Research on the Design of Mobile Art Education App for Children - Taking "Paint Color" App as an Example

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Abstract. Children's art education mobile applications, which can effectively reduce the learning threshold and improve learning efficiency, has become the first choice for many parents to provide extracurricular art learning for their children nowadays. The characteristics of art education and information technology determine that while art education mobile applications play the advantages, should pay attention to exploring and solving some problems that tend to appear at present. Taking the "paint color" App as an example, this paper discusses the problems that need to be solved in the design of children's art education app in the past. This app is designed based on Java, one of the most widely used programming languages. Using JOONE, an open source project, to form user portraits according to the user's capital data and usage, push art courses and related contents suitable for different users, and play a wider role in guiding and expanding users on the basis of art education.

Keywords: Children's Art · Online Education · Interface Interaction Design · App Design

1 Introduction

Nowadays, China is in the era of Informatization, digitalization and intelligence, and intelligent mobile devices have penetrated the daily life of every family and every person. In such a context, most parents will use smart mobile devices as an important medium to stimulate and cultivate children's spare time interests.

Art education can effectively cultivate children's creativity, improve their aesthetic perception, and give vent to their emotions, which plays an important role in their physical and mental healthy development. According to iiMedia Data Center 2021, 28.1% of Chinese parents will choose art quality education courses such as painting and music for their children. (https://www.iimedia.cn/c400/81775.html, 2021) The percentage of parents choosing arts courses is the largest of all quality education course types. Art education has become one of the most common choices for the development of children and adolescents' spare time interests.

The mobile applications for art education can break through the limitations of time and space, share educational resources and lower the threshold of learning. Then use the "fragmented" time to improve the efficiency of learning. It is one of the most promising online education platforms in the market today. Studying the design of children's art education app has important practical significance and value for contemporary art education.

2   Research Ideas and Methods

2.1   Questionnaire Method

This paper focuses on the psychological and physical characteristics of children from the perspective of this special group of children. Then a questionnaire survey was conducted with children, parents and other groups to find out the expectations and preferences of actual users for mobile applications of children's art education.

2.2   Practical Method

In this paper, the author explores in practice, through specific interface and interaction design, to explore the children's art education applications that meets the user's functional needs, visual needs, psychological needs and other characteristics from the user's perspective [2].

3   Overview and Rationale

3.1   Overview of Mobile APP for Children's Art Education

Children's art education applications have a variety of features such as flexible and portable, and various forms. They can break the limitation of time and space, lower the threshold of art learning for children, and enhance the learning efficiency. And they are suitable for children of different ages and different interest tendencies to choose according to their own needs.

The common applications for children's art education in the market today broadly include several categories.

Painting: With simple drawing, doodling, coloring and other functions, it mainly develops children's technical drawing skills. The users are mainly children aged 3–7 years old.

Puzzle and Creativity: Combines educational games with art content to exercise children's perception and thinking skills. The users are mainly children aged 5–11.

Comprehensive Art Education: It includes online learning, art appreciation, course pushing, resource sharing, competition exchange and other functions for higher age children. The users are mainly children aged 7–14 [3].

3.2 Features and Problems of Common Children's Art Education Mobile APP in the Market

By downloading, comparing and analyzing the children's art education applications currently on the market, this paper finds the following characteristics and problems.

(1) *Type Concentration*

By searching the Apple Application Store, this paper found that there are 123 items in the children's art education applications. Among them, there are about 86 drawing software with sketching, doodling and coloring as the main functions, accounting for 69.9%. There are about 27 puzzle painting software that combine puzzle games with art content, accounting for 21.9%. There are about 10 comprehensive art education software containing more comprehensive functions, accounting for 12.3%. It can be seen that the research and development of children's art education applications in the market is focused on the lower age group of users aged 3–7 years old, and there are fewer research and development projects for children in the higher age group of 7–14 years old.

(2) *Similar functions*

The functions of the same type of applications are too similar, with high similarity in style design and technology development, lacking their own characteristics and highlights. Users have difficulty making choices when downloading and can only judge by simple data and content such as downloads, ratings and reviews. A similar sense of use and experience leads to low user viscosity [4].

4 Questionnaire

In this study, 100 parents and their children were surveyed to fully understand the needs of child users. Than organize the data of the survey sample, the results are as follows:

(1) *Function Design*

The proportion of respondents' requirements for functions is: 51% for painting guidance,18% for art exhibition,16% for teachers' comments,9% for art class and 6% for picture book stories. Most users want the software to teach drawing as the main purpose and reduce unnecessary information such as games.

(2) *Interactive information*

The attitude of respondents towards software interaction is like this: Intelligent pushing 39%, hierarchical simplicity 22%, format variety 20%, sharpen the focus13%,other 6%.Most users would prefer not to have overly cumbersome procedures, when using app, they can get intelligent push and find suitable content more quickly.

5 Design Practice of Children's Art Education Application - Take "Paint Color" Application as an Example

The existing applications in the market are mainly of the type for lower age group users, and there is a lack of applications for higher age children group users. After user

research, this paper found that users expect a children's art education applications that can collect: art practice courses, online sharing of works, art knowledge learning and other functions. This study takes "Paint Color" Application as an example to design an application for children's art education with clean interface, reasonable interaction and good user experience according to children's psychological cognitive and behavioral characteristics.

5.1 System Architecture

The whole system architecture is divided into three layers, which are basic technology layer, business logic layer and application layer from bottom to top.

Among them, the basic technology layer refers to the underlying technical support platforms, such as database management system and J2EE application server.

The business logic layer is the layer for function realization, which can realize the main functions of children's art app, such as educational function, sharing function, social function and so on.

The application layer and operation layer are the client terminals of an app, which has characteristics, such as strong openness, simple upgrading, easy expansion, strong information system integration and flexible information exchange and information release services.

5.2 Technical Architecture

The construction of this system must be based on advanced and mature technology. With the full consideration of the running speed and scalability of the software, users have access to the platform based on APP mode. Therefore, the architecture is adopted (Fig. 1).

5.3 Interface Design and Function Introduction

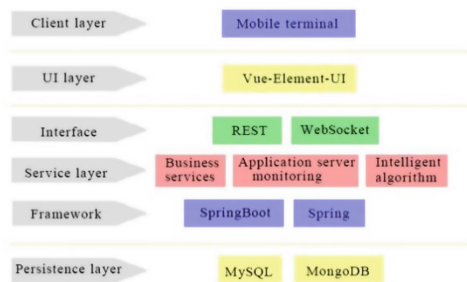The information framework of this app is designed as Fig. 2.
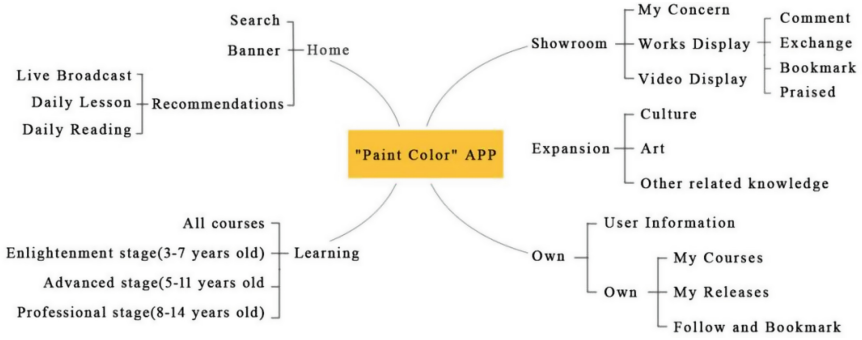

Fig. 1. Technical architecture of APP.

Fig. 2. Information framework design of Paint Color APP.

5.4   Design of Home Page

"Home page" (Fig. 3) can make the first impression of the whole software. It can indicate how users use the functions in the program and present the most eye-catching things in the software to users. Banner on the home page mainly shows the promotion of specific theme activities. There are several options in the King Kong area for users to enter quickly.

The push content of the "daily recommendation" and "live portal" modules below is not fixed. It is mainly pushed through the open source project JOONE according to the user's basic information and usage habits. The contents need to be considered, which include the age of the user, the art categories that the user is interested in, the functions that the user is interested in, the completion degree of the user in different courses, the people that the user pays attention to, etc., so as to facilitate the software to push the most suitable content to the user, and also to drain each module. (see Sect. 5.5 intelligent algorithm later of the implementation method.)

5.5   Intelligent Algorithm

The current intelligent algorithm used in App design is JOONE.JOONE can give a highly adaptive neural network to Java programs. JOONE supports many features, such as multithreading and distributed processing, which means that JOONE can take the advantages of multiprocessor computers and multiple computers for distributed processing. (Soares, & Souza, 2016).

The main consumer of Art education APP for children are users. JOONE can efficiently and accurately make user portraits according to users' relevant materials and use conditions at low cost. Let the software have the idea of the most suitable, necessary and interesting content for the users to push information accurately. It can not only improve the sense of experience of the users, but also improve users' stickiness [5].
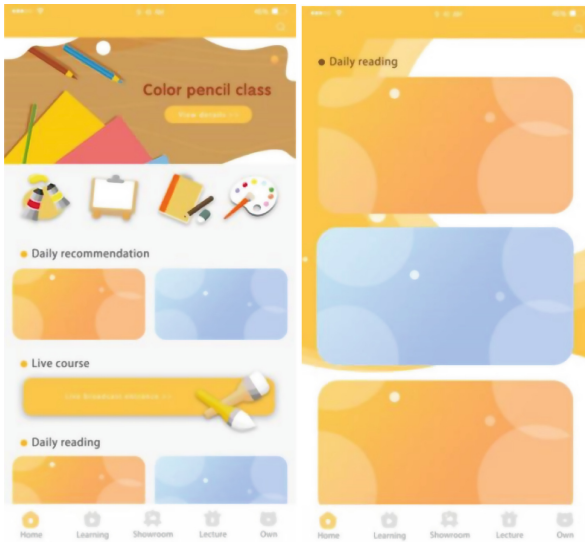
Fig. 3. Home page design of Paint Color APP.

6 Conclusion

This study uses JOONE, an open source project at the technical level, so that children can no longer be limited to the content they choose when using the software. Now they can accept more content that may meet the inner needs of users. It greatly increases the user's sense of experience and trust, and improves the user's viscosity.

Designers have to use their experience and imagination when designing children's art education application. At the same time, it is also important to focus on the needs of the producer, and ultimately needs to return to the users' need. The most basic function of the children's art education application is to teach children the knowledge and practice of art subject content. On a larger scale, it can also expand children's interest in other artistic disciplines and other cultural knowledge.

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