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The Research on Evaluating the Interactive Interface of Learning App for Adolescent Children Based on Visual Guidance Design

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Abstract: The growing popularity of online teaching and the increasing number of mobile applications have made mobile learning increasingly pervasive in the daily lives of adolescent children, and learning APP's have become an important form of learning for adolescent children in and out of class. This paper is based on the design of a visually oriented interactive interface for adolescent children's learning app. The research takes the APP's design of visual guidance as the entry point, conducts a comprehensive analysis of the psychological characteristics of adolescent children, and conducts a comparative analysis of the user experience evaluation of three existing APP's in the market. Using the actual demand feedback from the main user group of APP's - adolescent children and their parents, we conduct data excavation and data analysis of the ranking of the user demand index of these APP's, and explore the ways to improve and optimise the adolescent children's learning APP's interactive interface of visual guidance from the perspective of satisfying users' needs.

Keywords: *Visual guidance, Interactive interface, Adolescent children, User needs, APP design.*

I. INTRODUCTION

The visual guidance is a very important part of the app, and it is the icon that pops up when the user is using the app and helps the user to complete the whole process clearly. The visual guidance，which follows a clear and smooth path，acts as a guide to help the user understand the whole app more clearly. The visual guidance of a successful interaction design page allows the user's eye to move smoothly from the primary to the secondary functions, following the guidance to the next level, invariably forming a coherent guide route. This allows the user to successfully complete the objectives and needs they want to achieve within the app. The user operates the software through the interactive interface, sending instructions to the back-end, which in turn shows the user the functions and information that the app should have through the interactive interface. In a word, an interactive interface is a platform of communication built by the designer.

II. THE ANALYSIS OF THE DESIGN RULES OF LEARNING APP AND THE PSYCHOLOGICAL CHARZCTERISTICS OF ADOLESCENT CHILDREN

2.1 The Visual Guidance Design Of Learning APP

Creating contrast is a good way of guidance. The presence of different elements can highlight what the designer wants the user to notice first, such as different colors, larger fonts, and suddenly flashing icons，which can effectively catch the user's attention. More direct guides include arrows with clear

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directions, pictures with instructions, and text boxes with explanations. A more subtle visual guidance is to follow the user's navigation rules[1]. For example, placing the main functions in the top left corner，which follows the user's left-to-right, top-to-bottom reading habits. This allows the main functions to be prioritized. In contrast, large-scale designs tend to use the "S" curve reading style of visual guidance.

2.2 The Design Principle Of The Learning APP's Interactive Interface

The interactive interface is the channel that connects the user with the function of the software for information exchange, and is the way to make the user connect with the computer. When using an app, the app as an operation object, the user is ultimately concerned about whether it can meet the needs of use. The interactive interface makes it possible for the user to focus only on what he wants to use, without worrying about the difficult operation of computer semantics and algorithms. The interactive interface of APP will introduce audio and other interactive means to enrich the form of information, simplify the operation and improve the efficiency of users[2]. The interaction interface of APP is a medium of interaction design，and in interaction design, we should consider the design of human relationship more deeply, and the final interface requirements should return to "people-oriented"[3]. The ultimate goal of interaction interface is to serve people, improve efficiency and provide users with the simplest and most comfortable experience.

2.3 The Psychological Characteristics Of Adolescent Children

A. The increase of self-awareness.

Adolescent children's self-awareness grows qualitatively during this period, and they begin to have more discernment and consideration, and to have ideas that are uniquely their own. Their sense of self is amplified, they begin to consider their future and direction, and to think about what kind of individual they are. They have a strong interest in themselves and are eager to think about their own characteristics, to be different and to seek individuality[4]. They also have a strong curiosity about themselves and always want to express themselves and seek approval from others.

B. The increase of independence.

Children entering adolescence always want to be recognized and respected by others, to be free from the constraints of adults, and to be independent. They need the satisfaction of success from learning to build positive feedback.

C. The significance of changes in emotions.

Children in this period are sentimental and temperamental, and the variability of feelings occurs in conjunction with the deepening of emotions. During this period, children have begun to generate and feel many delicate and complex feelings[5]. There is a need for deeper psychological needs. (With deeper psychological needs, there is a need for positive psychological guidance.)

D. The increase of the need for socialization with peers.

Peer relationship is a very important part of life during this period. No adolescent can be separated from the influence of peers, and they always sees interaction and recognition of each other as extremely important.

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III. THE EXPERIENCE AND COMPARISION OF LEARNING APP

The study is based on the evaluation of three learning APP's implemented in the existing Chinese market, and it summarizes the interaction design pattern and visual orientation design pattern of these APP's based on actual users' feedback.The study also compares the data evaluation of the three APP's to give feedback on the visual orientation and comparison effect of the three APP's.

3.1 SCALLOP WORDS.

The registration opening screen page of Scallop Words is simple and clear, using the easiest to operate opening method. The interface is easy to operate, has strong functional guidelines, and is extremely practical. The color arrangement is reasonable and has a aesthetic visual.

The pop-up design of the advertisement box can instantly attract users' eyes, and the interesting drawings can arouse users' interest, and such design is suitable for the aesthetics of adolescent children. The color scheme of high saturation, high brightness and low hues is compatible with the color tone of the page itself and will not be too abrupt. The function pages are clearly prioritized, with the main function of learning words placed in the middle of the page. The high brightness cyan color is chosen to distinguish the page from the white one, allowing users to focus on the main function. The design of the word recitation page is also highly concise, retaining only the most critical parts, and the frame-less design makes the interface more clean and neat. The page has only two clear and suggestive guide buttons to facilitate learning and use of the function. The colors of two function buttons are cyan and orange, and the hues is low, ensuring a beautiful color match while forming a high contrast, which is convenient for users to distinguish. However, the color arrangement of the pattern under the Hot Sale section of scallop words APP is too much, which makes it difficult to integrate the App and establish the brand characteristics. When the learning task is not completed and the operation returns to the upper level, the page will pop up a prompt box of anti-touch, which can effectively avoid the return of the page caused by touching by mistake. The pop-up box uses the image of robot, which makes the process of using the app more interesting and greatly enhances the favor-ability of adolescent children to the app. For the personal homepage, the app can independently choose the profile pictures and manage the user's learning and speech[6]. Users have more autonomy in their use and can meet their own personal needs. However, the layout design is a little confusing with the boxes, and a lighter design is recommended. A clear visual hierarchy can be built only through the contrast of large spacing and text, thus highlighting the content itself. In terms of reward mechanism, users who achieve their learning goals will be rewarded with a badge. This design can bring users a certain sense of satisfaction and help build positive feedback. However, the app has not stronger brand characteristics and does not have a distinctive brand feature, which makes it difficult to establish a memory point. The course page is too advertised and the color saturation of the images is too high, which makes the overall appearance not high-level.

3.2 100 WOEDS.

The registration page of 100 words also follows the principle of simple and easy operation. Compared with Scallop Words，the 100 words is bolder in color arrangement and has more brand characteristics, which is more able to attract users' eyes and form a memory point. After the update, the app has increased

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the saturation and hues on the basis of the original brand color, which makes the overall appearance more fashionable and its style is more suitable for adolescent children. The pop-up box is less interesting and more practical, and the simple and square design style is more close to adult aesthetics. For the main page design is also clear about the main and secondary, and the layout is more lightweight, only through the contrast of large spacing and text to build a clear visual hierarchy and highlight the content itself. The main function of learning words is placed in the middle, and a high brightness blue color is chosen to distinguish from the white page, so that users' eyes can focus on the main function. However, there is no dark mode, which makes the user's experience worse at night. The lower half of the course page is designed with cards, and the cards are reasonably spaced to create a clear visual hierarchy, giving the interface a clean and tidy visual feel. However, the design of the top half of the columns, Personalized Score and School Season Benefits, is not consistent. The overall structure framework is clear, which reduces the browsing obstacles caused by too much information on the page. The "S" curve reading style is used for visual guidance, which helps users' visual guidance to a certain extent[7]. In addition, the page has more interactive and social sections, creating a more intense learning atmosphere for users. The personal homepage can freely define profile photo and nickname, providing personalized expression. This design, which meets the needs of adolescent children for socialization and nationalization and enhances the fun of using the app, also introduces competition and boosts users' interest. The overall interaction framework has clear interaction attributes, with simplified and clearly layered operations. The page of word study places the main operations at the bottom of the screen, following a top-down browsing style that naturally guides the operations and enhances the user experience. However, the overall style is too serious. Although the word memorization interface follows the previous fun picture memory, such an overly serious aesthetic is not popular and lacks fun in the face of adolescent children. The sharing of punching in makes a certain personalized design, which can freely define the background image, thus stimulating users' desire to share and guiding them to share and spread among themselves.

3.3 DO NOT RECITE THE WORDS.

The registration page of do not recite the words is the same simple and easy to use structure as the previous two APP's, but the background color is more conservative, using the most basic white colour with a certain texture to give it a more premium look. The logo of the APP is placed in the middle of the upper position and occupies a large area, which is the only pattern with high brightness color and can immediately catch the user's sight and form a memory point. However, the design is uninteresting and uninspiring, which does not make a background that expresses the brand's own main propaganda point of aesthetic. The interface for selecting a word book is clean and simple, with only a single level of word book selection, easy to use and with practicality taking precedence[8][9]. After the selection, enter the main page, the background of the main page selected a random picture of the way, and the picture style are very beautiful, which is highly in line with the aesthetics of adolescent children and can effectively attract users. The overall interface is very simple and the prompt box is very prominent, and the colors are a greyish color system of Morandi in line with the font color, which blends in subtly with the background. The font color adapts to different backgrounds to enhance the visual appearance of the color arrangement. The home page places the main operations at the bottom of the screen, and the size and spacing of the icons can meet the aesthetics of people. And it leave only four small icons, which are not overly cluttered and follow a top-down navigation pattern to naturally guide the operations and enhance the user experience. The recitation interface is simple and clear, with English-Chinese translation as the main function. The small icons for operation tips flash on

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their own to attract the user's attention and guide them to the function. The operation of the word search follows the main page search method of sliding upwards on the previous level and takes advantage of the user's inertia of thinking to operate the function, which is more practical. However, there is no design of returning to view if the answer is correct, which makes it difficult for users to return to the previous word after touching it by mistake, and the text color is too close to the background color, which makes it difficult to see in low light conditions. The interactive interface of the app has a certain humanity and really puts the user experience first, with the freedom to choose the preferred interaction method, which moreover satisfies the customer's certain personalized needs. It is worth mentioning that the pop-up box here does not follow the aesthetic style of the page, probably due to the lack of time, and is less adaptable. It is recommended that the pop-up boxes here also conform to the overall style and also create the sense of a unified overall interface atmosphere that can strengthen the brand's memory points. The interface of No recite School also does not follow the aesthetic style of the brand, and the pictures within the icons of each function are of different sizes and the style is not holistic enough, which is too fragmented. It can consider that unifying the use of icons with aesthetic style, size layout and clear features. The little man on interface of collection is also inconsistent with the overall brand style and appears very abruptly. The icons on the page of Listen Anywhere are much consistent, but there are too many color elements, and it would be better to use the same grey from the color system of Morandi as the homepage[10]. The layout of the dashboard is slightly constrained by the use of boxes to divide it. The lighter design is recommended, with only large spacing and text contrasts to build a clear visual hierarchy and highlight the content itself. The personal homepage interface is clear, simple and practical, and the ability to define your own profile photo ， nickname and theme satisfies users' individual needs.

3.4 The Comparison Of User Experience Data Of The 3 APP's

As of October 2021, there are a wide variety of learning APP's on the Android App Store with a large number of downloads. In order to reasonably observe the interactive interface design features of learning APP's, we chose the word memorization learning APP's and identified three of the most well-known word memorization learning APP's on the market as our samples. Based on their characteristics and the number of downloads and positive reviews, we used a questionnaire to randomly select 200 adolescent children and 100 parents of children for the survey grading.

As shown in Table I, this table is rated by adding up the number of levels typed by users and dividing it by the total number of users. The data for both downloads and positive reviews are taken from the App Store for Android. As can be seen from the data, 100 Words is firmly in first place in terms of downloads and positive ratings. It has a high social aspect, which satisfies the psychological needs of adolescent children for social interaction and a sense of identity and community. Its brand characteristics are highest, with a certain base of users that can form a memory point. In terms of functionality, it also has the most functionality, with interactions guiding each function in an effective and prioritized way, which is why it has the highest number of downloads and positive reviews. However, the over-emphasis on the simplicity of the brand leads to a lack of momentum and makes it difficult to appeal to younger adolescents. Not recite the Words is weaker socially, but more ornamental and more personable, so although it is under-rated and under-downloaded, it has greater potential to improve and improve its app usage.

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TABLE I. The comparison of user experience data of the 3 APP's

APP name /Feature	Interface Personality	Cultural identity	Independent Operation	Full of Fun	Highly interactive	Social function	Feature prominent	Simple and convenient	Brand prominent	Viewability	Downloads (10,000)	Positive rating (%)
SCALLOP WORDS	5	3	2	3	4	3	4	5	3	4	2043+	95.23
100 WORDS	4	3	2	3	4	5	4	3	5	3	15000+	97.46
DO NOT RECITE WORDS	4	5	2	2	4	1	4	4	2	5	1849+	94.32

IV. The RESERACH ON THE NEEDS OF ADOLESCENT CHILDREN AND THEIR PARENTS FOR THE INTERACTIVE INTERFACE OF LEARNING APP

Combining the unique psychological characteristics of adolescent children and the research on learning APP's in the market, when adolescent children do not yet have the independent ability of self-control, the parents ‘ intervention is one of the important factors influencing the use and download of APP's. Therefore, in order to study and research the demands and feedback of adolescent children and parents on the interactive interface of learning APP's， the sample data should include the overall data of fathers, mothers and adolescent boys and girls, of which 1916 were valid and 84 were invalid, with an effective rate of 95.80%.

4.1 The Establishment Of The Experimental Data Sample

The data experiment adopted the research interview method, questionnaire analysis method and data statistical analysis method to rank the demand index of adolescent children and their parents on the use of learning APP's from high to low on a scale of 1-10, selecting the highest value as the representative demand and listing the corresponding data situation, finally forming the sample data Table II.

4.2 The analysis of sample data by category

This paper summarises the data analysis of a total of ten demand categories for personalization, humanism, independence, interestingness, interactivity, sociality, functionality, practicality, supervision and control of the learning APP's. The leftmost side of table 1 shows the percentage of the project population and the rightmost side shows the numerical value of the project population. Table 1 below shows the research on mother's demand degree of learning app design and application.

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TABLE II. A survey of parents and adolescent children's demand for learning APP design and Application

Features /Objects	Mother/ Proportion		Father/ Proportion		Children(female) /Proportion		Children(male) /Proportion		Total /Proportion	
Personalization	28	5.85%	12	2.51%	62	12.94%	52	10.86%	154	8.04%
Humanism	34	7.10%	23	4.80%	21	4.38%	18	3.76%	96	5.01%
Independence	33	6.89%	45	9.39%	43	8.98%	51	10.65%	172	8.98%
Interestingness	54	11.27%	67	13.99%	132	27.56%	145	30.27%	398	20.77%
Interactivity	38	7.93%	22	4.59%	62	12.94%	37	7.72%	159	8.30%
Sociality	23	4.80%	44	9.19%	48	10.02%	68	14.20%	183	9.55%
Functionality	47	9.81%	36	7.52%	24	5.01%	41	8.56%	148	7.72%
Practicality	52	10.86%	79	16.49%	29	6.05%	34	7.10%	194	10.13%
Supervision	109	22.76%	120	25.05%	36	7.52%	19	3.97%	284	14.82%
Control	61	12.73%	31	6.47%	22	4.59%	14	2.92%	128	6.68%
Total	479	100.00%	479	100.00%	479	100.00%	479	100.00%	1916	100.00%

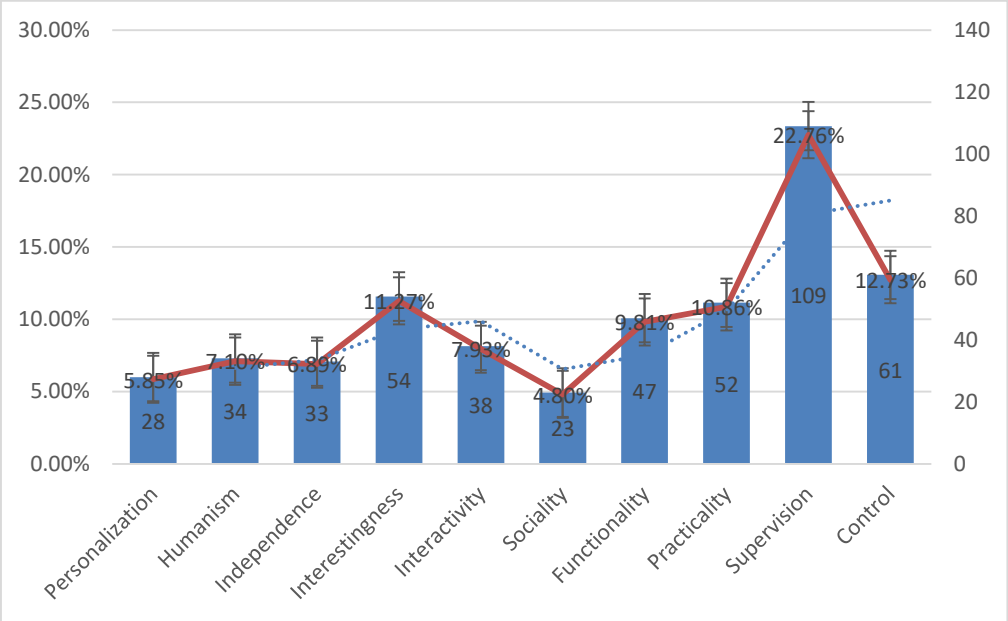

Fig: 1 The Research On Mothers' Demand Degree Of Learning APP Design And Application

According to Fig.1, the research on mothers ' demand degree of learning app design and application shows that in the twelve items, the highest item is supervison, with 109, accounting for 22.76%. The lowest item is sociality, with 23 items, accounting for 4.80%. The data shows that mothers' demand for learning

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APP's is the highest for supervison and the lowest for sociality. Mothers focus on supervisory aspects of app use in adolescent learning. This is due to the fact that adolescent children are not very capable of self-monitoring and parents have limited energy, so they need APP's to provide effective supervision of learning. The lowest need for social interaction shows that mothers are the users who have the lowest need for social interaction due to the insecurity of the internet and the fact that too much social interaction is detrimental to children's study habits and concentration. It is worth noting that the table has 54 items of interestingness，accounting for 11.27%, which is the third highest percentage. This indicates that mothers focus on the development of their own personalities and interests, as well as interestingness and guidance in the learning process.

As can be seen from Fig.2, the item with the highest demand from fathers for learning app design applications is supervision, which is the same as the item with the highest demand from mothers in Table 1. The item with the lowest demand from fathers is personalization. There were 120 items of supervision, accounting for 25.05%, and 12 items of personalization, accounting for 2.52%. This data shows that fathers are most concerned with supervision of learning APP's and least concerned with personalization. This suggests that fathers are most concerned with the supervisory role of learning APP's for their adolescent children and less concerned with their adolescent children's personalisation needs when using learning APP's. In addition, fathers have a greater need for the column of social aspect than mothers, with 44, accounting for 9.19%. This data shows that the fathers are concerned about the sociality of adolescent children while focusing on the supervision of the app. This is due to the fact that adolescent children are developing physically and mentally at a rapid pace and appropriate social activities are beneficial to the learning and growth of adolescent children.

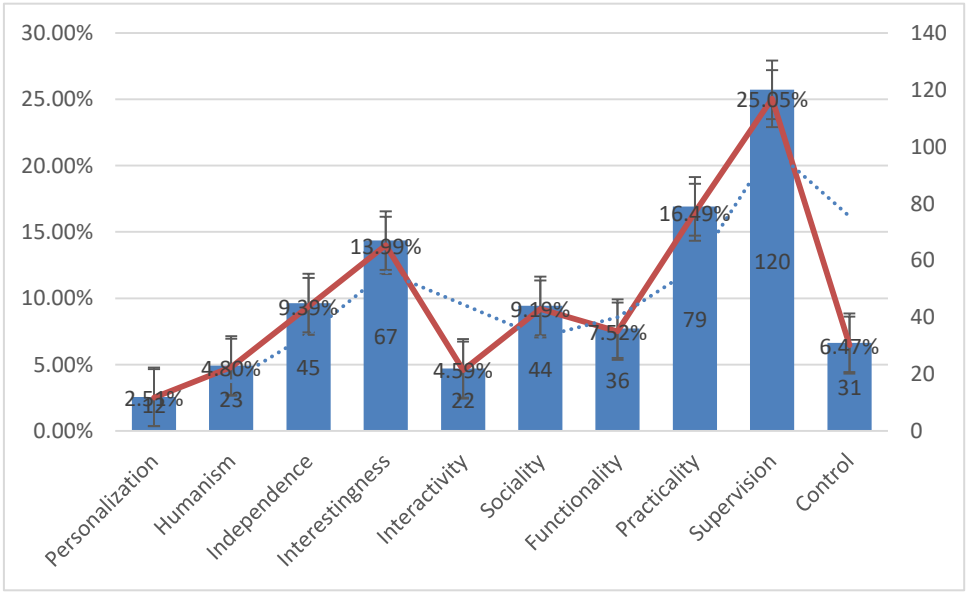

Fig: 2 The Research On Fathers' Demand Degree Of Learning APP Design And Application

The highest item in the research on a adolescent girls ' demand degree of learning app design and application is fun, with 132 items, accounting for 27.56%. The lowest item is humanism, with 21 items, accounting for 4.38%. This data shows that the adolescent girl user group is most concerned about the

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interestingness of learning APP's. Interesting and rich learning formats can arouse adolescent girls' interest when using them. Adolescent girls are the least interested in the humanism of the app and are less concerned with the humanism of the app. In addition, there are 62 personalisation items in this chart data, accounting for 12.94%, which is second in size only to interestingness . Functionality has a demand level of 24, accounting for 5.01%, and is only second in size to humanism. This data indicates that the adolescent girl user group favours APP's with strong personalisation, paying more attention to their own personality and style, and paying more attention to the sense of use and experience of the app..

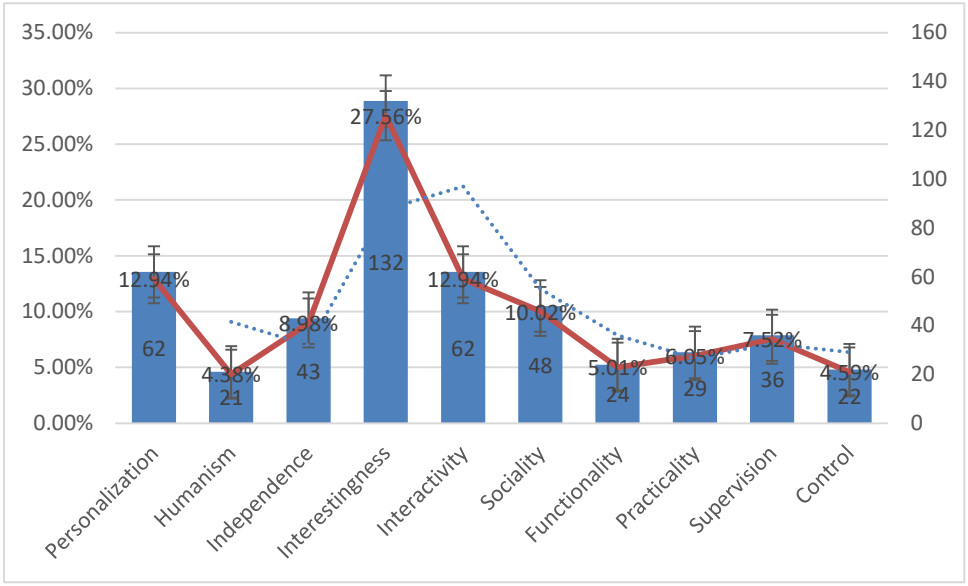

Fig.3 The Research On Adolescent Girls' Demand Degree Of Learning APP design And Application

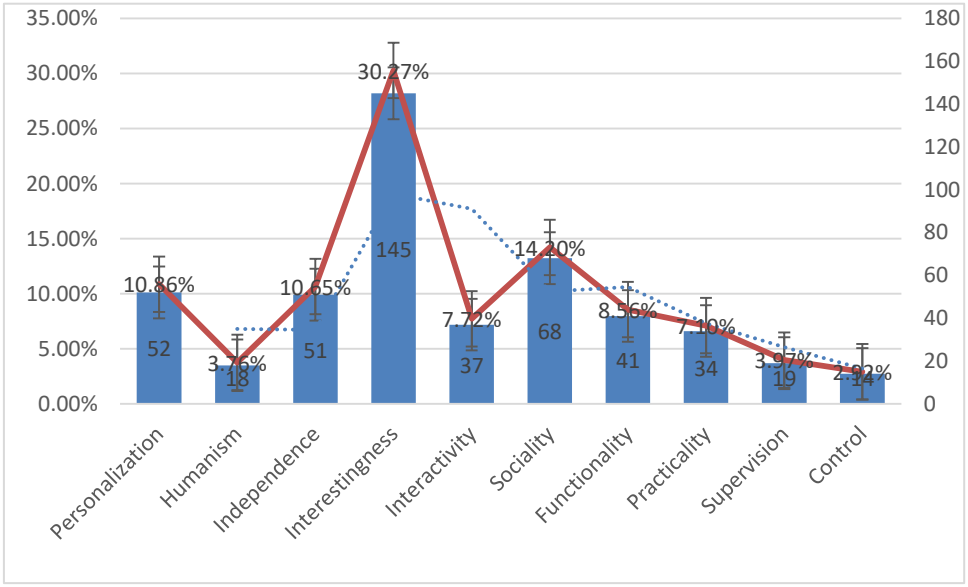

Fig. 4 The Research On Adolescent Boys' Demand Degree Of Learning App Design And Application

Forest Chemicals Review
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Fig 4 shows the research on adolescent boys' demand degree of learning app design applications. According to the table, the highest demand item is interestingness , with 145 items, accounting for 30.27%, which is the same as the highest demand item for the adolescent girls user group in Table 3. The lowest demand item is control, with 14 items , accounting for 2.92%. In contrast, there are 68 items, accounting for 14.20%, in the social category, which is second only to interestingness . This data shows that the highest demand for learning APP's among adolescent boys is for interestingness, and the lowest demand is for control. This shows that adolescent boys have a high demand for interestingness and personalization , and a low demand for control, and they are concerned about communication between themselves and the outside world when using APP's. It can be seen that the rich and interesting learning process is very attractive to adolescent boys in the use of learning APP's, and the ability to satisfy their social activities while learning is also an aspect of concern for adolescent boys.

4.3 The Conclusions Of The Data Sample Analysis

Fig. 5 shows the research on users' demand degree of learning app design applications, the leftmost side of the table is the percentage of the number of people, and the rightmost side is the number of values. Based on the data in this table, it can be seen that users have the highest demand for the item of interestingness, with 398, accounting for 20.77%. Adolescent boys and adolescent girls have the highest impact on this item, with 277. Humanity was the least demanded, with 96 users, accounting for 5.01%. Of these, mothers account for the largest share and play the biggest influence. In addition, users' demand for supervision was second only to interestingness, with 284, accounting for 14.82%. It can be learned that the supervision of the app and the interestingness become the two highest users’ demand in this data.

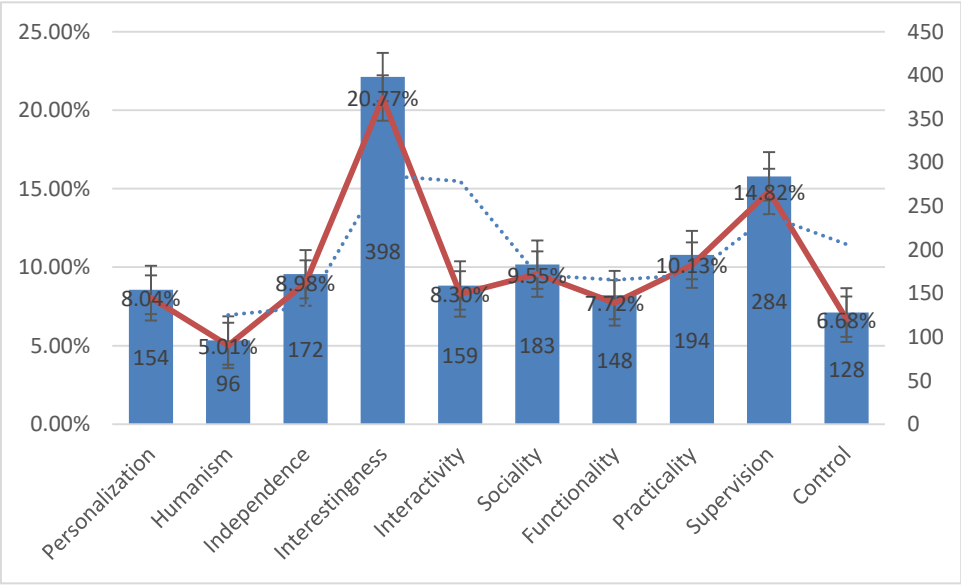

Fig.5 The Research On Sample Users' Demand Degree Of Learning APP Design Applications

A. Users have the highest demand for interestingness

According to the data, the highest user demand for learning APP's is for interestingness , with adolescent girls and adolescent boys playing the biggest influence on the demand for this item. This is related to the diversity of personalities and interests of adolescent children and their personality

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development. This data also shows that parents focus on the learning app as a guide for their children's learning and as a way to develop their children's interests.

B. Users' demand for supervision is second only to interestingness

Supervision is second only to interestingness, with fathers and mothers having the greatest influence on this value with 229 users. This data shows that although the mothers and fathers have different needs for the app, they both focus on its supervision. It can be seen that parents need learning APP's to play a supervisory role for their children instead of themselves, or to play a more effective supervisory role than the parents themselves, to monitor the learning behaviour of their young children.

C. Users are more concerned about the practicality of the app

Users are more interested in the practicality of learning APP's than in their functionality. This indicates that users focus on the practical value of learning APP's in real life, and on the independence and good habits that young children develop when using them for learning.

D. Social needs are an important aspect of app use that cannot be ignored

It is worth noting that in this table, users ‘ demand for the item of sociality is ranked fourth, with 148 items, accounting for 9.55%. Adolescent boys and adolescent girls account for the largest number of values in this data, with 116. It can be seen that adolescent boys and girls are more concerned with social activities between themselves and the outside world and focus on interacting with other users when using the app.

V. THE DESIGN METHODS OF VISUAL GUIDANCE FOR LEARNING APP FOR ADOLESVENT CHILDREN

5.1 The Emphasis On Personalisation And Humanism.

Adolescent children, as the main user group of learning APP, each have their own style and preferences to pursue, and their visual experience and interaction on APP do not want to be stylised in a uniform way, and their increasing awareness of themselves leads to higher requirements for personalization of the interface. In order to meet users’ needs, the interaction interface design process should give users the space to show their personalization.

5.1.1 The transmission of personalised colors in the interactive interface.

Timely changing color arrangement can meet the needs of adolescent children for personalised expression, so users can be given the autonomy to personalise their choice of interface colours after a reasonable color system has been formed, guiding them to use colors to express their own mood diary according to their personality and current mood. For example, the colors used in the No recite the Words are the same as the font colors, which are greyish color system of Morandi and can be subtly blended with the background. The font colors on the pages also adapt to different backgrounds, enhancing the visual appeal of the colour arrangement. The dark mode is set to automatically change from daytime to nighttime following the sunrise and sunset, which is a better experience for users who use the app at night.

5.1.2 According to the different habits and needs of users, partition module and search bar can be set, so that users have different focus for different needs to target services.

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July-August 2022 Page No. 2597-2612
Article History: Received: 10 April 2022 Revised: 18 May 2022 Accepted: 30 June 2022 Publication: 25 July 2022

So that users have a choice and target to find the information they need. Personalized content recommendations can be added to the common experience exploration. After analysing personal preferences based on big data, visual guidance can be used to push content of interest to a obvious position to attract users' attention and guide them to the page of interest. The recommendations from the big data of platforms such as Tiktok and Taobao are very reasonable, so that every time users open the app they see the content they want to see and learn, which invariably leads them to open the app again and again and create a strong appeal. However, it is important to notice that the content recommended is safe and healthy learning content. For children and young people, they are not sufficiently experienced to distinguish between advertising and external content within the app. The external links that click the browser should be avoided or disabled[11]. Interaction patterns should also avoid the need to direct external links as much as possible, placing them in the least obvious places and integrating them into the page. The majority of users use their parents' mobile phones and numbers to register accounts and use the software. The safety of the app is a serious matter for parents of young children, so it is important to ensure that the source of knowledge of the app is authoritative and trustworthy[12].

5.1.3 profile photos, backgrounds and signatures are the best way to express your personality and introduce yourself.

The independent setting of user profile photos, backgrounds and signatures also helps users to express their sense of self to a large extent. For example, the personal pages of the three APP's above can be set up with profile photos and nicknames, providing a stage for users to express their individuality. The difference is that the design of the personal page of do not recite the words is the simplest and clearest, with the main functions clearly visible and fewer layers for easy operation. The icons and options are perfectly matched in size. The page of the 100 words is also clear and hierarchical, with a clear overall framework that makes it easy for users to operate. However, the pages of scallop Word are more cumbersome, and the distinction between primary and secondary functions is not clear enough, so the visual experience and overall neatness are not as good as the other two software.

5.1.4 Attention is paid to the emotionally sensitive stage of adolescent children.

For example, reminding users to take a timely break in the interface, pushing relevant birthday wishes in the interface on users' birthdays, etc. This can shorten the distance between users and the APP and enhance users ‘ satisfaction. For example, the interactive interface of do not recite the words has a certain degree of humanism, after the update there is a newer way of interaction, but considering the habitual nature of old users, so also retains the original interaction. Users are free to choose their own preferred interaction, which provides users with a certain degree of personalized needs to meet. Whether APP has a certain humanistic care, which is one of the tests of the intelligence and rationality of the interactive interface, then as a learning APP for adolescent children it is more important to do a good job of APP's humanism, as shown in Table 6, APP to do for the user's satisfaction and user needs-oriented. This is also reflected in QQ's concern for its users, for example, the pop-ups on pages such as friends' anniversaries, reminders for friends' birthdays, and wishes for users' birthdays invariably bring users closer to the APP and bring them small surprises.

Forest Chemicals Review
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July-August 2022 Page No. 2597-2612
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5.2 The Prominence Of Independence And Interestingness.

Reducing the sense of supervision of users by parents and teachers, allowing only personal login for individual accounts, with the option of facial recognition or fingerprint or voice recognition, can both strengthen the user experience and protect privacy, highlighting the ease of use and usability of the app. The need for respect is particularly important in the Malos Hierarchy of Needs theory, and adolescent children themselves have a greater need to be encouraged and respected. The shift from assigning homework and supervising punch in to creating a mechanism of reward and punishment game that builds self-awareness through games that reverse the incentive for users to voluntarily share their learning.

Fig.6 THE FAMILY CARE APP

For example, Swift Playground , uses a 3D interface and chooses a level-based approach. In each level, all the user has to do is write and run code to get Byte to complete a given task. There are also 'inciting' words of encouragement when you succeed. The game style of learning reduces the tediousness of learning, and the leveling mode and inciting words of encouragement bring a sense of satisfaction to the user, helping to build positive feedback and affirmation, helping to build confidence and goodwill towards learning. For example, the interactive interface after the completion of memorising a word in Do not recite the words and Scallop English is designed in this way, using encouraging language to guide the user to the next learning session[13][14]. Icons can be cute, fun and easy to recognise patterns or simple, memorable signs, with a visual lead that matches the scene and a short text to show the way. Colourful images and scenes are more appealing to the user than boring text-based guidance. In addition, sound effects are also a good way to enhance the interestingness, for example, when clicking to start memorising words in 100 words，a chopping special effect sound will appear, which is very good to enhance the interestingness when memorizing words.

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5.3 The Embodiment Of Interactivity And Sociality.

Adding social features and establishing a relevant forum or discussion group model, which users can communicate with each other. Set up personal homepages to allow users to share their learning status, progress and experiences[15]. Support forum mode to ask questions and discuss with each other to answer questions , and help each other, such as the small group mode of 100 Words. Competition can also be introduced, such as the word duel mode in 100 words, which draws on the ranking and practice modes of rivalry games, allowing users to be matched to different users after entering the duel module, strengthening the interactivity of the app and enhancing social interaction between peers, which helps to build a sense of identity. You can also choose to match users who are studying together to reduce loneliness and create an atmosphere of learning together, for example, the function of friends in Scallop Words allows you to choose to invite or find your friend in the software to study with, which facilitates the establishment of a learning atmosphere and meets the user's need for companionship[16]. However, as the app has a social aspect， it is important that fraud and comments that are illegal or lead to cognitive bias in children are blocked and dealt with in a timely manner. Pop-up reminders or blocking should be used to prevent adolescent children from being scammed on the app when personal information and money transfers are detected between users.

5.4 The Emphasis On Functionality And Practicality.

The professionalism of the learning app is demanding, so the core is to be highly functional. The page setup should be enlarged to highlight the main functions, with the main and secondary pages separated for ease of operation and use. The overall framework should be considered to build and optimise the simple interface and interaction design. For example, the page design of 100 Words is simple and generous, with white as the main color and key areas displayed in blue, so that users can see the key functions at a glance in the page, without excess details forming interference, and users can focus on the main operation process, with following the principle of consistency and accuracy.The display of key content on the course is an important and very user-friendly design, and the ability to focus on reviewing the nodes users have marked is also a direction of the interactive page design.

5.5 The Increase Of Supervision And Control.

So it is also important to consider some of the requirements of parental supervision and make some interactive interfaces that meet the requirements of parental supervision features.

5.5.1 The use and disposal of hierarchy and simplification.

The page requirements on the parent side differ from those on the student side. In the research, ease of use was a factor of concern for many Users. Users preferred a parent-side with an easy-to-use interface and strong functional guidelines. The hierarchy of the app should be based on 2 to 4 levels, as parents have more business and will have less patience for the more purposeful the app is, so the fewer levels arechu better. To reduce the number of steps and complexity of operations, each function should be limited to 4 operations, easy to operate and the content modules are clear and easy to identify. The typography should be enhanced to improve the operability of the pages. The parental side needs to provide independent operation and editing functions, while reducing distracting visual effects in the interaction design and choosing colors with high saturation[17], high brightness and low color hues. The parental side does not need the app to be too interesting, it should be simple and clear, so the fonts of the interactive interface should be square and sharp in outline, not only the visual effect is high-class and simple, but also easy to identify. The functions should

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be fewer and more precise, and the icons should be more concise and easy to use[18]. The child's learning situation should be graphical, so that parents can see the data they want to know in the shortest possible time and atomatically analyse the child's situation and advise for parents. The form of interaction should also show simplicity and can be operated in a variety of ways such as direct operation, gesture operation and voice operation. Parents can use their fingers to manipulate the graphs in the interface. When parents enter the analysis details page, they can change the graphs in any format they wish to meet their needs in all aspects of their child's situation[19]. This allows for simpler operation while reducing the number of steps. For example, the data analysis for do not recite the Words and Scallop English is very comprehensive, with charts and tables, and the analysis of data is very intuitive[20]. This clear and easy to understand format can attract the user's attention and meet their needs for understanding and analysis of the situation.

5.5.2 The increase of communication in the parental intervention process.

Enhancing parent-to-parent interaction and communication between parents can analyse commonalities in children and share experiences with each other, which allow parents to better understand their child's psychological situation and the stage they are in[21]. For example, after registering on the Nano Box, you can interact with other parents on the platform, exchange learning and educational experiences and share ideas. You can also ask questions and wait for other parents to give you advice and solutions[22]. Communication with teachers should also be enhanced so that parents can have the most comprehensive approach to information.

VI. CONCLUSION

When dealing with adolescents, the main users, designers must start from the needs and experience of the users, analyse the main needs of the users and aim to improve users ‘ satisfaction. The design of the app should not only be based on functionality, but also on the users ’ aesthetic and emotional experience in the interactive interface, satisfying the users ‘ aesthetic and usage experience.Based on research and analysis, the study uses questionnaires, market research, psychological analysis and other ways to summarize the value of personalization, humanization, independence, interestingness, interactivity, socialisation, functionality, practicality and supervision for the study of visually led learning app interaction interfaces for adolescent children from the user's perspective. A methodology for the interaction design of visually guided learning mobile APP's is summarised. This study will provide some reference ideas for the design of the interactive interface of the visual guidance of learning app for adolescent children in the future. At the same time, while satisfying parents' involvement in the use of APP's by adolescent children, the learning APP's are better suited to the developmental characteristics of adolescent children and more effectively meet the functional attributes of such APP's used by adolescent children.

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