AI EDUCATOR

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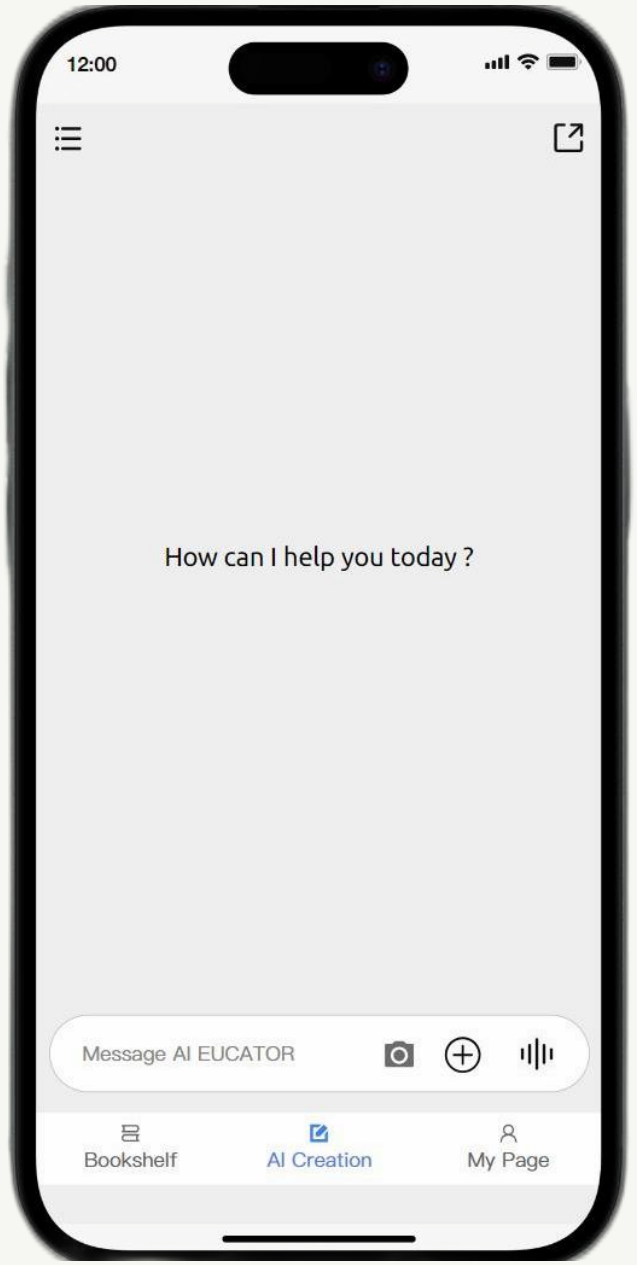
Mainly Contribution:



Introduction

0 Topics (Generative AI in X) :

The domain is **English language education**, specifically focusing on the teaching process of English reading comprehension in educational institutions.

a increasing workload

b birth rate growth

2 Relation to Human - Centric Computing:

The project takes HCC as its methodological cornerstone, constructing a "tools as extensions" human-computer collaboration through the path of "explicit identification of user needs → cognitive alignment of interaction design → value-added empowerment through technology".

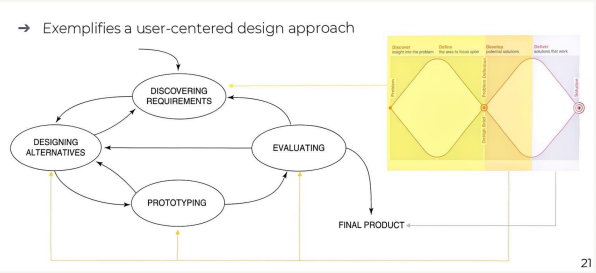


Fig 1 Iteration Design LIfecycle model

1 Specific Problem and its importance:

English teachers often face the challenge of creating high - quality reading comprehension questions. Manually generating such questions is a time - consuming task. Teachers need to search for appropriate reading materials, design questions that test different cognitive levels, and ensure the questions are relevant to the curriculum and the students' proficiency levels. This process can be extremely labor - intensive [1].

c keep up with the trend

Initial User Requirements

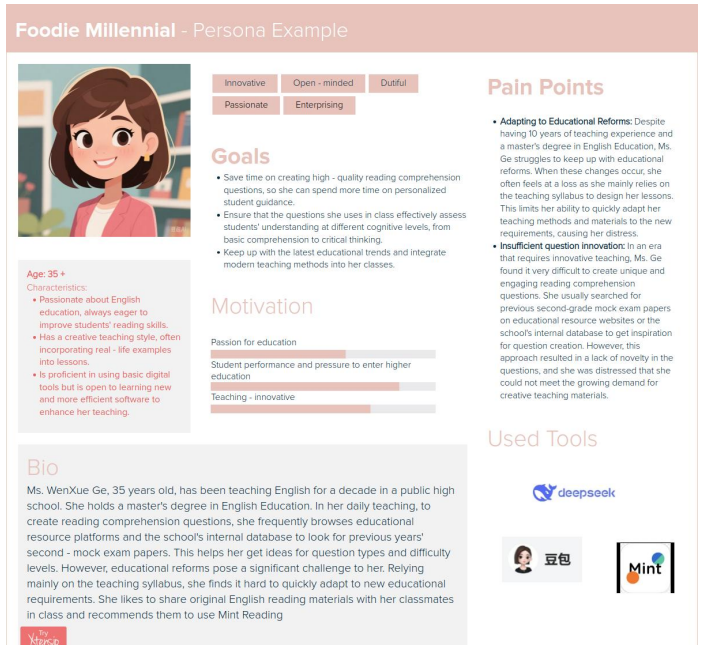


Fig 2 Persona About Wenxue Ge

User group characteristics

- High level of education
- Teaching needs-driven
- Pay attention to student feedback
- Different levels of acceptance of technology

Type of requirements

Content requirements

- English reading materials
- Different topics
- Different difficulty levels

Functional requirements

- Personalized questions Question analysis
- Hitory records
- Score statistics

Interface requirements

- Easy-to-use interface
- Reading materials and questions are clearly displayed

Evidence

We distributed **Questionnaire to 30 English teachers.** Most teachers believed the existing question - creation resources were **time - consuming. (Fig 3)**

When asked about the functions they most expected from a question creation software, they mainly chose the ability to set **different difficulty levels and various question types.(Fig 4)**

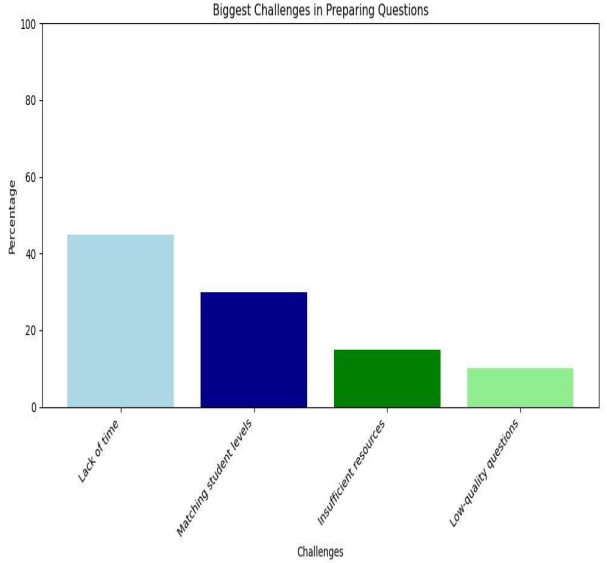


Fig 3 Challenges in Prepareing Questions

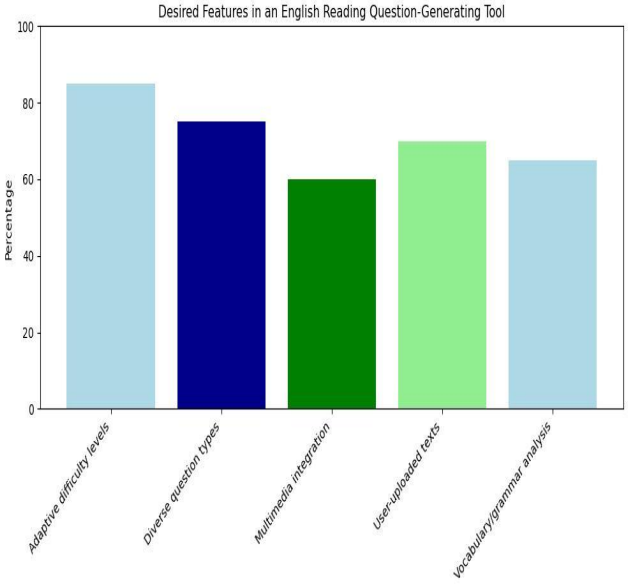


Fig 4 Desired Tools in AI Educator

Our findings are consistent with the viewpoints in the research paper [2]. This paper points out that the traditional method of manually creating reading comprehension questions is time - consuming and labor - intensive.

Design Principles

log in with check

Support voice input

Constraints

Accessibility

Visual consistency

Interactive feedback

Gray as main color

Continuously improve user needs

Prototyping

Menu Design

- Retain only the first - level menu at the bottom of the brief introduction.

Tools and Compatibility

- Use the Modao tool for prototype design.
- Compatible with both iOS and Android systems.

Function Breadth

- Implement both the generation and marking functions.

Function Depth

- Do not support listening, speaking, and writing functions currently.

Iteration	Function	Evaluation Methods
Iteration I	Drew layout sketches for key features; crafted flowcharts for main processes	Interview + Team Discussion
Iteration II	Designed bookshelf, "My", and AI creation pages; no Q&A, popular or recommended features	Questionnaire + Cognitive Walkthrough
Iteration III	Implemented login , favorites, enhanced bookshelf, Q&A, history, popular & recommended features	User Walkthrough + Heuristic Sharing
Iteration IV	Added sharing, login confirmation, AI marking, voice input functions	Experimental Design

Fig 5 Four iterations comparison

Trade -off

Functional completeness and development difficulty :

- **Original Plan:** Use complex algorithms to set questions accurately, considering multi-dimensional data
- **Prototype stage Adjustment:** set questions only based on the word count of reading materials and question types

Interface Design and User Experience :

- **Design Approach:** Adopt a mature interface layout mode to speed up the design process.
- **Visuals and Operation:** lack novelty to help users quickly get familiar with the operation process.
- **Interaction Effects:** Retain basic interactive effects while omitting complex animation effects.

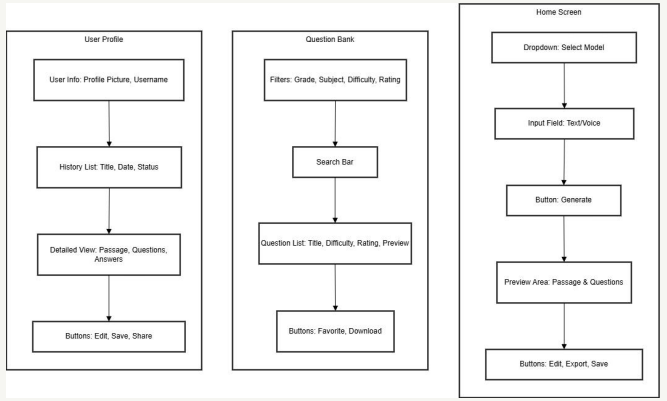


Fig 6 Iteration 1 of the prototype

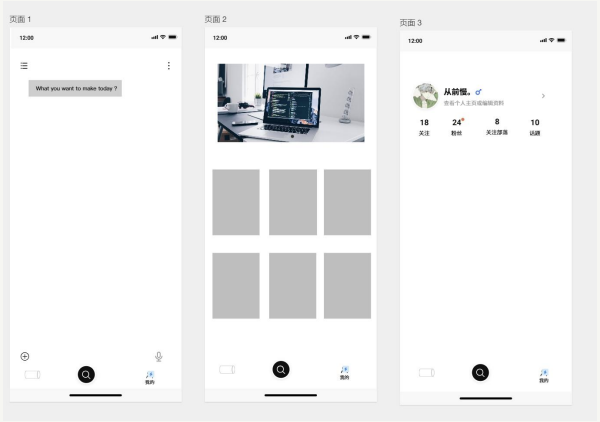


Fig 7 Iteration 2 of the prototype

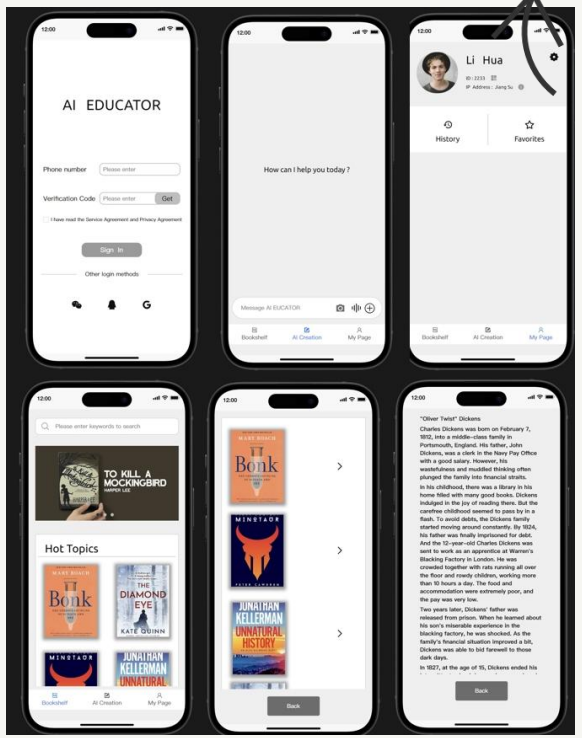


Fig 8 Iteration 3 of the prototype

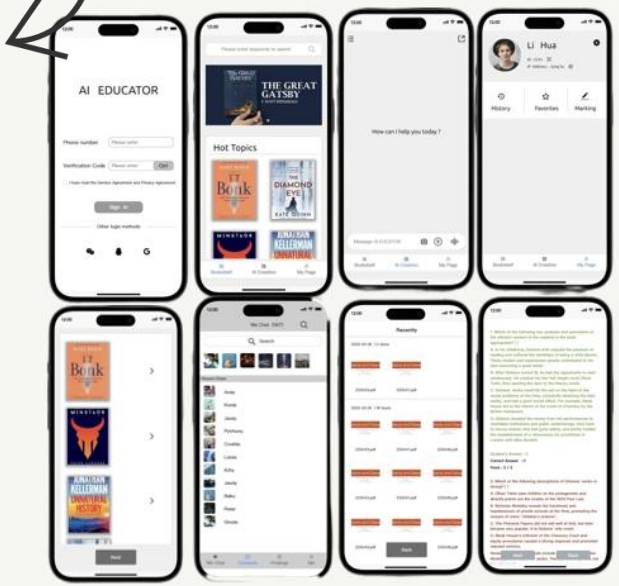


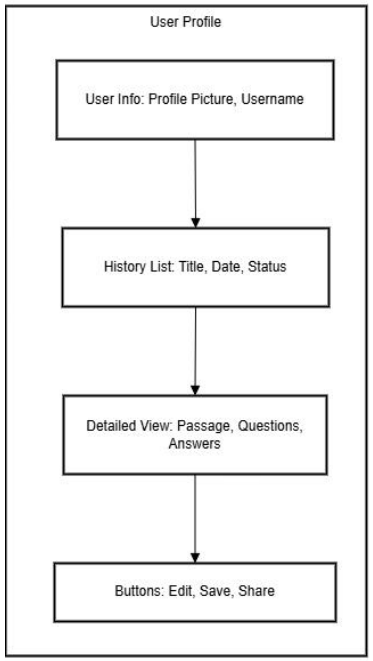
Fig 9 Iteration 4 of the prototype

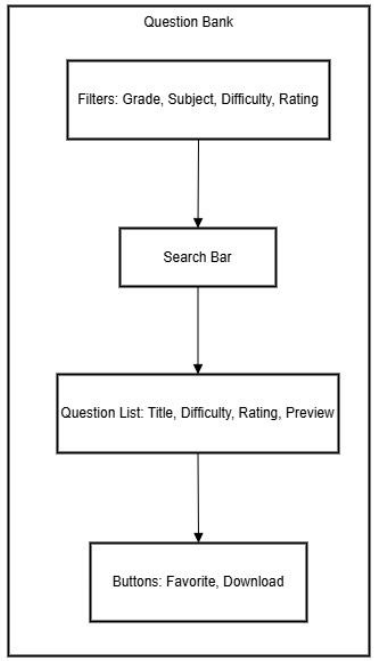
Iteration 1

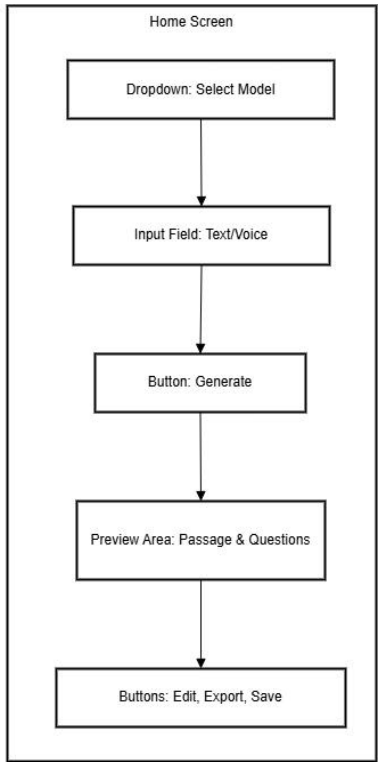
My contribution: Writing prototypes and participating in group interviews and evaluations

User issues :

- Unclear operation process of the tool
- Doubts about the technical implementation method







Prototyping Reasons :

- Quickly present the core concepts
- Reduce the cost of trial and error
- Focus on user needs

Evaluation (Interviews) :

Interview Process

- **Task Explanation:** Provide high school English teachers with detailed information about the evaluation task to assess the flowchart in the sketch.
- **Independent Review:** Give teachers sufficient time to review the flowchart design alone.
- **Questioning Session:**
  - How does the user management page distinguish users with different permissions?
  - Can the bookshelf function classify and organize materials according to students' learning progress?
  - Does the operation of the creation page meet the needs of the teaching scene?

Discussion and Analysis

- **Analysis Dimensions:** Analyze from multiple dimensions, including actual teaching needs, user operation convenience, and product implementation feasibility.

Final Conclusions

- **Determination of Important Pages:** Confirm that the three interactive pages of user management, bookshelf, and creation are indispensable and crucial parts of the product.

Key Insights

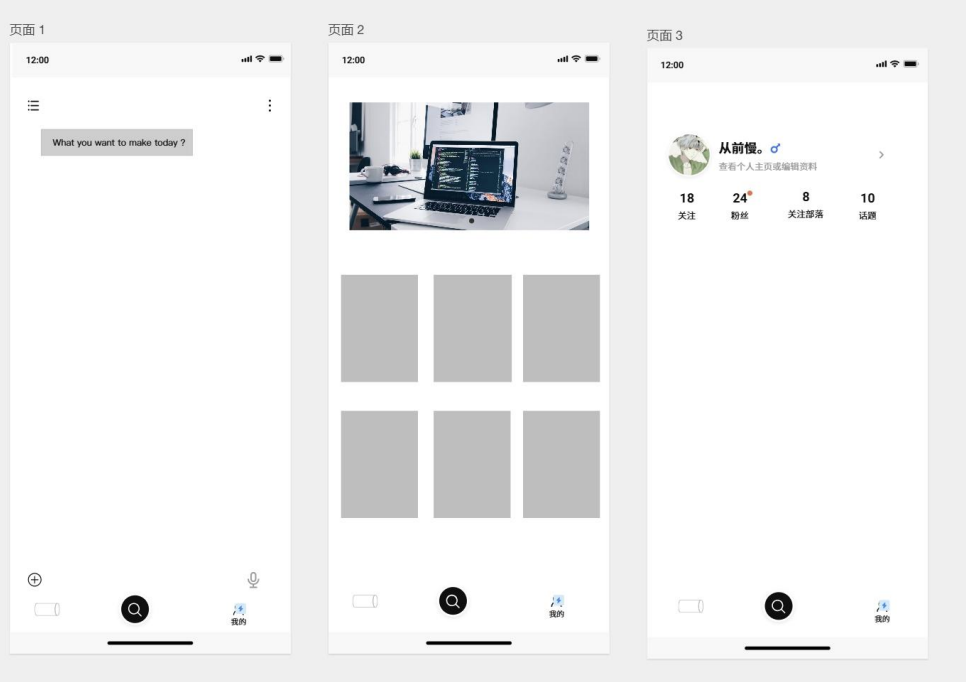
Area	Feedback
Current Feedback	Teachers expect the bookshelf to have a search function, enabling quick filtering and organizing of materials according to teaching stages, student characteristics, etc., and achieving multi - dimensional classification and retrieval.
Next - Iteration Improvement Expectation	Add a visual interface to make material management and searching more intuitive and convenient.

Iteration 2

My contribution: Writing prototypes , Drawing up a questionnaire and visualize the received data.

User issues :

- Difficulty in intuitively understanding the actual user experience just from the flowchart
- Flowchart Architecture Limitations
- Ambiguity regarding whether to target computers or mobile phones.



Prototyping Reasons :

- Graphic design intuitively displays divergent user thinking
- Subjectively believe that mobile apps are more suitable for teachers to use interactively

Evaluation (Questionnaire + Cognitive Walkthrough) :

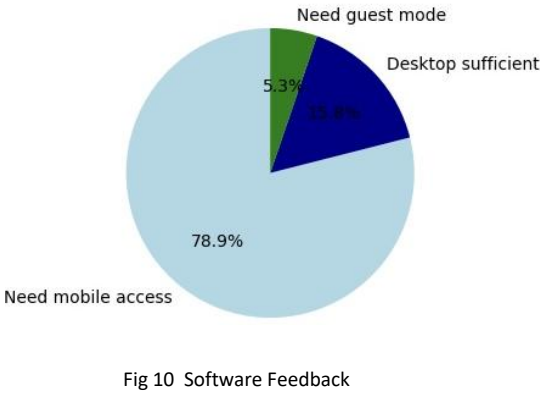


Fig 10 Software Feedback

Questionnaire

Survey Basics

- Sample Size: 30 samples were selected for the questionnaire survey.

Survey Content

- Focused on collecting users' preferences for product usage platforms (APP or Web) through carefully designed questions.

Survey Results

- The results clearly indicated that users prefer to use the APP side.

Cognitive Walkthrough Identified Issues

Visual Design Issues

- The page predominantly uses white as the color, and transparent icons are difficult to locate, resulting in poor visual consistency.

Functional Design Issues

- The user management page contains excessive content. As it is not a social media application, only historical records and a collection function are required.

Key Insights

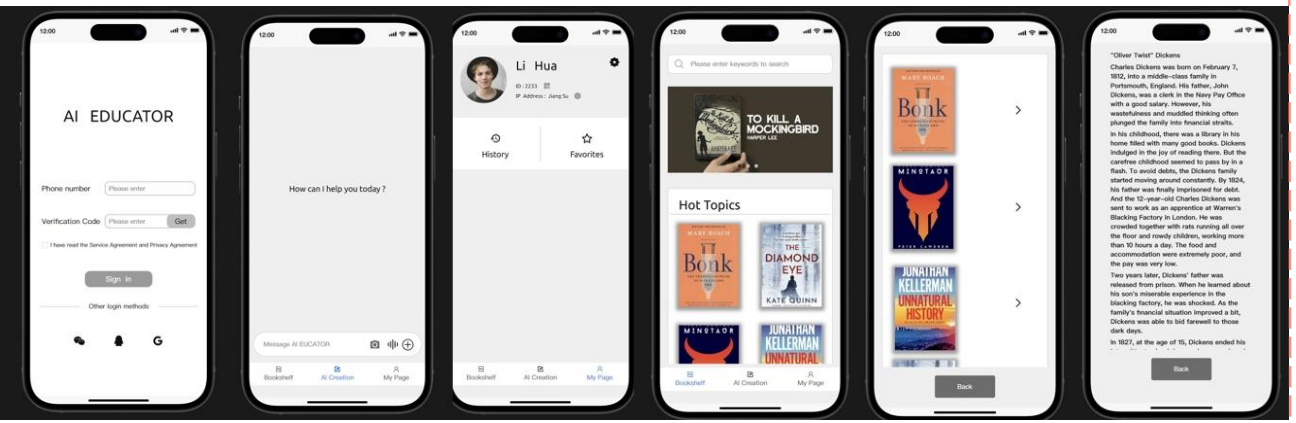
Area	Feedback
Interface Design	In the graphic design, the pages predominantly in white and the transparent icons lead to poor visual consistency, making it difficult to identify functional elements. It is necessary to adjust the color scheme and icon design to enhance visual unity and element recognizability.
Interaction Operation	The user management page has redundant content. It is recommended to simplify the operation process, integrate functional entrances, and streamline the user management page, keeping only the history and favorites functions.
Platform Selection	Users prefer the APP version. Subsequent development should focus on the APP to fully leverage its portability advantages.

Iteration 3

My contribution: Writing prototypes and Do heuristic analysis.

User issues :

- The difficulty that users can perceive, understand, and discover for interactive interface icons



Prototyping Reasons :

- Refer to the bookshelf interface of Mint Reading, the creation interface of Deepseek, and the user management interface of Xiaohongshu to ensure that using books is simple and easy
- Realize user interaction to facilitate user perception and subsequent simulation evaluation testing

Evaluation (Heuristic analysis + User Walkthrough) :

Heuristic analysis

- ✓ Languages familiar to users
- ✓ A one-click option to return to the creation interface
- ✓ The overall visual style is simple and consistent.
- ■ **Shortcomings :** Firstly, an effective error handling mechanism is lacking. Secondly, the accessibility is suboptimal. The needs of special user groups (such as people with disabilities) have not been fully considered.

User Walkthrough

- **Task :** Write an article you like and obtain an article of interest from the bookshelf.
- **Search Function Usage Issues:** When using the search function to find learning materials, some users repeatedly tried different keywords due to the absence of expected results.
- **User Feedback :** Users generally reported that they occasionally operated other function buttons by mistake during the creation process and hoped for

Key Insights

Area	Feedback
System Function Design	Strengthening barrier-free functions can not only meet the needs of special groups, but also expand the user coverage. At present, there is a lack of effective error handling mechanism, and it is necessary to ensure the security of user information and comply with relevant laws.
Continuous Improvement	Consider additional user functions.

Iteration 4

My contribution: Writing prototypes and independently complete experiments, data collection, analysis and evaluation.

User issues :

Function Operation Difficulties

- Users could be unfamiliar with uploading answers for the whole class when using the homework - correction function.

Time Management Difficulties

- Users may struggle to balance the time spent on different product functions. Teachers might still find it hard to reduce time wasted on repetitive and tedious tasks, preventing them from fully focusing on core teaching activities.

Difficulties in Adapting to the Closed - loop Function

- Users could be confused about how to utilize product functions to achieve effective closed - loop operations in homework management and teaching feedback, or experience inconvenience when switching between different links.

Difficulties in Meeting Personalized Needs

- Given the diverse learning characteristics and requirements of different students, the product may fail to fully adapt to these varied needs, which in turn impacts students' learning outcomes and teachers' teaching results.

Prototyping Reasons :

- AI grading reduces the burden of writing feedback for teachers, allowing teachers to spend more time on teaching design and student tutoring.
- Through sharing, users can communicate and discuss with each other, enhancing user interaction.
- The login verification mechanism maintains the user's right to know and complies with local laws.

Evaluation (Experimental design) :

Purpose : Use F test to analyze user satisfaction with the project.
Experimental hypothesis : Users are basically satisfied with the project.
Sample : 30 users from 4 different schools between 25 and 55 years old
Experimental process :

- Users sign a consent form to clarify the data collection and use methods involved in the experiment.
- Users conduct a 10-minute unguided experience to freely explore the various functions of the project and simulate real-life usage scenarios.
- After the unguided experience, provide users with a video presentation to introduce some key functions and users continue to experience the project for 10 minutes to further familiarize themselves with the functions .
- Users rate the content interaction, core questions, and auxiliary functions of the project on a scale of 0-10, with 0 indicating very dissatisfied and 10 indicating very satisfied.

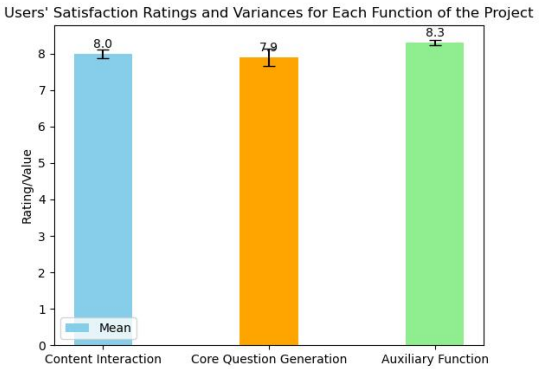
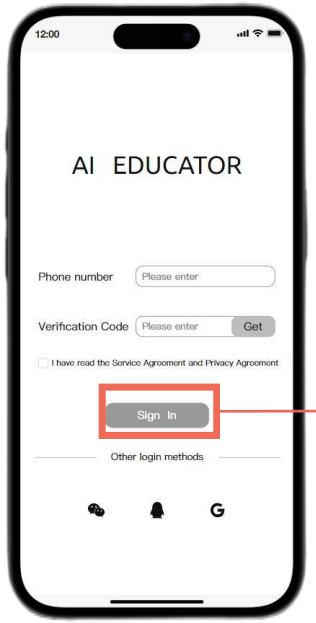


Fig 11 Uses' Satisfaction Rate

Results :

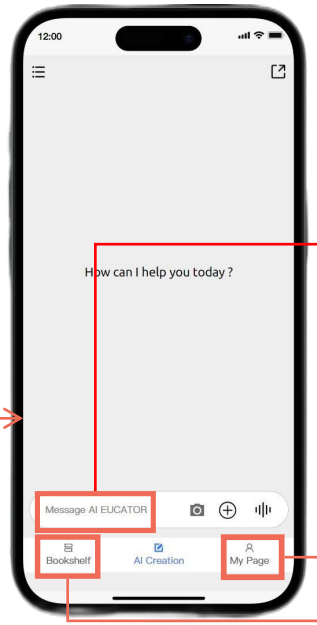
- The experimental results show that the mean score of each function is around 8, and the variance is very small.
- This shows that users are generally satisfied with the project, and the evaluations among users are relatively consistent.

Iteration 4 Showcase



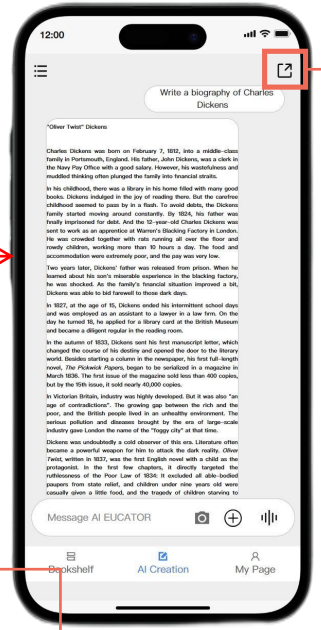
0

Click Login from the login interface to enter the creation interface



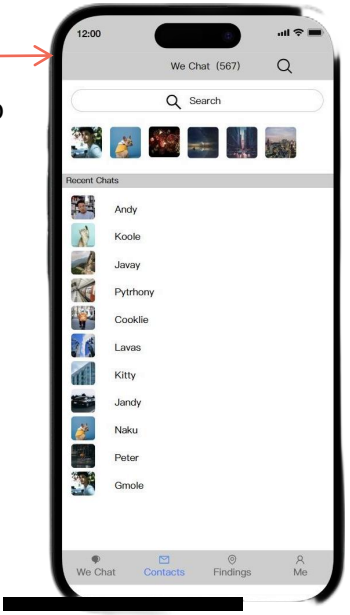
1

Enter text in the dialog box to create English reading



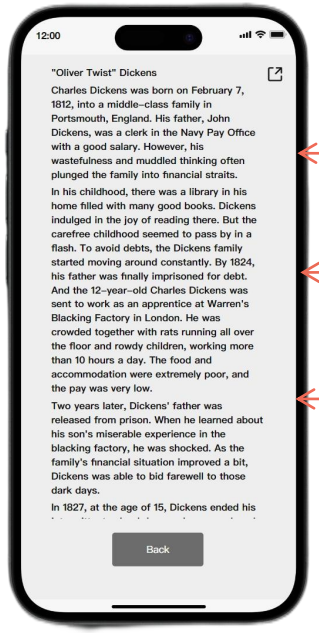
2

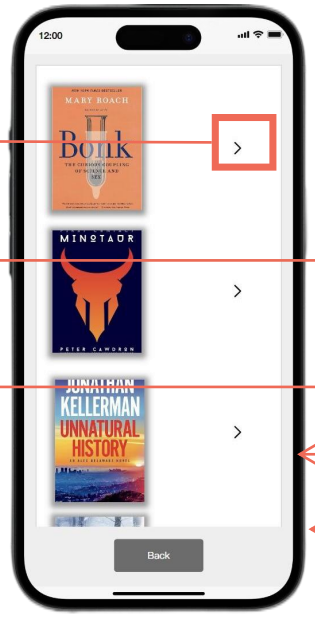
Click Share to jump to the WeChat interface and share with friends



3

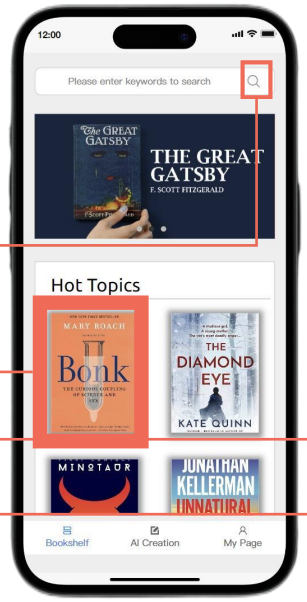
Click on the bookshelf and my page in the navigation bar to jump

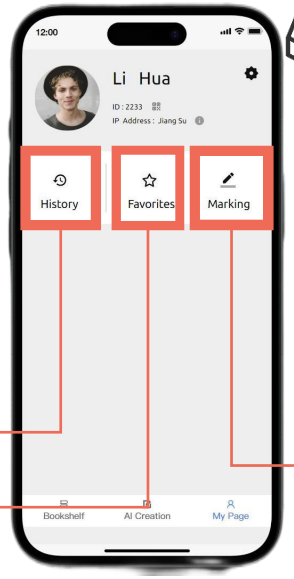




5

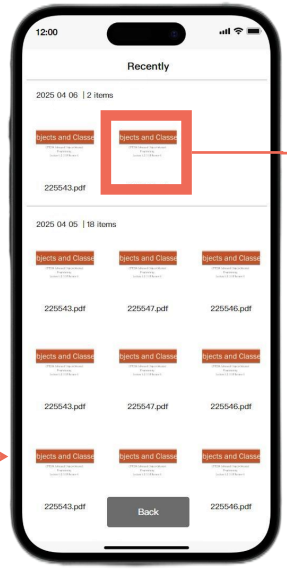
Click History/ Collection/Co ntent Search to jump to the topic you want to view

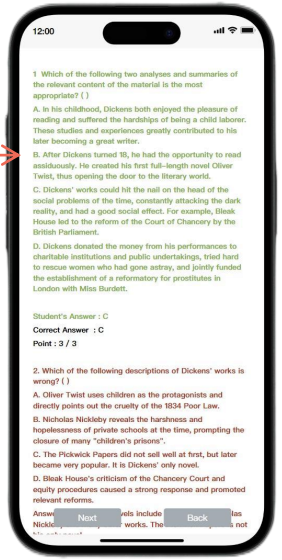




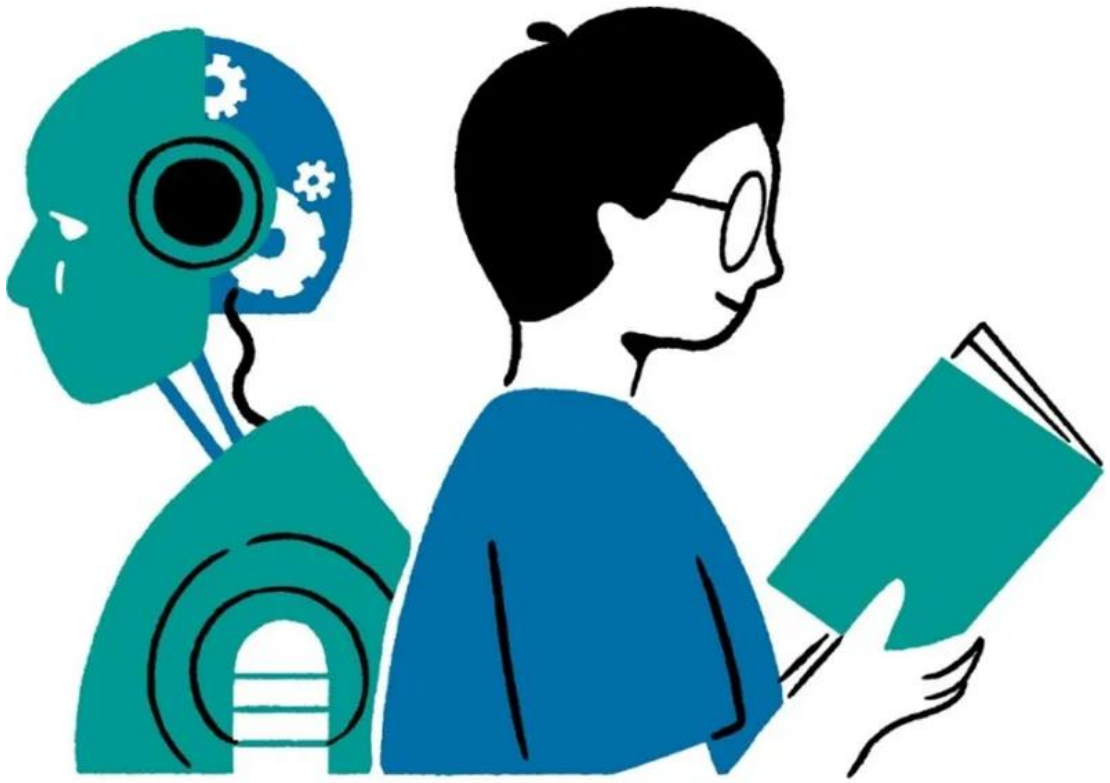
4

Click on the rating to jump to the interface for reviewing and correcting files. Click on any document for automatic rating.





Conclusions



Our app now offers essential features such as secure login, a functional bookshelf, and basic content generation. These features have provided users with a starting point for efficient study and content management, addressing initial user needs like access control and resource organization.

However, the question - answering module's accuracy remains inconsistent, often providing subpar answers. The customization options, though present, lack finesse in truly tailoring to diverse user preferences. Also, the app's performance can be sluggish, especially when handling large reading materials.

In the future, we aim to enhance the question and use deepseek api to realize a true prototype.

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