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Original Paper

The Design and Implementation of Personalized Learning Platform Based on Android

Qiaoying Ming[1*]

[1] School of Information Engineering, Xi'an FanYi University, Xi'an, Shaanxi, China

[*] Corresponding author, E-mail: 184072575@qq.com

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Abstract

Through an investigation and analysis of learning platforms, the author designed and implemented the personalized learning platform based on Android, adhering to the design principles. The platform is customized to learners' learning styles and ubiquitous learning. Learners may receive personalized recommendations from the platform and get optimized user experience, which in turn enhances learners' motive and efficiency in learning and supports teachers' teaching.

Keywords

Learning Style, Platform Design, Platform Implementation

1. Introduction

As an important branch of Digital Learning, mobile learning has attracted extensive attention, becoming the hot research subject in the filed of education. Mobile learning platform is targeted at portable mobile devices and the mobile learning protocol based on wireless internet, which stresses the portable fragmented learning that may happen anytime, anywhere. The system supports users' implementation of distance teaching and learning through mobile devices, which means educators may check up the feedback and evaluation of learners' learning state (Chen & Wang, 2021). Based on Android platform, this article explores the design and implementation of personalized learning platform.

1.1 Platform Architecture

Android platform adopts open license and authorization, using Java in the development of language. The system architecture contains application layer, application architecture layer, system runtime library and operating environment layer, Linux kernel layer. The common class library and structure of

Java can be used in the development and implementation of Android applications (Qiu, Zhang, Luo et al., 2020; Ahmed & Sallow, 2017).

1.2 Learning Style

Learning style refers to the preference for specific categories of learning resources manifested in the course of learning. Learning style affects learners' selection of learning resources, accordingly, the study of learning's learning style is indispensable in the research on learning platform. The system screens and sort learning resources in light of learner's learning styles to recommend the most suitable learning resources to learners, which not only enhances learners' learning efficiency but also personalizes the learning platform.

2. Design Principle

2.1 The Principle of Education

The platform and learning resources are designed for students' learning. Therefore, to better achieve teaching objectives, the designing procedure must follow the principle of education. Students utilize learning platform to access the learning resources that serve their learning, gain satisfactory learning experience, finally , improving the learning quality and attaining teaching objectives.

2.2 The Principle of Scientificity

The development and demonstration of learning resources should follow the principle of scientificity, which entails the strict designing ethic and the in-depth probe into the content of subject curriculum to make the learning resources more scientific, accurate, applicable, concise and intuitive, conforming to students' needs and scientific cognition.

2.3 The Principle of Convenience

The navigation of learning platform should be explicit and operable, avoiding a large number of input operation, to guarantee the accuracy of the prompt and the response or feedback to each operation (Hong & Hwang, 2020; Sahara & Ranggadara, 2018), to ensure that users may study consistently on different terminal equipment and mobile devices.

2.4 The Principle of Individualized Teaching

The mobile learning platform embeds the categories learning styles into platform design perfectly. Students can select different categories of learning resources according to their personal preferences, satisfying the learning needs to the maximum extent, embodying the platform's principle of individualized teaching (Walkington & Bernacki, 2020).

3. The Platform Design

3.1 The Design of Platform Function Module

As is shown in figure 1, the function module of the mobile learning system can be divided into front-end module and back-end module. The front-end module is learner-oriented, comprising personal center, personalized recommendations and the curriculum studies. Learners can check and edit personal

information and configure the style of learning interface, as well as reviewing the course material they collected and the learning credits or deleting the collected course material. The contents of personalized recommendation may be learners' favorite material, hot courses, latest curriculum based on learners' learning style. After clicking the course learning interface, learners' enter the selection interface of relevant course. After course selection, learners can see the corresponding course description and learning resources. Learning resources generally fall into two categories, one is the general learning material, the other is the learning material customized in accordance with learners' learning style classification. For instance, learners without particular requirements for learning materials may select conventional resources in learning. If the learner excel at practical hands-on skills, he or she may select the kinesthetic type of course; for learners with acute hearing sensitivity, he or she may select the auditory material in learning. The classification of course resources based on learning styles is demonstrated in Table 1 (Shemshack, 2020).

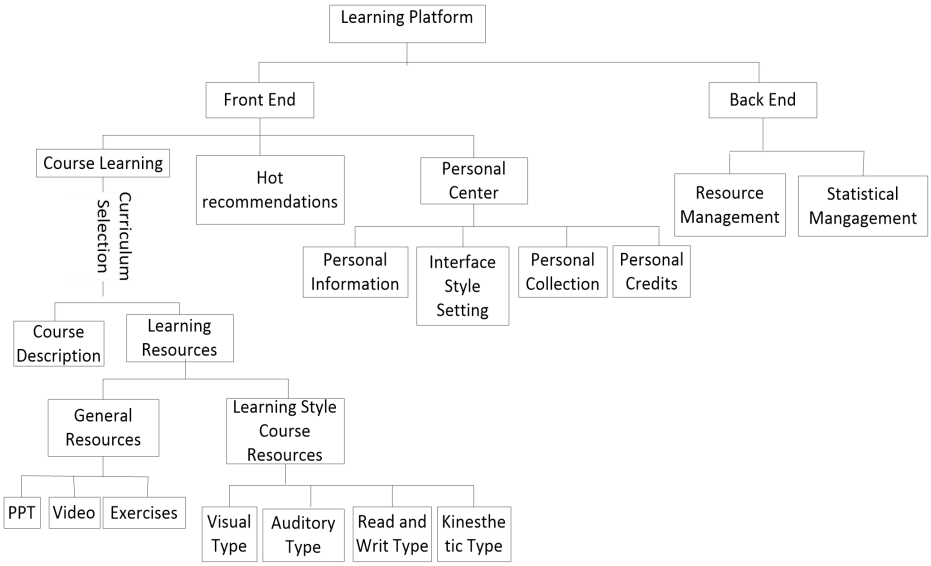

Figure 1. The Function Module of Learning Platform

Table 1. The Categories of Learning Resources Based on Learning Style

Learning Style	Characteristics	Categories of Learning resources
Visual Type	Having keen observation and inclination to gain information from visual stimuli like animation or videos.	Animation, Video, Picture
Auditory Type	Inclined to learn through listening, having the preference over auditory stimuli like audio and oral interpretation.	Audio, oral interpretation

Read and Write Type	Having preference over text reading and writing, obtaining the optimal learning effect through the application of words.	Writing, rote learning
Kinesthetic Type	Having preference over hands-on practice and learning by doing.	Hands-on practice, rule-inference

The back-end module is administrator-oriented, including resource management, message management and statistical management. Resource management is designed for the management of course resources, realizing functions such as the uploading or removal, and the release of course information; in addition, it is also designed for user information management, such as the review or removal of users' registration information. Message management administrates the information push and the reply to messages; Statistical management is mainly used to generate a statistical overview of the utilization of platform resources, aggregate students' learning records and analyze students' learning effect.

3.2 The Design of Platform Dynamic Model

The dynamic model is mainly used to represent system behavior. The dynamic model of mobile learning platform has been constructed in line with the system function module, as is shown in figure 2. From figure 2, it is evident that system clients fall into two categories, one being the registered regular users, the other being new users. After logging in the system, regular users may proceed with learning and sets personal style (Dong, 2021), as well as browsing and learning the hot curriculum, latest curriculum and the curriculum matching their personal style and interest, recommended by the learning system. New users may annotate the content of interest and fill in the course they would take in registration (Hang & Kim, 2019). Registered users who log in for the first time may learn the curriculum and set personal style like regular users, moreover, the system may recommend the contents corresponding to the course they selected and the content they annotated, which certainly include the hot curriculum and latest curriculum, to ensure the good user experience. If users select the curriculum not included in the previous courses, the administrator will receive system notification of course content addition, meanwhile, users will receive system notification of the update time of required curriculum, which not only enrich the course content of the entire system, but also satisfy different users' individual needs, finally enriching the online learning resources and making targeted recommendation.

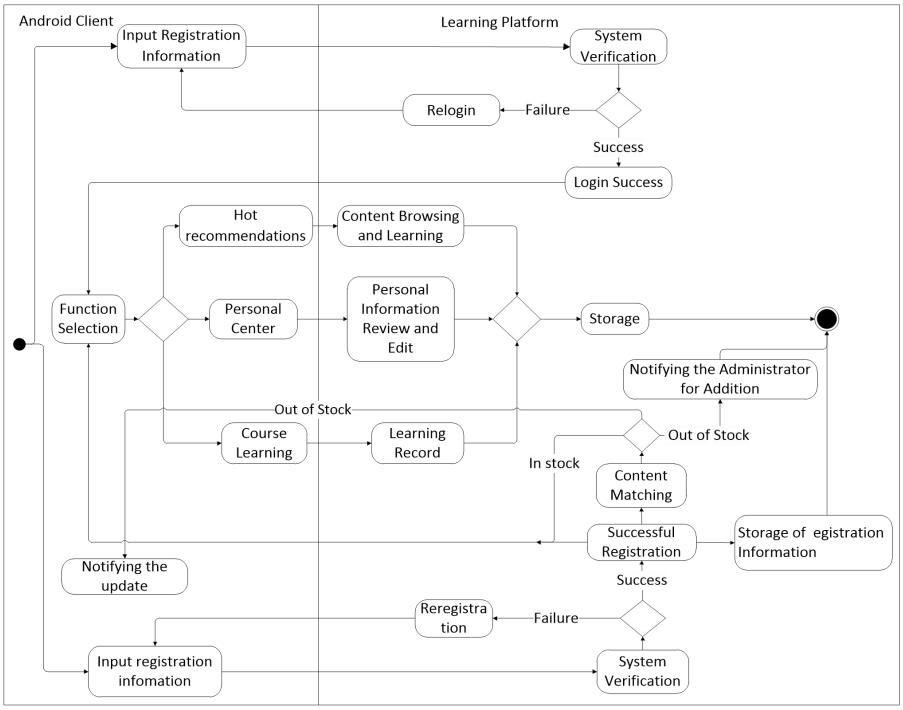

Figure 2. The Dynamic Model of Mobile Learning Platform

4. Platform Implementation

4.1 Initial Interface Implementation

Allowing for the individual differences of platform users, to make users concentrate on learning, the user interface is simplified to the maximum degree, to build the minimalist and user-friendly mobile operating learning platform. The platform will present the introduction of itself in the first installation and use, to adapt users to the platform smoothly (Junaidi, Irviani, Muslihudin et al., 2018).

4.2 Administrator Module Implementation

Administrator has the highest authority in the management of learning platform . The administration authority is not limited to the management of platform resources and messages, administrators also have moderator authority, which includes access authorization, to handle platform transactions in an effective and comprehensive way and ensure the healthy operation of the mobile learning platform (Novaliendry, Darmi, Hendriyani et al., 2020).

5. Conclusion

With the development of the internet technology and the popularization of smart terminals, more and more learners choose to use mobile learning platform in their learning. Mobile learning platform afford learners the freedom in selecting the space and time for learning, which enables learners to make timely adjustments to their learning plan, making classroom teaching more flexible. This research introduces personalized learning into mobile learning system, which makes active information push one of the

important functions of the system, providing valuable reference for better recommendations of mobile learning resources, strengthening the optimization of mobile platform functions and extending the range of application through constant amelioration.

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