Development and Application of Computer-Aided Innovative Learning Mode of Undergraduate Entrepreneurship

Xinhao Ji
Zhejiang Business College, Hangzhou, China
East China Normal University, Shanghai, China
jxh@zjbc.edu.cn

Abstract—This paper gives the related definitions of online school-based mode of research and teaching, on the basis of which the detailed activities are designed, including online lecture preparation, lecture evaluation, collective discussion and subject-oriented collaboration, obtaining of online resources and displaying of results for research and teaching. After determining the forms of online activities of research and teaching, the procedures were further explored and discussed. In combination with its own characteristics of school-based online mode of teaching and research, the practical procedures of activities were given for future reference.

1　Introduction

Currently, the construction of educational network has made great progress, which especially allows teachers in remote or rural districts to have significantly improved online teaching and research [1-2]. They can actively discuss educational ideas or existing problems in the teaching processes through the Internet with teachers, experts and educationalists working in urban regions or with national organizations, through which they are capable of obtaining advanced ideas and practical teaching experience. Ultimately, the capabilities of teaching and research of teachers at elementary and middle school levels will be improved, with their level of professionalization raised which will help them to become not only educators but also educational researchers.

The teachers' professional development directly influences the changes of their teaching modes, and eventually the curriculum reform conducted by educational departments [3]. However, the traditional activities of teaching and research cannot provide more opportunities of learning due to limited space. In contrast, the online

mode of teaching and research allows teachers to flexibly absorb the teaching experience and professional knowledge from the regular teaching operations, and aided by advanced educational theories makes [4-5] it possible for them to interact with their counterparts concerning difficulties in the curriculum and the corresponding countermeasures through the Internet. Then, the obtained theories, knowledge and experience can be applied to the actual teaching practice, which can boost the qualities of teaching, improve the environment of teaching and ultimately promote the development of the overall educational system.

The traditional mode of research and teaching still exist in the educational realm. The online mode of teaching and research has not yet been well understood or received. Relevant educational departments, schools or teachers lack the online environments for research and teaching [6-8]. For example, the superior educational departments have not provided the online virtual platform for teaching and research as well as the supporting facilities, which makes it harder for teachers in the actual classrooms to obtain the corresponding services. In some cases, the online platform for research and teaching is only used for resource databases, without enough restraints on activities or evaluation standards. It is not well thought out and has not solved the issue of in-depth interaction and still remains at the preliminary stage.

Above all, the traditional school-based mode of teaching and research focuses on analyzing, researching and solving problems in the process of teaching. Additionally, organizing of teaching-and-researching activities is relatively convenient in the traditional way. However, since only a limited number of teachers can participate in activities held by the school with which these teachers are affiliated, there is a possibility that no guidance from experts can be offered to them. With the quickening of steps of information and technology sweeping into schools and universities, creating an online environment on the basis of previous on-campus educational networks which is capable of meeting the school-based requirements of teaching and research has currently become a new requirement for teaching and research [9]. Through the constructing of online platforms, in the process of school-based teaching and research, the mutual assistance, guidance from experts and self-reflection can be achieved so as to promote the professional development of teachers. The school-based web for teaching and research is comprised of homepages, educational podcasts, forums, resource base for teaching and research, thematic study and website for research[10].

However, a school-based network for teaching and research is also limited. Due to the different levels of development in different regions, there are notable differences in the network environment and teaching forces. Therefore, it is impossible for all schools to establish their own school-based platform for teaching and research. Meanwhile, some schools only promise to offer their best resources of advantageous subjects in reserve, which puts great constraints on the exchanges among different schools within a certain region [11].

2 Technological Supports for Network of Teaching and Research

No matter the website of a single subject, the teaching-and-research website for teachers created by the educational institutions or campus network of a school is technologically supported by an online platform. Technologies including the structure of the website, realization of presentation layers, design of business layer and data layer as well as cloud storage should be assisted by the relevant supports provided by professionals, which will not be discussed here[12].
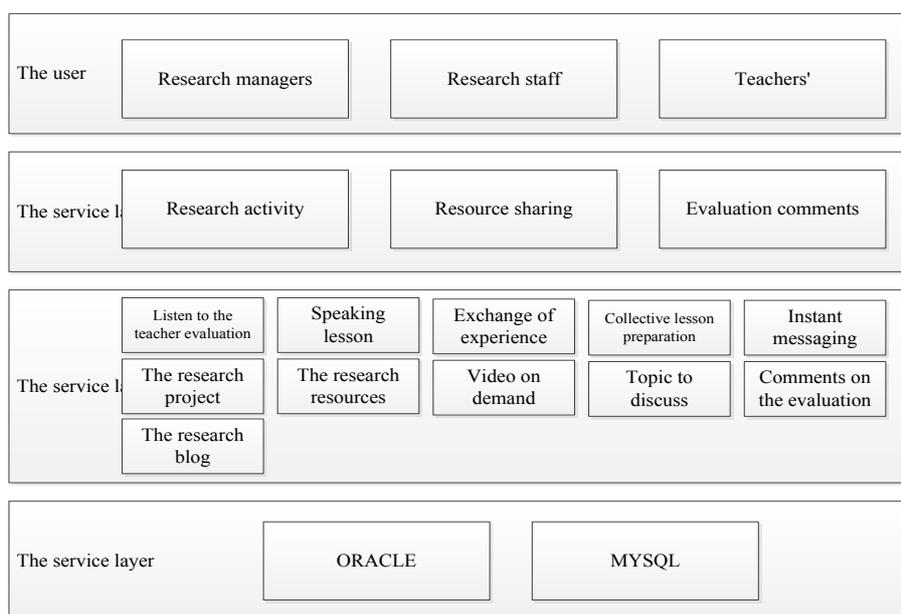

Fig. 1. system structure

Most online environments for teaching and research include the following platforms.

1. Platform for Interaction and Communication

From the perspective of information exchange, online research and teaching is the process of information exchange. The high-efficiency, stability and safety of information exchange is key to the results of online research and teaching [13-15]. The online research and teaching is cross-regional, and provides several means of information exchange which are real-time, asynchronous and interactive through videos. Currently, some online platforms for research and teaching can provide convenient and quick services and ensure the quality and effects of online research and teaching, such as the online platforms developed by the Information Research Institute of Northeast Normal University[16].

2. Platform for Collaborative Learning

One of the preconditions for teachers conducting online activities of teaching and research is collaboration. How to collaborate with other teachers and experts has become the primary concern. The school-based activities of teaching and research in a network environment must have platforms for collaboration so as to conduct collaborative learning related with research and teaching, such as blogs, Baidu Baike, Douban and Wikipedia.

3. Platform for searching resources suited for teaching and research

Various and complicated kinds of information are rich on the internet, as is news for teaching and research. How to directly and effectively obtain key information about topics of teaching and research from the complicated information system is a difficult problem. For this, we need to provide the function of locating resources according to the needs of teachers [17-18]. The function of information searching should also be provided for accurately locating the required information and resources. The customized functions should be offered to meet teachers' needs for teaching and research and learning.

4. Platform for Resources Sharing

The most beneficial aspect of the Internet is resources sharing, through which teachers can quickly obtain corresponding resources for collaborative learning and teaching and research[19]. Meanwhile, they can contribute to the individual learning, collective learning, and the sharing of experience. The resources sharing websites include Tudou.com, Youku.com, etc.

3 Designing of School-Based Platform for Teaching and Research in a Network Environment

3.1 Positioning and Goals of System Design

The traditional teaching and research is are activities aided by the grass-roots teachers, and guided by researchers and related to actual experience of teaching or the discussing of relevant difficulties[20]. It researches several problems concerning teaching practice, which can promote teachers' professional development and improve the educational levels of learners. However, the online teaching and research does not limit itself to the functions of its traditional counterpart [21-24]. It is also the carrier with the activities and resources of teaching and research as well as evaluating the curriculum resources. Additionally, the online activities of teaching and research include classroom observation, teaching-related research, guidance by experts, sharing of experience and collective preparation of lectures[25-26]. Resources of teaching and research include many relevant information created in the process of the traditional mode of teaching and research, such as teaching related thoughts and reflec-

tions, text data and videos from conferences. The process of evaluating curriculum resources should be conducted after the holding of activities or the reviewing of some resources. Some constructive advice should be proposed after the evaluating and commenting, which is the ultimate goal of evaluation.

3.2 Designing of Teaching and Research Activities of the System

The activities of teaching and research are the applied research behaviors conducted by front line teachers and aided by professional researchers. The research subjects are the actual teaching phenomena appearing in the process of lecturing and teaching in an actual classroom. They are expected to promote teachers' professional development and comprehensive advancement of teaching practices. The forms of teaching and research include attending a lecture, evaluating the lecture, giving a lecture, sharing of experiences and collective preparation of lectures.

1. Implementing Activities:

a. Researchers plan, organize and arrange various sorts of activities of teaching and research.

b. Researchers and teachers should be well prepared according to schedule.

c. Participants should participate in activities on time according to schedule.

2. Resources Sharing

a. After the activities, teachers or researchers should arrange and share the resources.

Other teachers should review, learn and discuss the resources.

3. Commenting and Evaluating

a. Participants should evaluate and comment on the activities.

Those reviewing or using the resources should offer advice on, evaluate or comment on these shared resources.

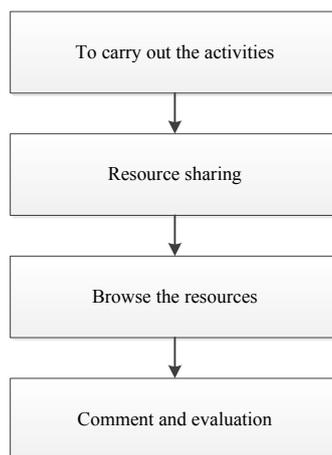Procedures for teaching and research are shown in Figure 2.

Fig. 2. Research flow chart

3.3   Contents of Teaching & Research Activities

School based online platforms for teaching and research are expected to provide conveniences for teachers. Even the unregistered teachers can enjoy the right of learning. They can read the latest news related with teaching and research, policies and regulation, classic articles, typical examples and excellent courseware through the portal. For registered teachers, even without signing in, they can obtain the desired information from the portal website for a convenient learning experience[27]. The settings of the platform's functions are shown in Figure 4.

(1). Contents of Teaching and Research Activities for Designated Personnel (As Shown in Figure. 5)

After having signed in, the user is in the home page from which can be read the personnel information[28]. From this page, the user can to any page conveniently.

The Latest New tab shows conferences you have been invited to, or comments or messages you have received.

Notices shows activities created by, articles published by or resources uploaded by those people you have followed.

Rapid Setting sets the most-frequently-used functions, or maintains your own information, such as published articles or uploaded resources[29].

Announcement & Notification is where you can publish your own announcements.

Through the Messages Inside Station you can send messages to a particular person.

For better knowing the information of other users, you can review information at other persons' spaces such as teachers or researchers.

(2). Contents of Teaching and Research Activities for Average Teachers

Personal Space

After having signed in the user is on the home page, from which you can read the personnel information. From this page you can go any page conveniently.

Latest New shows conferences you have been invited to, or comments or messages you have received.

Notices, such as activities created by, articles published by or resources uploaded by those people you have followed.

Rapid Setting, through which you can set the most-frequently-used functions, or maintain your own information, such as publishing articles or uploading resources.

Messages Inside Station, through which you can send messages to a particular person.

For better knowing the information of other users, you can review information at other persons' (e.g. teachers and researchers) spaces.

Activities for Teaching and Research

All activities of teaching and researching can be searched for related with a subject.

For the ongoing activity, those having been invited can directly participate in the activity, or they can attend a conference through a code given by researchers.

For those activities that have ended, relevant videos can be watched from the Activity Details tab. Additionally, some resources can also be downloaded.

After reviewing, the user can comment on any activity or resources.

Themes of Teaching and Research

Search themes or topics related with a subject.

Search related resources through the topic of a theme include articles published by teachers, documents or uploaded animated pictures. Searching resources in the whole area can be convenient for teachers to obtain more resources.

Publishing personal articles and uploading documents or animated pictures through the topic of a theme allows other teachers to review, learn and discuss.
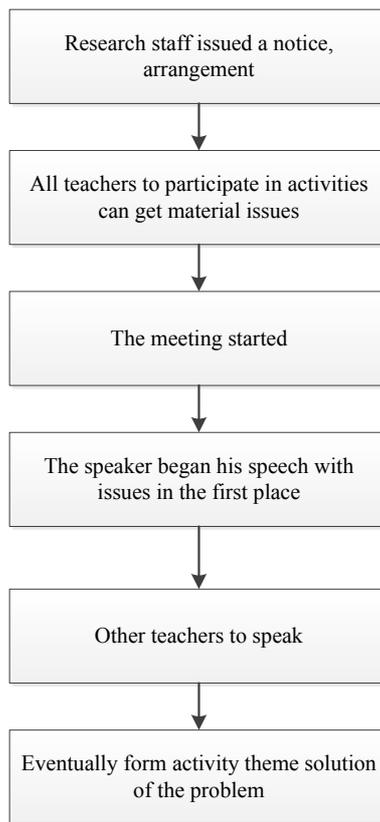

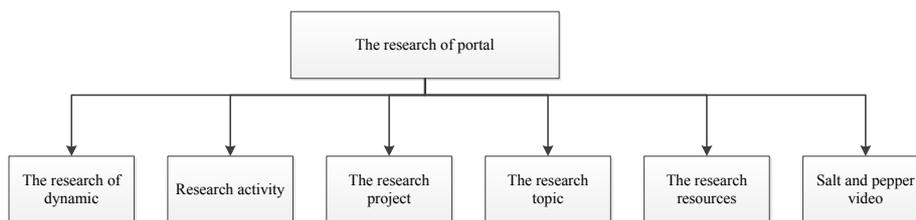**Fig. 3.** Flow chart of research activity
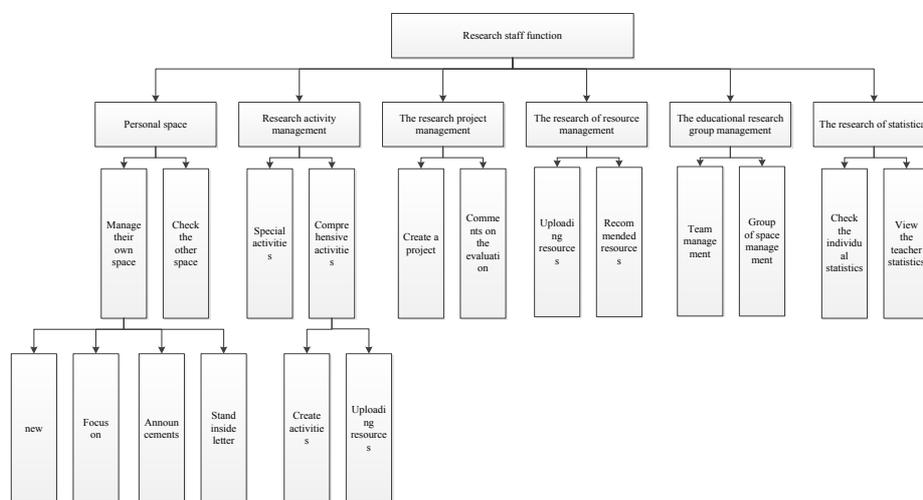

Fig. 4. platform feature set

Fig. 5. Research content of teaching and researching activities

You can comment on your resources or others. Constructive advice can also be proposed.

Resources of Teaching and Research

Only the best resources for teaching and research can be reviewed because they are chosen by researchers from educational institutions for usage and evaluation.

The published personal articles and the uploaded resources belong to the user and can only be reviewed by others visiting your space.

Groups of Teaching and Research

Within the group, teachers can know and participate in intra-group activities and review related resources.

Video Play

The contents of videos contain lecture-delivering, lecture-explaining and relevant discussion so that researchers can play these video and learn from them. Teachers can upload the videos of any regularly-used forms into the system for others to watch.

Compared with words, videos are more likely to be accepted and understood. Therefore, the videos help to motivate teachers and significantly improve their personal initiative so as to enhance the qualities of the teachers' work.

Notification and Announcement

The notification and announcement for teaching and research can be divided into three levels, including provincial level, municipal level and county level, which can be displayed explicitly and easily.

(3). Contents of Teaching and Research for Management is shown in Figure 7.

Personnel Management

Firstly, those registering the system are reviewed. Secondly, the information of personnel inside the system is maintained. Given the fact that the number of people registering in the system is large, four levels of personnel management should be established, including provincial management, municipal management, county or
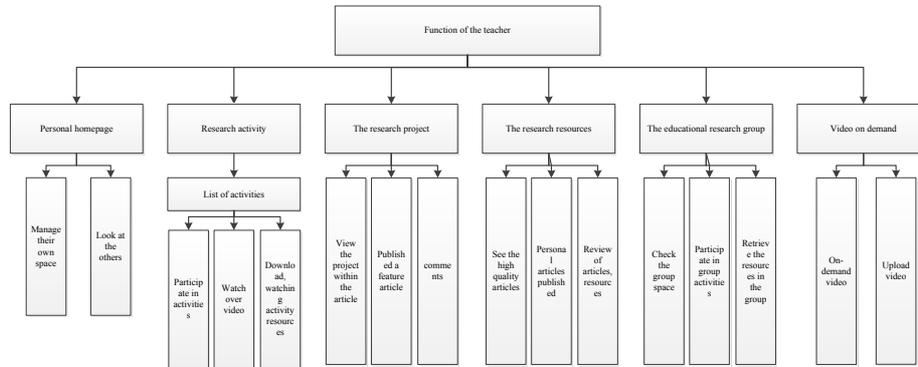
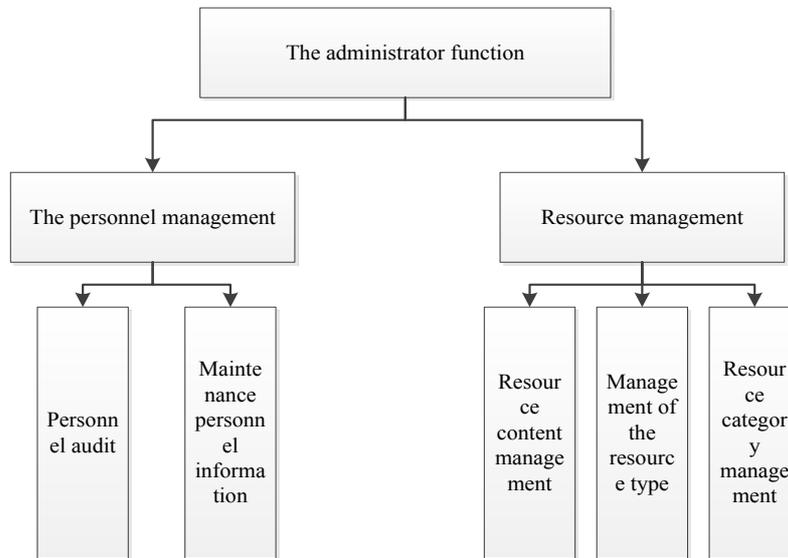**Fig. 6.** Common contents of teachers' teaching and researching activities

Fig. 7. Administrator research activity

district management and lastly school management. Management of different levels are responsible for different personnel. Users are required to register in the system with their true names, based on which the reviewing process will proceed.

Resources Management

The texts inside the system should be reviewed. Therefore, a database of vulgar words will be provided to delete any offensive information while non-text information will be left for management to review. Any offensive or illegal information must be deleted and users posting this information must be warned. Users who have been warned many times will be prohibited from entering the system again.
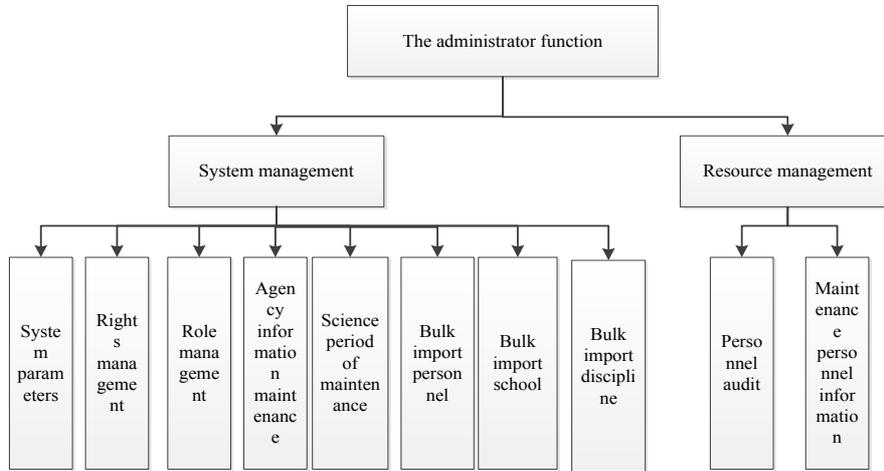
Fig. 8. System administrators research activity

(4) Contents of Teaching and Research for System Management is as shown in Figure 8.

Management of system parameters involves setting the internal information of the system, such as the system name, account and code for the server of video interaction, and whether those resources should be subject to review or comment.

Management of power and authority ensures the normal usage of links of the system's menu, pop up related pages, maintains the system's menu and change orders of items in the menu.

Management of roles involves four default roles including super management, average management, researcher and average teacher. These roles have been preset by the system and will not be deleted. Additional roles of business can be added for different functions.

Maintenance of institutional information means that educational institutions of various levels will be displayed through a tree structure. The levels and names of educational institutions can be changed by manual operation.

4   Conclusion

This paper includes the research background, related questions and current conditions of the online platform for research and teaching globally as well as the reasons for choosing such as topic. It also involves the actual and theoretical significance of research and the composition of this paper. Then it defined the related concepts and introduced the theoretical basis, such as concepts and characteristics of school-based and the online mode of research and teaching. The theoretical basis of the online mode of teaching and research includes the theory of knowledge management, the theory of informal learning, the theory of a learning community and the theory of reflective teaching.

This paper then gave the related definitions of the online school-based mode of research and teaching, on the basis of which the detailed activities were designed, including online lecture preparation, lecture evaluation, collective discussion and subject-oriented collaboration, obtaining of online resources and displaying of results for research and teaching. After determining the forms of online activities of research and teaching, the procedures were further explored and discussed. In combination with its own characteristics of the school-based online mode of teaching and research, the practical procedures of activities were given for future reference.

Finally, according to the previous basic research, this paper established a strategy for the online school-based mode of research and teaching. On the basis of researching various forms of activities of online school-based research and teaching and their corresponding procedures, in combination with the online platform for teaching and research and the related theories, some assumptions and solutions were proposed about the detailed implementation of school-based online research and teaching. From the perspectives of environmental construction, activity management and exploitation of information-based curriculum resources, the analyses were conducted and specific methods were given. At the end of this paper, some conclusions and expectations were offered. Meanwhile, tentative plans and conceptions about further work were proposed.

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6 Author

Xinhao Ji, doctoral students of East China Normal University, associate professor of Zhejiang Business College, mainly engaged in employment and entrepreneurship research.(jxh@zjbc.edu.cn)