The Construction of Problem-based Learning and Communication Platform

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Abstract. Based on the investigation and survey of the existing communication platforms, aided by modern information technologies, this article constructs the problem-based learning and communication platform with user-friendly interface and straightforward operation. The primary functions of the platform include: user’s questioning and answering, sharing materials and resources related to the problem, releasing new professional knowledge of the industry, the domain-specific categorization of problems etc. The application of the platform achieves the real-time unlimited interaction and exchange between teachers, students and industry experts, inspiring learners motivations and initiative, enhancing learner’s problem-solving capabilities.

Keywords: Platform Analysis, Designing Principles, Platform Design

1. Introduction
Along with the rapid development of Internet, drastic changes are taking place in people’s modes of communication. Learners’ communication and exchange in learning are no longer limited to a single class, a specific specialty, a specific grade or an institute, therefore, the construction of a platform for learning and communication which provides services such as open-ended questions and discussions can enhance the learning effect maximally. Via the platform, learners can exchange their views, technologies, sharing experiences and enlightenment, also seeking learning assistance. The learning and communication platform realizes the on-line information transmission, creating the appropriate atmosphere for communication, which makes communications more convenient and improves learners’ learning efficiency.

2. The Survey and Analysis of Existing Communication Platforms
As is shown in the Table 1, the survey of existing mainstream communication platforms (QQ, BBS, Blog, SNS) and the corresponding contrastive analysis leads to the following conclusions [1].
Table 1. The contrastive analysis of existing platforms

| Platform/Tool                  | Major Functions and Features                                      | Defects                                      |
|-------------------------------|-------------------------------------------------------------------|----------------------------------------------|
| Instant Messaging Tool, QQ    | Equal, instant and anonymous communication, creation of groups    | Disorderly communication, unmanageable organization and management |
| Forum, BBS                    | Open-ended topics, the participation spanning time and space       | Unsuitable for time-limited discussion       |
| Blog/Virtual Space            | Management taking content as clue, quality reliant on publisher’s attitude | Insufficient support for communication       |
| SNS, Social Platform (WeChat, facebook etc.) | User-centered, taking user relationship as clue, remarkable communication effects | Disorderly, complex and diverse communication content, multiple interference |

3. The Analysis of Learning and Communication Platform

3.1 The Development of Learning and Communication Platform and its Operating Environment

To realize the convenient operation and maintenance and the speedy presentation of resources, to make the operation and usage more concise, the basic function of the platform adopts the server language of the PHP+MySQL database and the client interactive function of the platform is realized via JavaScript and JQuery script language [2].

Personal preferences and learning needs are the behavior factors of user’s communication on the platform, accordingly, learners communicative behaviors on the platform shapes up the communication environment. Therefore, rules need to be established for the learning and communication platform to guide and restrict peoples behaviors. The establishment of rules build up favorable communication environment through the selection and screening of resources and information and the reward and punishment of certain behaviors. The bidirectional reaction between these factors delineates the mutual influence between the individual learner and the environment, and the changes induced thereby. Illustrated in figure 1.

Learners, teachers and experts can join the platform via mobile internet technology such as WeChat official account and WeChat applets [3].

![Figure 1. The Tripartite in Network Communication](image)

3.2 The Analysis of the Core Application Model of the Learning and Communication Platform

The PBL model is the problem-based learning in which problem-solving is achieved through learner’s search of relevant knowledge or cooperation and discussion with others. PBL learning model is conducive not only to the improvement of learner’s problem-solving capabilities, but also to the development of learner’s advanced thinking skills and the cultivation of learner’s team spirit and teamwork ability.

The platform has at its core problems which are categorized and store according to specific specialty and industry. Learners, teachers and industry experts can raise and answer questions and comment upon or approve of reasonable answers. Besides, teachers and industry experts can release videos, cases relevant to the problem or provide new knowledge, new advancements and new trends in
the professional industry, which may contribute to problem-solving [4]. The application model is illustrated in figure 2:

![Application Model Diagram]

**Figure 2.** The application model

### 4. The Design of Learning and Communication Platform

#### 4.1 The Design Principles for the Learning and Communication Platform

This learning and communication platform is the network learning platform synthesizing user’s collaboration, resource management and sharing, which also provide services for learner’s knowledge exchange, independent learning and social learning, to improve the knowledge level and abilities of learners. The design and development of the platform should adhere to the following principles:

#### 4.1.1 The Principle of Convenient Interaction

The interaction between users and platform requires user-friendly interface and simple manipulated functions, using prompts and guides to enhance accessibility. Moreover, real-time and non-real-time interactive tools are devised to satisfy the communication needs in the interaction between users.

#### 4.1.2 The Principle of Evaluation and Motivation

Evaluation tools are essential to the platform since the evaluation of the questions raised and the corresponding answers is beneficial to the maintenance of a favorable environment in the learning and communication platform, playing a positive role in the regulation and quality of network learning, also enhancing learner’s ability to discriminate between entities and concepts. Similarly, motivation is the prerequisite in learning and the necessary measure that facilitates knowledge sharing. Therefore, users should be motivated to raise, answer and evaluate questions, which will be realized via point management and the appropriate incentive mechanism.

#### 4.1.3 The Principle of Dynamicity and Maintainability

The content and theme of the platform varies constantly with user’s ever-changing needs and the learning resources need to be updated at any time. The platform should be able to add, delete, modify and integrate resources conveniently, meanwhile, in accordance with user’s needs, updating basic elements such as the function module and column setting timely.

#### 4.1.4 The Principle of Openness

The openness of the platform is manifested as the openness of the users in the communication and the openness of resources. The openness of users refers to the different cultural backgrounds of the
participants in communication and the openness of resources lies in the fact that participants can download or supplement resources at any time.

4.2 The Design of the Functional Structure of the Learning and Communication Platform

Figure 3 is the illustration of the functional structure of the learning and communication platform [5]. After logging in the personal space on the platform, users can browse questions, play videos, get access to data or even collect and store data. Users can also check up their points, the record of their questions, their answers to and review of others’ questions, as well as others’ review of their own comments and answers. Users can also modify their personal information, reset the favorite interface style, message their friends etc. [6, 7]. In the user management module, the administrator has the highest authority, who manage users and administrators at the lower level. The release review module prevent the platform access of harmful videos, questions, answers and materials [8, 9]. The classification management module give administrator permission to modify, delete comments and points, or even the questions and materials in the categories of specific disciplines and specialties. The system maintenance module allows system administrator to revise columns and release announcements and notifications etc.

4.3. The Design of Reward Mechanism

The registered users who have access to the platform can earn points by raising and answering questions, posting materials. Likewise, users get bonus points through the evaluation of other users’ questions and materials. After accumulating points in a given period, users can also redeem different prizes with the system administrator according to the ranking of points and the points will be reset afterwards.

5. Conclusion

Exploiting modern information technology in the revolution of learning style and the amelioration of learning resources is the inexorable trend in education’s future development. The problem-based learning and communication platform acquaints learners with the utilization of tools in creative learning, fully eliciting learner’s initiative and exploratory curiosity, thus prompting the development of learner’s practice ability, enhancing their problem-solving abilities. The learning and
communication platform extends the classroom teaching and discussion to extracurricular network learning, spanning the temporal and spatial barriers, finally, realizing the all-round exchange and communication between teachers, students and professionals.

For a platform, the development, change and usage run in parallel, so long as the platform is still in operation, it needs constant maintenance and amelioration [10], therefore, the author will further devise the follow-up, updating and maintenance mechanisms for the platform.

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