a submit button with “Submit” text written upon it.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user attempts to find the submit button to submit and get the reward for his/her drawing.

2. *Will the user notice that the correct action is available?*

No, the save button is hidden inside the toolbox which is in turn hidden inside the navigation menu. So, the user has to open the navigation bar to submit the image. So, for better usability, icon can be made explicitly available outside the toolbox.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

No, the user being of age 5 to 9, will have difficulty in identifying the submit icon. As the icon is inside the toolbox, he/she will misunderstand it for the toolbox icon and never think of it as an icon to submit the image.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

No, there is no progress bar shown indicating how much drawing has been processed. After some time the result is shown to the user, within this time the user is confused whether his image has been submitted or not and clicks the submit button multiple times.

Step 7

Share his/her drawing using the “Share” icon, multiple options to share drawing appears.

Main Issue: It will be difficult for children for this age group to interpret the meaning of share.

Recommended Improvement: There should be guidelines on how to share the image and what the “Share” means in context of drawing.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user attempts to find the icon to share his/her drawing with his/her friends.

2. *Will the user notice that the correct action is available?*

Yes, the user notices different options including the share image button on the screen.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

No, the user might have difficulty in identifying the share icon, it would be appropriate to include the share image button with a text written on it as an instruction for the user to understand.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, a new screen pops up with multiple options to share the image.

Step 8

Select "Play next level" to play the next level.

There were no main issues found with this step. Everything checked out clear and free.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user tries to find the button to play the next level.

2. *Will the user notice that the correct action is available?*

Yes, the user notices different options including the "Play next level" button on the screen.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

Yes, as the play next button is available with a proper text written on it, so the user has no difficulty in performing the task.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, the screen to select a drawing board appears on the screen for the next level.

2.5.2 Task 2

Deleting an existing drawing from the gallery.

Step 1

User presses the “Start” button.

There were no main issues found with this step. Everything checked out clear and free.

Answer to questions

1. *Will the user try to achieve the right effect?*

The user will attempt to find a button that allows the user to start the Paint App.

2. *Will the user notice that the correct action is available?*

Yes, because most of the children are familiar with how the “Start” button works.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

Yes, because there is no other button apart from “Start” on the screen.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, When the user clicks the start button, the user is taken to another page which contains different modes from which the user can choose.

Step 2

User selects the “Gallery Mode” icon to enter the gallery.

There were no major issues found with this step. Everything checked out clear and free because the icon of the gallery is very much familiar compared to the icon of game mode.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user attempts to find the button to view the gallery.

2. *Will the user notice that the correct action is available?*

Yes, because there are three different modes available including gallery mode.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

Yes, as the icon of the gallery is more familiar to the user of age 5 to 9.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, the gallery opens containing all the saved images of the user.

Step 3

Select any image from the gallery.

There were no main issues found with this step. Everything checked out clear and free.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, in order to view or modify the image, the user tries to select the particular image.

2. *Will the user notice that the correct action is available?*

Yes, as clicking on an image to view it is a common operation in every phone gallery.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

Yes, the user clicks on the image to view, rename, share or delete it which is the common operation in every gallery in phones.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, selected image enlarges with different options to perform on it.

Step 4

Click the “Delete” icon to delete the selected image, a dialogue box appears.

Main Issue: The dialogue box which appears doesn’t seem to be familiar for most of the children and it is redirecting to another page. Hence the child will not be able to understand properly what is happening.

Recommended Improvement: The dialogue box can be changed to the ones which are used frequently in mobile phones.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, the user attempts to find the button to delete the selected image.

2. *Will the user notice that the correct action is available?*

Yes, the user notices different options including the delete icon on the screen.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

No, the user might have difficulty in identifying the delete icon, it would be a lot better if a little text is also available along with the icon as an instruction to the user.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, a new screen appears as a dialogue box to confirm the deletion of the selected image.

Step 5

Click “No” in the dialogue box, if the user does not want to delete the selected image.

There were no main issues found with this step. Everything checked out clear and free.

Answer to questions

1. *Will the user try to achieve the right effect?*

Yes, as the user does not want to delete the image, he/she tries to find the button to undo the delete operation.

2. *Will the user notice that the correct action is available?*

Yes, the user notices two options including an option to undo the delete operation.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

Yes, as in common language “No” means to discard the operation, so users will have no difficulty in performing the operation.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

Yes, the user will be redirected back to the selected image.

Step 6

Click “Yes” in the dialogue box, the selected image will be deleted.

Main Issue: There is no confirmation message displayed whether the image is deleted or not, this can be an issue when there is a huge pool of images that are very similar specifically, so the user has to search the whole gallery for the image to confirm the operation.

Recommended Improvement: Displaying a confirmation message indicating that the image has been deleted from the gallery.

Answer to questions

1. *Will the user try to achieve the right effect?*

User wants to delete the image, that’s why he/she wants to select the “Yes” option in the dialogue box.

2. *Will the user notice that the correct action is available?*

Yes, because he/she sees a button in the dialogue box with “Yes” written on it.

3. *Will the user associate the correct action with the effect that he/she is trying to achieve?*

Yes, the user wants to delete the image, thus after selecting the “Yes” option of the dialogue box image will be deleted.

4. *If the correct action is performed, will the user see that progress is being made toward a solution of his/her task?*

No, As there is no confirmation message, users will find it difficult to track whether the image was deleted or not. In the current design, users will be redirected to the gallery, where he/she has to search manually whether the image was deleted or not.

2.6 Representative Use cases

We have chosen Game Mode and Delete Function as our two representative use cases. As they can explain all the possible use cases of our Paint App.

2.6.1 Reason for choosing Game Mode:

Our paint app is mainly a gaming based learning app, thus choosing game mode as representative use case seems an obvious choice.

Game Mode can represent all the tasks that users will perform in practice mode like choosing a drawing board, drawing, using the toolbox, saving an image, sharing an image. But, practice mode does not contain game mode tasks like choosing a level,

submitting a drawing for evaluation, proceeding to the next level, thus game mode is a better choice for a representative use case.

2.6.2 Reason for choosing Delete Function:

Images in the gallery have functions: Rename, Delete, Share. Share was also present in game mode, thus there was no need to make it a separate use case. Tasks involved in renaming a file can be covered easily by tasks involved in deleting an image, but vice versa is not true. For Example: Dialogue box similar to one which appears while deleting an image is not seen in renaming a file. Thus, we chose Delete function as another representative use case.