

Exploring the Visualization Design of Ancient Poetry Based on Human-Computer Interaction

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Abstract: Purpose: To explore the visualization design method of ancient poetry with human-computer interaction, and to provide an innovative path for lower grade students to appreciate the beauty of ancient poetry and improve their cultural literacy from the perspective of interaction design, thus providing an innovative path to inherit excellent traditional culture. Method: The design related to existing language and poetry programs was analyzed by competing products. Expert interview research was used to understand the pain points of lower grade teachers in teaching ancient poetry. A questionnaire survey was used to understand the attitudes and needs of lower grade students in learning ancient poetry. Results: Through the above study, we analyzed and sorted out the learning styles of lower grade students, clarified the user orientation, and completed an empirical study on the design of a small program for visualizing ancient poetry by combining Unity3D and C# programming language, taking the type of verse with tonal patterns modelled on tunes drawn from folk music in Yuan Dynasty Tune: Sunny Sand - Autumn Thoughts in ancient poetry as an example. Conclusion: Through assessment and feedback, visualization of ancient poetry can, to a certain extent, attract the attention of lower grade students, arouse students' interest in learning ancient poetry and help content comprehension and memory. It can also play a positive role in the transmission and dissemination of excellent Chinese traditional culture.

1. Introduction

As one of the most precious national cultural heritages in China, ancient poetry has united the splendid civilization of China for 5,000 years. It shows the charm of Chinese wisdom and Chinese language. Ancient poetry is characterized by refined language, long meaning, rich connotation and beautiful rhythm, etc. Studying ancient poetry can cultivate the sentiment and cultivate students' literary literacy. The style of classical poetry is also unconsciously reflective of Chinese culture's hidden ambiguity and introspection. In the past, the literati were more interested in spiritual communication. The ideas were embedded in singing a duet with somebody. Classical poetry retained the function of recording history, reflecting the minutiae of people's lives at that time, and helping future generations to understand the culture of a thousand-year-old country from those words [1].

In the current society, the public does not have a high level of mastery of traditional poetry and culture. There are cases in the public media where basic words are mispronounced and simple verses are not familiar enough. With the continuous development of the social era, we should adopt an eclectic attitude, inherit and innovate with abandonment and creativity, and strive to realize the creative transformation of classical poetry, as well as innovative development, and continuously stimulate the vitality of cultural innovation and creation for all people [1]. Visualization design has a visual communication effect that cannot be replaced by words and language [2].

2. The Current Situation of Ancient Poetry Learning for Junior Grade Students

The Guideline for Improving Chinese Excellent Traditional Culture Education, issued by the Ministry of Education, proposes to study and develop evaluation criteria for Chinese excellent traditional culture education, make Chinese excellent traditional culture education an important part

of the monitoring and evaluation index system for education modernization, and increase the weight of Chinese excellent traditional culture content in the secondary and college entrance exams. Due to their unique learning cognitive characteristics, lower grade students have difficulties in learning abstract content, especially in feeling the meaning and feelings embedded in the poetry.

2.1 The Dimension of Understanding

Poetry is the art of language. Most of the junior students' language level is not high, words often appear in ancient Chinese poetry is relatively uncommon, students' understanding of word meaning is not in place. Therefore, most students lack a certain perception of the mood created by the whole ancient poem and the emotion expressed by the author. Even though the teacher in class has a preliminary memory through explanation, students lack the language environment after class or back home, practice and exchange less, and the atmosphere of in-depth learning is not enough.

2.2 The Dimension of Tests

At the present stage, most students learn ancient poetry mainly for examination purposes. The single mechanical training mode cannot stimulate students' interest in learning, coupled with the low level of understanding of ancient poetry, it is difficult for students to feel the pleasure and sense of achievement brought by learning ancient poetry. Their learning initiative is reduced. Teachers' explanation of the meaning of ancient poetry and the artistic conception depicted are less related to real life, and students' attention is not high. It is difficult to give play to students' imagination and creativity by relying only on the mechanical memory after teachers' explanation in class, which affects knowledge transfer to a certain extent.

2.3 The Dimension of Poetry Culture Perception

The chapter, rhythm, form, and mood of ancient poetry are all revealed in the field of aesthetics [3]. The poetic culture of China is profound. The construction of imagery by poets is the most essential part of it [4]. Making students perceive poetic culture and poetic aesthetics is one of the important purposes of learning ancient poetry. In addition to learning ancient poetry from textbooks and schools, students in junior grades find it difficult to relate what they hear and see in their daily lives to the feelings, scenes and objects described in ancient poems, and are unable to empathize with them and perceive the beauty of their emotions and moods. They know little about the metaphors and exaggerations used in the poems and the allusions and myths quoted in the poems, making it difficult for them to appreciate the subtle elegance of ancient poetry.

3. User Research Analysis and Positioning

3.1 Functional Analysis

Related APPs were searched by keywords ancient poetry learning. According to the download quantity of users and the comprehensive evaluation of users, the APPs with good feedback from users were selected and analyzed in terms of visual effect, interaction design and interface design. As in Table 1, the software functions were counted by checkboxes. The current ancient poetry design products are more comprehensive in word explanation, translation, audio playback, and other functions, which can meet students' needs for learning ancient poetry. However, most of the current products explain the content of ancient poems in words, and very few of them are displayed in a visual way. Students can only associate the scenes through the word descriptions of ancient poems, and the interaction design is mainly based on the two ways of audio playback and voice reading with one-way communication, which is less interactive and has a single color in the interface design.

Table 1 Product-Related Function Statistics

	Visual effect			Interaction design			Interface design	
	Word explanation	Translation	Animation display	Audio playback	Voice reading	Poetry answer	Simple	Clear layout

Ancient poetry dictionary	√	√		√	√		√	√
Ancient poetry study treasure book	√	√		√			√	√
Xichuang Zhu	√	√			√		√	√
Ancient poetry Feihualing	√	√		√	√	√		√
Classics	√	√		√				
Ancient poetry classification appreciate	√	√			√			√
Ancient poetry net	√	√		√				

3.2 Expert Interviews

Taking Chinese teachers of primary and middle schools as the interviewees, the difficulties in language learning and ancient poetry learning in teaching are as follows :(1) lack of interest in learning ancient poetry; (2) Unable to resonate with the artistic conception contained in the author's poems; (3) Lack of after-class extension and use situations, and poor memory; (4) Students have a weak sense of the painting of ancient poetry; (5) Don't understand the meaning of words; (6) Inaccurate pronunciation of words.

In teachers' teaching, there is a lack of intuitive and interesting teaching tools to stimulate students' curiosity. It is difficult to explain and convey the abstract contents such as the emotion of poets and the mood of ancient poems better. Visual teaching is a new way of teaching based on visualization and multimedia teaching or network teaching by computer. By extracting the essence of things from the complicated natural appearances, the abstract concepts are represented visually and the difficult-to-observe phenomena are simulated imaginatively for students to perceive intuitively [5]. The combination of visual design and ancient poetry teaching as a teaching aid can effectively solve this challenge.

3.3 Questionnaire Survey of Target Groups

In order to meet the needs of students and gain an in-depth understanding of their needs for learning ancient poetry, a questionnaire survey was used to select students aged 6-20 years old. 55 valid samples were obtained, 21 boys and 34 girls, including 12 students aged 6-9 years old, 14 students aged 10-12 years old, 10 students aged 13-15 years old, 7 students aged 16-18 years old, and 12 students aged 18 years old and above.

Through the cross-analysis of gender and interface style selection (as shown in Figure 1), it can be seen that these boys and girls preferred traditional Chinese ancient style, while simple and elegant interface style was more popular among boys. Girls preferred cute or cartoon design style. It can be seen that girls were more emotional in interface style selection, while boys were more rational.

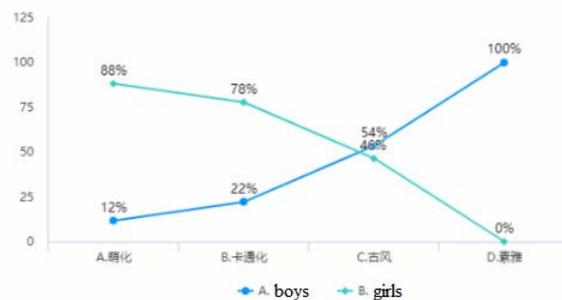


Fig.1 Crossover Analysis of Gender and Interface Style Selection

According to the comparison of different ages and memory points of ancient poetry elements (Figure 2), students of different ages all remembered the classical phrases in ancient poetry deeply,

while their memory of the mood of ancient poetry was weaker. 6-9 years old students remembered the title, author and representative verses of the poem more deeply, and their memory of the emotion and mood of ancient poetry was positively correlated with their age, while their memory of the author was inversely correlated with their age, especially in experiencing the poet's They have difficulties in understanding the poet's emotions.

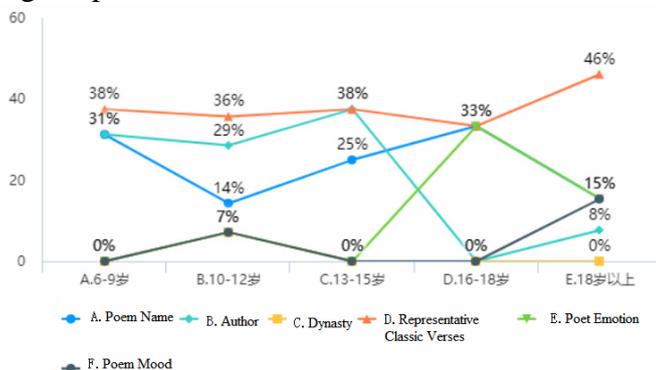


Fig.2 Cross Analysis of Age and Memory Elements of Ancient Poetry

In the analysis of the data on memorization difficulties in the elements of poetry (Figure 3), the difficulties of the junior grades compared to the senior grades were concentrated in the poet's emotion and the poem's meaning, indicating that the junior grades were relatively weak in deeper learning such as empathizing with the poet's emotion and feeling the poem's meaning. In this analysis, it is difficult to learn the ancient poems in depth, to appreciate the author's ideological and emotional aspects as well as the rich connotations of the ancient poems and to fully appreciate the beauty of the ancient poems, which are closely related to the cognitive levels and abilities of students of different ages. The lack of life experience makes the junior grade students unable to really understand the context of ancient poems. It is a major problem in teaching ancient poetry. By creating various means, such as creating situations, students can intuitively perceive the content of ancient poems, gain emotional experience, and have emotional resonance with the author to promote better understanding of ancient poetry [6].

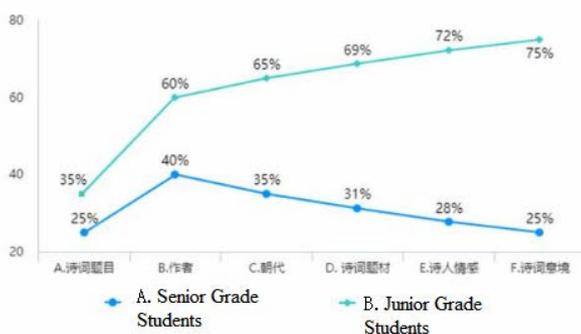


Fig.3 Comparison and Analysis of Memory Difficulties of Ancient Poetry Elements between Senior Students and Junior Students

Due to differences in cognitive abilities, people's understanding of color varies [7]. In terms of color selection (Figure 4), most of the senior grade students chose colored ink for the poetic interface, and more of the junior grade students chose bright colors. This indicates that the senior grade students have a high recognition of traditional ink and wash elements, and the junior grade students prefer bright colors and strong color contrast, so more bright colors should be used in the design.

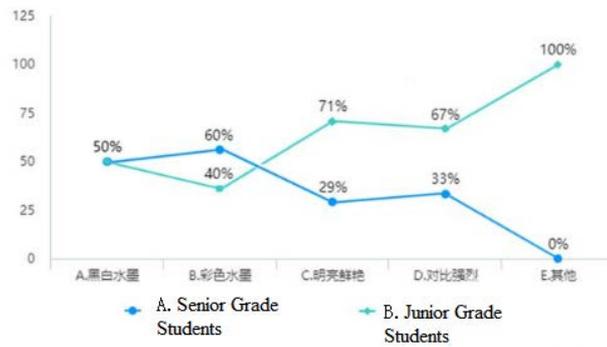


Fig.4 Comparison Analysis of Color Interface Choice between Senior and Junior Students

According to the law of Ebbinghaus' memory forgetting curve, it is found that forgetting starts immediately after learning. Many students gradually forget what they have learned when they do not focus on later retention after learning ancient poems. Through the research, students of different ages agreed that reading aloud repeatedly would be extremely helpful for memorizing ancient poems (Figure 5). Therefore, the learning method of repeated reading aloud or the interactive method that facilitates repeated learning can be presented in the design.

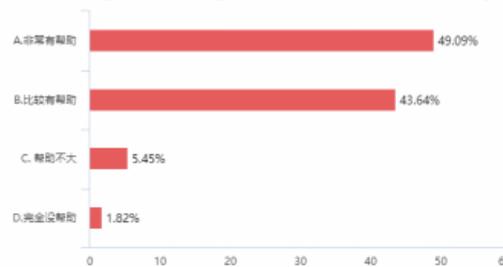


Fig.5 Analysis of the Extent to Which Reading Aloud Helps to Memorize Ancient Poems

3.4 Analysis and Positioning

The design of ancient poetry learning products can be innovative and breakthrough in the design of the interface, multi-sensory experience, and diversity of interaction. The use of pictures and animations, background music to create an immersive learning experience, and more diverse ways of interaction to learn ancient poetry can better motivate students to learn ancient poetry, improve learning efficiency, and make the learning atmosphere easy and enjoyable. The design can read aloud the ancient poems repeatedly through voice interaction to help students learn and remember. In the interface color can be combined with bright colors of color ink, the interface selected unified elegant Chinese style.

Based on the above research and analysis, the product is positioned as a visual design learning applet for ancient poetry. It provides junior grade students, teachers and parents with a learning product that can carry out ancient poetry content and annotated translations, cover ancient poetry animation scenes, and further understand and master the texts by interpreting them through voice recognition keywords. It aims to allow lower grade students to break through the difficulties of learning ancient poetry through visual learning.

4. Visualization Design of Ancient Poetry for Human-Computer Interaction

4.1 Design Thought

With the name of "Watch and Feel Poems", the program aims to reproduce ancient poems in a visual way, combining animation with the poet's perspective to lead students to experience and feel the poet's state of mind in a set time and space context.

The principle of adaptability. As long as there is a computer, poems can be played and interaction can be done. It also has the adaptability for the number of students and the teaching

environment. It has the scene reproduction to break the limitations of time and space. It can also help students experience the beauty of the mood of ancient poetry. Moreover, it should have voice recognition function to realize learning interaction, which means it can be connected to the microphone device and repeatedly play by recognizing the “key words”, so as to improve students' sense of participation and fun. The applet also has the function of key words playback and explanation, for language level problems, it can play and explain in text. The keyword playback and explanation function can play and explain the keywords for language level problems. The design is based on two major sections: the entry interface and the main interface. As shown in Figure 6.

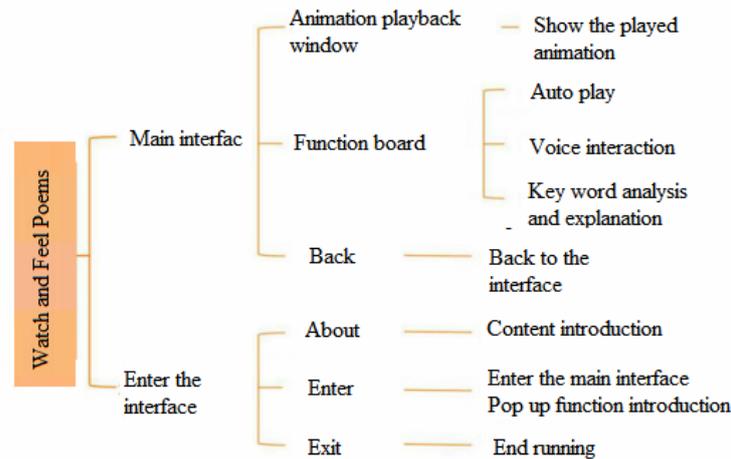


Fig.6 Functional Structure of the App of “Watch and Feel Poems”

4.2 Function Analysis

The entry interface contains Content introduction, Enter the main interface and Exit. The main interface realizes visualization design, highlighting the emotions contained in the ancient poems and the mood shown, and facing a variety of interactions including the realization of animation playback, voice playback of ancient poetry content, and voice interaction. After establishing the anthropomorphic 3D models of old trees, crows, bridges and sunsets through Cinema 4D software and completing the rendering, the scenes of wind and flowing water sounds and swaying under the wind are incorporated at a later stage, transforming the contents of the ancient poems into visualized contents and attaching importance to the sense of multi-sensory experience, students learn and enhance their understanding through illustration and text. The keywords that express the mood and are human emotions can be sliced and diced to realize the repetitive playback of ancient poems by button or voice control or to recognize the keywords, read aloud and explain, and learn repeatedly according to the students' mastery. Part of the interface display is shown in Figure 7.



Fig.7 Part of the Interface Display

5. Test and Estimate

By demonstrating in the classroom, the questionnaire research was conducted after primary and secondary school students actually participated in the interaction. The questionnaire was sent out 56 questionnaires, with 56 valid samples, of which 75.9% of the students thought that learning could

increase their knowledge and 86.5% thought that learning ancient poetry could promote the excellent Chinese traditional culture. Among them, 33.4% and 41.07% thought that the design of the applet was good and very good for learning ancient poems. 85.7% of the students thought the design was novel and interesting, 78.9% thought the voice interaction was participatory. 80% thought it was helpful in understanding and mastering the poet's emotions, tasting the mood and feeling the meaning of the poem, and 69.64% thought the animation was attractive and visual and it helped them master, savor the poem's mood and feel its meaning. However, there are many things to be improved in this applet, such as adding a game section at a later stage, so that students can experience the charm of excellent Chinese traditional culture and gain the power of traditional Chinese poetry culture in the fun of games.

6. Conclusion

With the improvement of economic level, the soft needs of our people at the spiritual level are gradually increasing, which provides a good opportunity for the inheritance and development of ancient poetry culture [8]. Not only that, we also use voice recognition, animation production and other technical means to provide students with a new poetry learning experience that is deep, pleasant and engaging. According to the American anthropologist Geertz: "Culture is a pattern of meaning that is passed down through history from generation to generation by means of symbols, which express the idea of inheritance in symbolic form. Through the symbolic system of culture, people are able to communicate with each other, to stretch and persist, and to develop knowledge of life and attitudes toward it. [9] " As one of the most precious national cultural heritages in China, ancient poetry has united the splendid civilization of China for 5,000 years. The visualization design approach of ancient poetry is to a certain extent more conducive to the learning of students in the lower grades and helps to solve the learning pain points of students. By promoting the learning and dissemination of ancient poetry through appropriate visualization design, we can educate people with culture and literature, improve the dissemination and transmission of ancient poetry among students in the digital era, and help the development of excellent Chinese traditional culture.

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