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003 Report (Group Work)

Module Name:	CPT208 Human-Centric Computing
Group ID and topic:	Group 15 Interactive Learning System for Chinese History and Culture
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Submission deadline:	**10:00 a.m. Monday April 4, Week 7**

Introduction

With the prevalence of computer science and the dissemination of Chinese history and culture supported by the government, various related learning and interactive products based on different systems have been developed. For example, one study shows that a group intends to design a specific mobile application with amusing functions and content to arouse the interest of college students and foreigners in teaching and inheriting traditional Chinese culture (Gu Zouji, & Zhang Yingfang, 2016). However, because people know less about the field, there are often different aspects of the related products. Therefore, this report aims to help people better understand the interactive learning system of Chinese history and culture by analysing five selected applications. In addition, the five apps are all based on specific objects related to Chinese history and culture, and include interactive and learning features such as lessons and quizzes, which are closely related to the theme.

The entire workflow for completing this report will firstly identify selected cases and gather information about them. Subsequently, invite a certain number of experts to conduct heuristic evaluations on each of these cases. Ultimately, propose some general solutions based on issues and unfriendly designs raised by these cases.

Case 1 – Forbidden City Ceramics Museum

Led by	Hao-Hsiang Yu (C15)
Participants	Yueran Cao (C11), Yetong Wang (C12), Lincheng Shi (C13), Qinchuan Zhu (C14)

1. Overview

The table of overview about Forbidden City Ceramics Museum has been used in below.

Features	Description
Device	Mobile
System	iOS and Android
Target User	People interested and researches in this area
Function	Show style and history about ceramics
Aim and Content	Learn knowledge about ceramic
Usability	1. Legibility: clear design of main user interface 2. Learnability and usability: many categorization features such as era and style 3. Comprehensive: organizing ceramics unearthed from various cultures
Main Issues	Ambiguous operation buttons and complex classification

2. Heuristic evaluations

For the heuristic evaluation, our group use Shneiderman's 8 Golden Rules of Interface Design (Shneiderman, B. et. al, 2016) to evaluate this product. According to this rule, we focus on functions relation to consistency and interactive. As a result, we decided to evaluate based on such as consistency, memory load, and usability. The following table show the unfriendly design of these principles.

Principle	Unfriendly design	Expert
consistency	The position of the buttons in each screen is not the same, which makes users need to spend time judging the position of the buttons they need to use.	C11, C12, C15
memory load	User needs to use the buttons multiple times to remember the function of each button since the buttons on the interface have no text labels at all	C11, C13, C15
usability	The various classification functions of the application are too complicated, and it is difficult for users to find the required information in a short period of time.	C12, C14

3. Observations and interviews

3.1 Observations

We surveyed some people who used the app through a questionnaire. Through the questionnaire, we found that most people think that they can be familiar with the operation in a short time. In addition, some people consider that the function is not complete enough.

3.2 Interviews

We found two users (P1, P2) to get the interview after the user test. In the interview, users were first asked about the UI design of the main interface. Both users felt that the user interface was very clear and direct. Secondly, regarding the unfriendly design of the buttons, P1 thinks that the buttons are difficult to understand, which will affect their willingness to use them, while P2 considers that they can become familiar with

their functions if they use them more. Then, for the experience of using the classification function, both users found it very useful for search and do not feel complicated, and P2 thought that the function of sorting by dynasty time was very creative.

4. Summary

In conclusion, it is found that the application has problems with consistency and memory load through the design principle. For the above problems, the proposed solution is to add text labels on the bottom that can effectively improve the problem.

Case 2 – Wood Joints

Led by	Qinchuan Zhu (A)
Participants	Yueran Cao (B), Yetong Wang (C), Lincheng Shi (D), Hao-Hsiang Yu (E)

1. Overview

Wood joints construction is the essence of traditional Chinese architectural culture. Unlike the flat drawings of mortise and tenon in books, the application on mobile phones with iOS or Android systems presented them as 3D models. An effective textual introduction of each structure can be obtained by pulling up the 3D display interface. Therefore, this software provides an intuitive way for those who love design to learn about wood joints. However, there are two main issues with the product. One is the lack of interactivity. The other is the inconvenience of operations.

2. Heuristic evaluations

The goal of our group was to use heuristic method to evaluate application from design principles. The first task is that divide the group into two parts. Secondly, group members will evaluate the app according to principles. It can be found that the design of this app satisfies most of the principles. However, the following table shows violated principles and improvements will be offered.

Principle	Explanation	Experts	Problem	Improvement
Feedback	Users receive prompts from the product after	A, B, C	The app does not respond after users performs a quick	Optimize the operation of the upper slide in the technology.

	performing actions		pull-up of structure interface.	
Affordance	The connection between how things look and the way they are used. (Helen Sharp, Yvonne Rogers & Jennifer Preece, 2002).	D, E	Users cannot observe its 3d display by clicking on any wood when different woods appear in one interface.	Have only one object appearing in an interface.

Table 2.1. The result of heuristic evaluation

3. Observations and interviews

The group observed the experiences of 39 people who used this app. It was found that 32 of the users were more attracted to view the 3D models of the mortise and tenon. However, only 7 people read the detailed descriptions of the wood carefully. Additionally, 3 users would like to change the background music when using the software, but they did not find the corresponding function.

A total of two people were interviewed on how they felt about the app. Both thought that the interface was simple and well designed. One user felt the interactive experience was poor. He would like to be able to participate in the process of making buildings playfully. Another person is elderly. She hopes that the app could provide audio explanations so that she doesn't have to stare at the phone screen for long periods.

4. Summary

To conclude, this application is a pretty good one. It has brought traditional folk art back into the lives of the public. However, there are still have design issues with the app which means that it could be improved to enhance users' experience.

Case 3 – Rhyme

Led by	Yueran Cao (E1)
Participants	Yetong Wang (E2), Lincheng Shi (E3), Hao-Hsiang Yu (E4), Qinchuan Zhu (E5)

1. Overview

Several years ago, Rhyme worked as a professional poetry deep learning website to provide poetry network services for global users. To meet users' needs, it has launched an iOS-based mobile application. This app not only inherits most of the functions on the official webpage, but also has a beautiful and concise interface. As one of the evaluation cases, this app also has the characteristics of helping users conduct interactive learning related to Chinese history and culture.

However, Rhyme still has some unresolved issues. For usability goals, it is not only not effective and efficient to use since some operation bugs may occur during user use, but also not easy to learn and memory since the categorization of the search function is too specialized. For user experience goals, it can be tedious and unpleasant to users since the interaction design is too rigid, which is the main point of undesirable aspects.

2. Heuristic evaluations

Evaluating unfriendly designs that violate design principles can efficiently lead to feasible solutions through heuristic evaluation. During the discussion, five experts first summarized the functions and interface of the product. Then they evaluated the unfriendly designs in these functions separately and proposed possible solutions

according to Nielsen's 10 usability heuristics (Nielsen, 1995). The following table lists unfriendly designs and the design principles they violate.

Principles	Unfriendly design	Expert
Visibility of system status	Whether the system settings are successful or not will not give feedback.	E1 E2
Match between system and the real world	Operation is different from the logic in reality when writing poetries.	E1
Consistency and standards	Higher learning cost, unfriendly to non-professional users.	E3
Recognition rather than recall	No search recommendations when searching	E4
Flexibility and efficiency of use	Operations are rigid and inflexible.	E1
Help users recognize, diagnose, and recover from errors	No error information when an error occurs	E1 E3
Help and documentation	No help and documentation.	E5

Table 3.1. Unfriendly design of Rhyme

3. Observations and interviews

3.1 Observations

Target group	Global poetry lovers and professional researchers
Potential target group	People of all ages who want to learn about Chinese poetry

Due to some functions like the classification provided by search and the unfriendly design of the system settings, Rhyme has not attracted most potential users to use it.

3.2 Interviews

The people participating in this interview are composed of the elderly (I1), poetry lover (I2) and amateur (I3). For I1, he is not interested in such apps because Rhyme cannot bring him more knowledge than books. Moreover, the inability to set the font size effectively also made it difficult for him to see the content occasionally. For I2, she feels it would help her do poetry research better and is satisfied with the clean interface and ad-free experience. For I3, he feels boring because of the obscurity of search categories and the lack of fun in the user experience.

4. Summary

By combing data in Table 3.1 and interviewers, to allow users to get a better user experience, the application should first simplify the classification difficulty in search function, so that more non-professionals can understand. Second, it should add more interesting content to attract users to use it. Finally, it should optimize the setting part of the system to reduce errors and provide more help for users of all ages.

Case 4 – XiChuangZhu

Led by	Yetong Wang (C40)
Participants	Yueran Cao (C41), Lincheng Shi (C42), Hao-Hsiang Yu (C43), Qinchuan Zhu (C44)

1. Overview

In order to the show the overview of XiChuangZhu clearly from different aspects, the table has been used in below.

Features	Description
Device	Mobile
System	iOS and Android
Target User	Students, teachers and people interested in this area
Function	Ideas sharing, quiz ranking and learning courses and etc.
Context of Use	Home, Classroom and conditions related to use mobile device.
Aim and Content	Share and Learn Chinese ancient poetry
Usability	Effective and Efficient: clear guide of design and the support of the system Learnability and Memorability: user interface and button are direct and clean for people to understand and use.
User Experience	Achieve most of the desire aspects like: fun, helpful and etc.
Main Issues	Some items related quiz has problems which influenced learning effect.

2. Heuristic evaluations

Based on above, our group intends to use heuristic method to evaluate product from Jakob Nielsen's 10 general design principles（Jakob Nielsen, 1995）. First, we focus on functions related to learning and interaction. Next, we decided to assign group into two parts to evaluate based on principles such as user control and freedom(A), error prevention(B), aesthetic and minimalist design(C), etc. It is found that the design of this product satisfies most of the principles. However, as shown in Fig4 and following table, some unfriendly design and related improvements will be offered.

Principles	Explanation	Expert	Improvement
A	Quiz start, users can not leave or close	C40, C41, C42	Set some button for operation.
B	If product closed accidentally, user cannot restart quiz, system only provides partial result.	C40, C41, C42	Improve related design and set error protection
C	Advertisement appears frequently.	C42, C43	Delete or limit appearance.

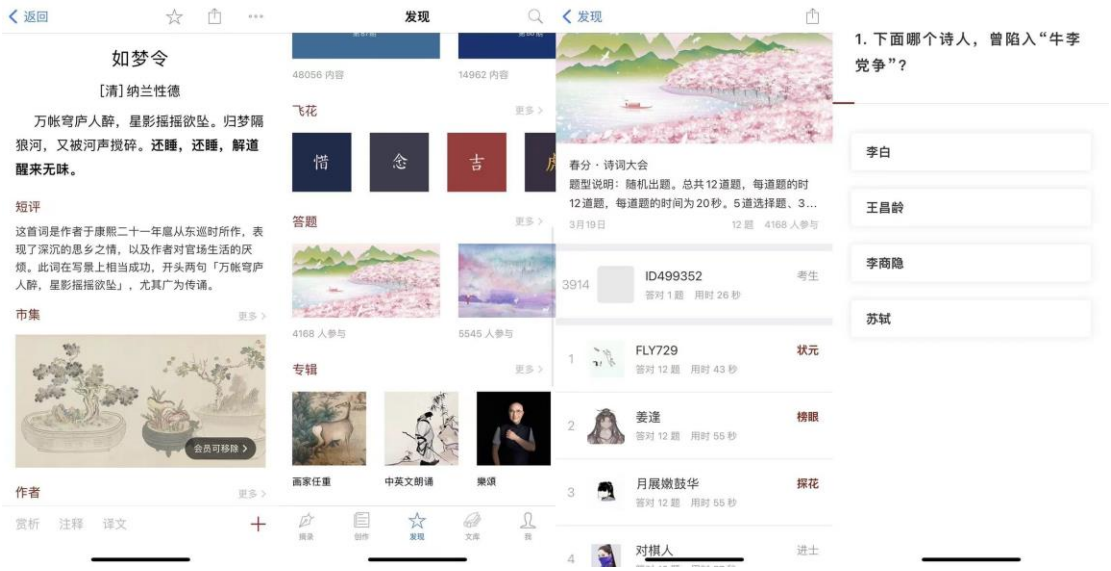

Fig4. APP Items

3. Observations and interviews

Our group set a questionnaire that collect 69 people's data and find that 24 people used this app. Then, observe those 24 people's user experience. It is found that most of them do not use voice and music functions on authoring page. Moreover, people would like to try different functions on discover page. However, quiz function has been regarded as useless and not so appropriate for participation. Additionally, most people show that they accept the advertisements used in app.

We select 2 people in the above group to interview their perspectives on this product (details in slide 4). The result shows that they both do not want to use voice and music since they think other learning functions are enough to use. For quiz system, P1 shows that it is hard to know the content based on pictures without any explanation but it is attractive. P2 finds that it is hard to close quizzes once started and problems are limited.

4. Summary

In short, this product is a nearly good app. However, based on above analyse of experts and users, the issue of design can be tackled with the above improvement solution to provide a better user experience.

Case 5 – Allhistory

Led by	Lincheng Shi (C5)
Participants	Yueran Cao (C1), Yetong Wang (C2), Hao-Hsiang Yu (C3), Qinchuan Zhu (C4)

1. Overview

As a mobile app, Allhistory has massive portability. The diversity of functions attracts many people to explore the product. Therefore, this product is suitable for people interested in history to use when they go out. For example, when taking the bus, it is a good choice for users to read a post about Chinese history. After all, the content in this product isn't very objective.

2. Heuristic evaluations

For this product, my group use Norman's design principles to conduct a heuristic evaluation (Helen Sharp et al., 2002). I assigned our group members into three parts to evaluate some functions on the front page based on those principles. After evaluation, we found affordance, constraints and consistency were violated. C1, C2 said when users switch the audio, they need to manually click a button to switch to the corresponding article. This button is often mistaken for just an icon showing the progress of audio (Figure 5.1). This confuses users a lot and violates affordance. One solution is to automatically switch articles while switching audio. C3 and C4 found different lists using different formats. Some lists have six topics while others have only three topics with pictures (Figure 5.2). It makes users' experience bad and violates consistency. One solution is to unify the list format. I think the function AB path violates constraints. Because I don't know what end entries I can enter after entering the start

entry (Figure 5.3, 5.4). My solution is that after entering either entry, the other entry automatically displays the optional entry.

Figure 5.1

Figure 5.2

Figure 5.3

Figure 5.4

3. Observations and interviews

I invited three additional ordinary users to experience the product. By observation, I found that P1 played 3D museum for a long time, P2 used some functions at the top of the home page, and P3 tried most functions of the product. Then I did an interview. I asked them "Why do you like using 3D museums?", "Why don't you use functions like

Allmusic?", "What do you think this product needs to be improved?" respectively. Their answers are as follows:

"These novel functions are interesting, but why the content of 3D museum is about foreigners, which goes against the product theme." (P1)

"There are too many functions on the home page. I ignored those in the back." (P2)

"I feel there is still a lot to be improved. For example, after the page is drawn to the bottom, it lacks a back to top operation, which is very tired." (P3)

After analysis, novel functions can meet the requirements of P1, P2 wants to put important functions on the home page, and P3 wants the software to be practical. More people hope to improve the product.

4. Summary

According to the above study, I think the effectiveness and learnability of the product need to be improved, because the content is not realistic and the use of some buttons is not clear. Besides, users think the interface is fun and surprising, but some functions are frustrating.

Conclusion

In summary, based on the results of the above heuristic evaluations of five cases, it is apparent to find that the unfriendly design can be divided into two types interface design and function design. For interface design which is considered to generally occur in different apps, such as buttons disappear and people misunderstand the content of buttons due to their shape. The related solution of this design is to add and redesign the shape of buttons which are easy for people to understand and cost less to memory. With regard to function design, set error prevention or system recovery can be considered as the solution for handling error functions. For instance, in case2 if error prevention is added, the object would be efficiently displayed. In case4, if system recovery is established, users could participate in the quiz again and achieve better learning outcomes. For function design related to the search function, simplifying the classification difficulty and adding more interesting content in it could help users search conveniently in case3. In case5, set restrictions and associations for search information could help users search efficiently. In general, with the improvement of software and users' suggestion, unfriendly designs could be gradually tackled. In the future, with multiple functions added to a particular app, if developers obey design principles and satisfy people's requirements, it would provide a better user experience to help people learn and interact with this topic.

(Word counts: 2985)

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