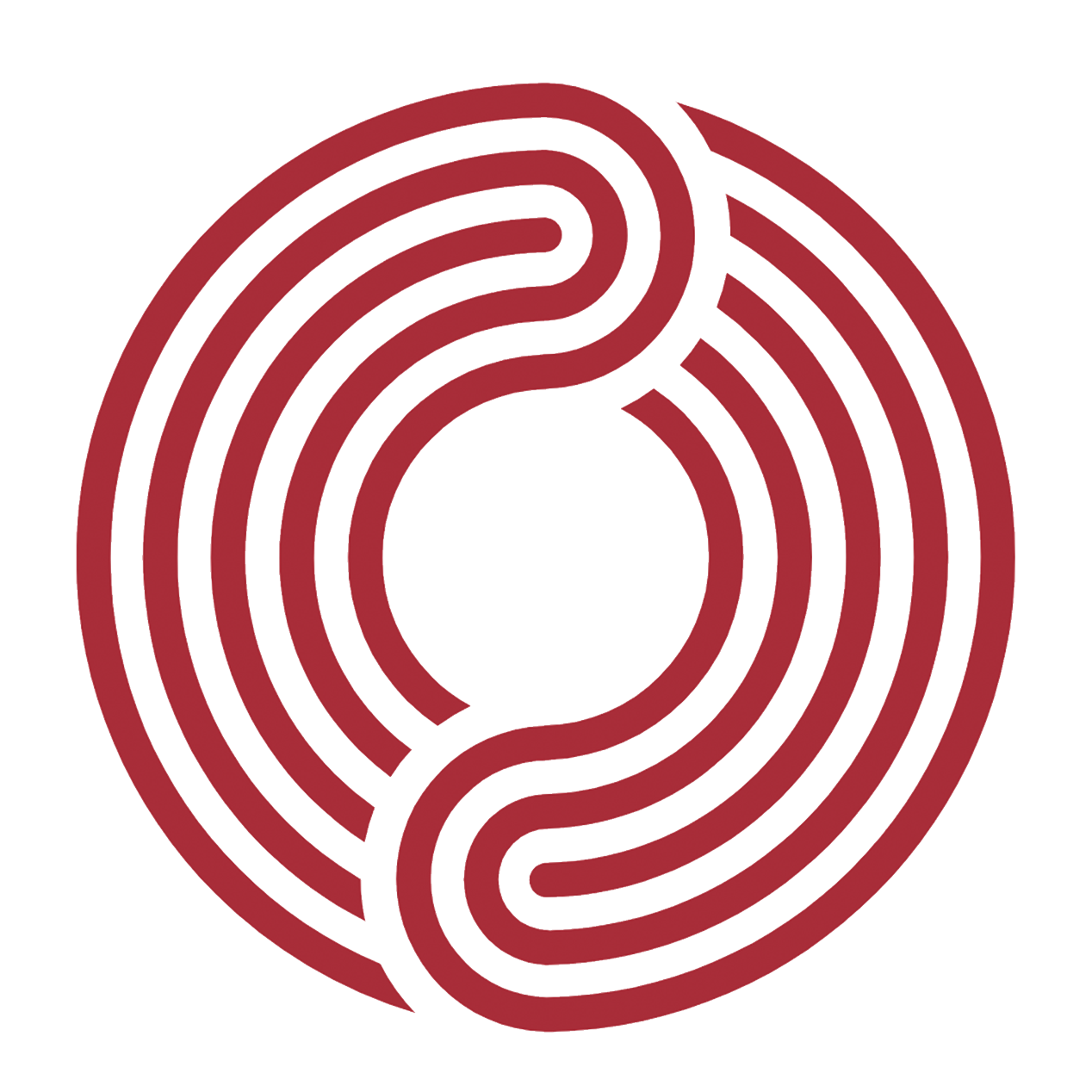
Logo

Description automatically generated

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| Zihan Zhou | Pangyu Li | Yuheng Liu | Xiangyu Shen | Lei Zhou |

**Freewheelin' Process Document**

5th Iteration and Overview

Final Report

Date: 23/12/2020

1. **Introduction**

This report contains content related to the fifth iteration as well as the general overview and summary for all five iterations of the ***FreeWheelin’*** video studio, our interactive and visionary prototype app ***(MVP***). Overall, this document will show how the enhancement for the 5th version of the app, and how ***FreeWheelin’*** has evolved through a carefully designed **process**.

1. **Prototypes**

**2.1.1 General goals for the *FreeWheelin’* *MVP***

The general goal for the ***MVP*** is presented as follows:

We want to make a prototype app with a good UI/UX design, which is suitable for **mobile phones, PCs, and tablets,** and provides a **unified** user experience for the three terminals (a good and unified user experience represents the consideration and countermeasures regarding the difference between the characteristics of the devices). The app should with a good level of **interaction considerations**, enabling a natural and pleasing **user experience**.

**2.1.2 Goals for the 5th iteration and Justifications**

The goal of the 5th version(iteration) is to add some functionalities relevant to the **accessibility** considerations and **internalization** based on the result of the questionnaire carried on the evaluation stage of the 4th iteration. The reason why this was selected as the highest priority is that we have already implemented software for **three platforms**, covering the majority of users' needs, however, **universal usability and internalization** is also an indispensable part of the user experience.

**2.2 Prototyping Techniques**

**2.2.1 The name of the techniques**

|  |  |
| --- | --- |
| **Name of the technique** | **Short Description** |
| Wireframing | For each iteration, we composed different levels of wireframes, some are handwritten, and some took advantage of advanced software with higher ***fidelity.*** |
| Sketches | For each iteration, we use sketches to initialize the design-discuss process inside the team. Some creative ideas will arise during this process. |
| Paper prototype | For the 2nd and 4th iterations, we made some paper prototypes and recorded videos that illustrate this process. |
| Native | For each iteration, we implemented the interactive MVP with native methods using Qt designer and CLion (C++) |

**2.2.2 Software used**

|  |  |
| --- | --- |
| **Software** | **Usage** |
| Moqups | A software to sketch the wireframe in a web. |
| GoodNotes | It is used to illustrate the rough ideas with iPad and Apple Pencil. |
| Adobe Premiere | We use Adobe Premiere to edit our paper prototypes (video). |
| Qt Designer | It is used to design the UI of software and create the QSS file. |
| Clion | It is used to develop the C++ Software. |
| Photoshop | It is used to fine-tune the details in the wireframe and native resources. |

**2.3 Thermotical Motivations**

1. We took advantages of **constructivism (similarity and invariant)** (Educational Broadcasting Corporation, 2019)to indicate some operations like some scroll area or using some shapes to imply a closure.

2. The **affordance theory** (Dane, 2016)is applied for more informative feedback and implication. For example, we carefully chose the hectograph icons with proper *hovering effects* and *cursor morphology*, so users without any prior knowledge can still easily use the interactive software.

3. **Design pattern** is applied, which provides a **recurring solution.** The code and templates that were composed in preceding iterations can be reused to accelerate this iteration and the robustness is guaranteed.

4. Using **Color Theory** (Morton, 2014) to distinguish the software. We carefully choose the color set to be in accordance with the intent of our software, indicating the user with psychological hint, fitting in with the workflow.

5**. User-centered** (Wikipedia Contributors, 2019) approach led to the emergence of the three distinguished ends. This naturally appeared and caught user demand since we obey the user-centered approach in all iterations.

6. Proper selection of **interaction method** (Imbus, 2022)**.** Although the size of the PC and tablet end is very similar, their **operation mode** is completely different due to the discrepancies in IO devices. For example, tablet users tend to use the hand or stylus to operate, so converged functions are close to each other on the PC is not feasible on the tablet. We noticed the differences and developed the prototype for three platforms.

7. **Schneiderman's 'Eight Golden Rules** (Capain, 2022)are applied through all the iterations as one of our UI models. Like we stressed the significance of consistent and unified user experience in different platforms. Also, we applied the shortcuts and the informative feedback in the app. Considerations on the **internal locus, simple error handling, and reductions on memory** are also taken.

**2.4 Group Working technique**

We chose **Agile development** as our main working principle and framework.

**2.4.1 Justifications**

By applying the agile development principle, due to the **incremental delivery nature** of agile development, each iteration will produce a usable *MVP* (Agile Alliance, 2019). We gain five versions of software containing the initial **Tomeo-enhanced version, tablet-oriented** version, the **mobile phone-suitable** version, and the **PC** version in a reasonable time slot. All these previous versions helped the team to identify the pros and cons instantly after each sprint, exchanging and **gathering ideas** from users and team members instantly, which accelerated and modulated the development and evaluation process.

**2.4.2 Evidence for the chosen working technique**

|  |  |
| --- | --- |
| A picture containing graphical user interface  Description automatically generated  Figure 1. Screenshot of Kanban board | **Whiteboard  Description automatically generated with medium confidence**Figure 2. Photo of our team’s real world Kanban board |
| Figure 3. Photo of our team’s real world Kanban board | Figure 4. Photo of our team’s real world Kanban board |

* 1. **The Design, the Process, and Evolution**

**2.5.1 From the 4th iteration to 5th iteration**

From the 4th iteration, we fine-tuned the user interface for the mobile and pc end, adding two important features: accessibility options and internationalization. And the stylesheets in terms of accessibility options are different from PC and tablet.

|  |  |
| --- | --- |
| Sketches | Wireframes |
| **d**    Figure 5. Sketches of mobile phone index page | Figure 6. Wireframe of mobile phone index page |
| **Diagram, engineering drawing  Description automatically generated**  Figure 7. Sketches of PC edit page | Figure 8. Wireframe of  PC edit page |
| Figure 9. Sketch of  pc index page | Figure 10. Wireframe of  pc index page |
| Figure 11. Sketch of  tablet index page | Figure 12. Wireframe of  tablet index page |

The above the table indicates the process and evolution from the sketch to the advanced wireframe,

**Below** are some hints for the MVP implemented in terms of internal.

|  |  |
| --- | --- |
| Figure 13. illustration on the usage of Linguist | Figure 14. Translated Chinese version |

**2.5.2 From naïve *Tomeo* to the well-designed Final *MVP***

During the five iterations, we have not only just refined the naïve Tomeo to an advanced one (1st iteration), but also produced a **tablet version (2nd iteration), a mobile phone version (3rd iteration), a PC version (4th iteration)** and fully consider the user interactions and experiences finally. Below are some illustrations of it.

|  |  |
| --- | --- |
| Figure 15 naïve Tomeo index page | Figure 16. Refined Tomeo index page |
| 电脑萤幕的截图  描述已自动生成  Figure 17. The Tablet version | 电脑萤幕的截图  描述已自动生成  Figure 18 The Tablet version 2 |
| 不同颜色的手机截图  描述已自动生成  Figure 19.The mobile version | 截图里有图片  描述已自动生成  Figure 20. The mobile version2 |
| 电视萤幕的截图  描述已自动生成Figure 21. The PC version | 躺在沙滩上  描述已自动生成  Figure 22. The PC full screen mode |
| Figure 23. Offline cooperative illustrations | |

As the illustrations above suggest, from the initial codebase and sketches, after several iterations of evaluation and refinement, the FreeWheelin’ video studio has evolved to a large extent in terms of user experiences, which can be regarded as a successful process of evolution.

1. **Code**

**3.1 Illustrating the UI improvement**

**3.1.1 from the 4th iteration to the 5th iteration**

|  |  |
| --- | --- |
| **4th iteration**    Figure 24. The 4th iteration without accessibility settings | **5th iteration**    Figure 25. The 5th iteration with accessibility settings |
| Figure 26 The 4th iteration without internationalization | Figure 27 The 5th iteration with internationalization (translated to Chinese) |

As the table above illustrates, there are no major changes in terms of main interface, however, we imported two important features, the accessibility settings and internationalization feature to the ***FreeWheelin’*** MVP, which includes an additional control interface. The translated content is presented, here the Chinese is used as an example.

**3.1.2 Illustrating the general UI improvement**

Below the timeline shows how the UI enhanced.

|  |  |  |
| --- | --- | --- |
| |  | | --- | |  | |  |   From the timeline presented, significant UI improvement can be witnessed, for the 1st iteration, we enhance the naïve Tomeo with a more modern and accessible interface, then we designed the most wanted tablet version in the 2nd iteration, and for the following three iterations, the mobile phone, professional PC, and accessibility considerations with proper internationalization are added as well, sufficiently illustrating the UI improvements.  **3.2 Prototypes and Implementation** |

**3.2.1 For the 5th iteration**

|  |  |
| --- | --- |
| Prototypes | Implementation |
| **A picture containing diagram  Description automatically generated**    Figure 28. The prototype | Figure 29. The implementation |
| Figure 30. Prototype for internationalization | Figure 31. Implementation for internationalization |

As the table suggests, for the 5th iteration, the prototype has been successfully implemented with some improvements in terms of the control interface. The functionality of internationalization has been

fully implemented, however, the accessibility setting is just an interface without implemented functionality due to time constraints. Nonetheless, the functionalities can be extended easily due to the structural design of the project codebase.

**3.2.2 General prototyping and implementations**

The **detailed illustration** can be found in the **previous four iteration** documentations, here the summary of the differences of prototyping and implementations are given. Generally, the implementations faithfully followed the wireframe prototypes.

|  |  |  |
| --- | --- | --- |
| **No.** | **The prototype** | **The implementation** |
| 1st iteration | Diagram  Description automatically generated  Figure 32. The prototype | Figure 33. The implementation |
| 2nd iteration | Figure 34. The prototype | 电脑萤幕的截图  描述已自动生成  Figure35.The  Implementation |
| 3rd  iteration | Figure 36. The prototype | 不同颜色的手机截图  描述已自动生成  Figure 37. The implementation |
| 4th  iteration | 图形用户界面  描述已自动生成  Figure 38. The prototype | 电脑萤幕的截图  描述已自动生成Figure 39. The implementation |

The 5th iteration has been scrutinized in **3.2.1**

1. **Evaluation**

**4.1 Evaluation Name of the Techniques**

**4.1.1 For 5th iteration**

Techniques applied in this iteration:

|  |
| --- |
| Cognitive walkthrough (After wireframe and through the software design process) |
| Heuristic evaluation (by UI- knowledge backed cs students) |
| Usability Tests |
| Video Based Interview |
| Questionnaire |

**4.1.1.1 Outcomes of 5th iteration**

In 5th iteration, we took an interview with one of the users of our software, and a questionnaire with 25 users.

Based on the feedback from the interviewee, we can know that he is satisfied with the UI interface and the user experience, such as our responsive layout and multiple ends adaptions. The user praised our software for considering the use of visually impaired people and different native speakers as well.

According to the feedback we collected from 25 users, it shows that most people have a good experience not only on just tablet end, but also on the mobile version and the PC version. Three versions of our software have been given high marks from users.

|  |  |
| --- | --- |
| 表格  描述已自动生成 |  |
| Figure 40. Marks on mobile version | Figure 41. Marks on PC version |

At the same time, most of users believe that the video playing and editing function provided by mobile version, PC version and tablets version can meet their usage needs and requirements in most scenarios.

|  |  |
| --- | --- |
| 表格  描述已自动生成 |  |
| Figure 42. Marks on editing function of mobile version | Figure 43. Marks on editing function of tablet version |
| 图表  描述已自动生成 |  |
| Figure 44. Marks on play function of PC version | Figure 45. Marks on play function of mobile version |

**4.1.1.2 Evidence of 5th iteration**

We have uploaded the interview video in our project folder. But you can access this video via this link alternatively.

5th iteration Interview Link: <https://leeds365-my.sharepoint.com/:v:/g/personal/sc20yl2_leeds_ac_uk/EUZuNvEyL6tNqy5K6ImRQcIB6_0ntZIfMP_Z89m26ELgGQ?e=oBzjVF>

And you can view detailed questionnaire in our project folder as well.

**4.1.2 Evaluation techniques used for all iterations**

|  |  |
| --- | --- |
| **Technique name** | **Applied times** |
| *Cognitive walkthrough* | 5 times |
| *Heuristic evaluation* | 5 times |
| *Usability Tests* | 5 times |
| *Video Interview* | 5 times |
| *Questionnaires* | 4 times |
| Paper prototyping | 2 times |

**4.2 Justifications for Evaluation Techniques**

1. Cognitive walkthrough

Allowing the evaluator(interviewee) **to “Think Aloud”** during the evaluation process. Based on the ideas of the interviewee, **informative feedback** can be gathered instantly.

2. Heuristic evaluation

We have made the process in a detailed way and documented it properly, and the 10 basic criteria have been **detailly checked to ensure the software can meet the higher standard**.

3. Usability Tests

Combined with real user experiences and feedback, we can fetch the most **precise** user reaction to the software.

4.Video Interview

The video interview can easily exchange relevant ideas with users, better get the specific ideas of specific users, and often get some **creative ideas.**

5.Questionnaires

Dig into more demands and user willingness since this kind of structured investigation enables us efficiently to analyze the result and rank the priorities of all the tasks.

6. Paper prototyping

It is very intuitive and has low trial and error costs. It can be used to evaluate early, low-precision prototypes. It can help users quickly get familiar with the process, help testers quickly establish a global awareness, and point out obvious problems and deficiencies in prototypes.

**4.3 Outcome of the Evaluations for ALL Iterations**

The **detailed** number of votes can be traced in the previous four iterations, where the evaluation techniques is elaborated under certain context.

|  |  |
| --- | --- |
| **Iteration name** | **Evaluation result** |
| *1st iteration*  *The enhanced Tomeo* | Accepted |
| *2nd iteration*  *The tablet version* | Accepted |
| *3rd iteration*  *The mobile phone version* | Accepted |
| *4th iteration*  *The Pro PC version* | Accepted |
| *5th iteration*  *Importing the internationalization and accessibility consideration* | Accepted |

**4.4 Evidence of ALL Evaluations**

|  |  |
| --- | --- |
| **Technique name** | **Evidence** |
| *Cognitive walkthrough* | Figure 46. Evidence for cognitive walkthrough |
| *Heuristic evaluation* | *Graphical user interface, text, application  Description automatically generated*  Figure 47. Evidence for Heuristic Evaluation |
| *Usability Tests* | Figure 48. Evidence for usability tests |
| *Video Interview* | Figure 49. Evidence for Video interview |
| *Questionnaires* | Figure 44. Evidence for questionnaires-from the 4th iteration  doc    Figure 50. Evidence for questionnaires-from the 3rd iteration |
| *Paper prototyping* | Figure 51. Evidence for the paper prototyping |

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