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# The application of Sakai in university of science and engineering

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**Abstract:** Sakai is an online collaboration and learning environment, which is used by worldwide education institutes, especially for the universities and colleges. Compared with foreign countries, the current level of development and application of Sakai system in China is not mature and extensive. More correlative study and practical applications on Sakai are needed. Sakai is used by some selected teachers and curriculums of Henan Polytechnic University in the first term of 2013 on trial. And in 2014, Sakai is conducted a comprehensive promotion in the whole University. Discussions of the application of Sakai in the University are included in the paper. The implement process of Sakai in the University is presented first. Then some experience and advices on the application of Sakai on university of science and engineering in China are discussed.

**Keywords:** Sakai, Learning Management System, University of Science and Engineering

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## 1. Introduction

E-Learning is a global trend of teaching reform at present. A network teaching platform can strengthen the interactions between teachers and students, and can provide an interactive, collaborative learning environment of multiple sets of information for teachers and students, without restriction by time and space [1] [2]. Sakai network teaching system is a worldwide network and system of popular teaching platform now.

With the rapid development of network education and digital campus construction, course management system has become an important choice for many universities and colleges to conduct curriculum design and organize activities of teaching. As an excellent open source course management system, Sakai is a powerful and flexible platform for curriculum and learning management system [3] [4] [5], and is widely used in many countries. Some universities in China have also used Sakai system for teaching practice [6] [7] [8].

Based on the analysis of the function and characteristic of Sakai, and with the actual application survey of Sakai in Henan Polytechnic University, the teaching application advantage of Sakai in university of science and engineering is discussed in the paper. The rest of the paper is organized as follows. In Section 2, a briefing introduction to Sakai is

presented. In Section 3, the basic information of Henan Polytechnic University is given firstly, and then the application of Sakai in the University is proposed. In Section 4, the discussions of the suitable characteristics of Sakai using in university of science and engineering are presented. Finally, in Section 5, the paper is completed with a conclusion.

## 2. Learning Management System of Sakai

Learning management system is a kind of software that used to establish the learning resource, learning process tracking and management. Generally, learning management system contains curriculum system, teaching system, and management system. Moodle, Sakai, ILIAS and Claroline are the most common learning management system at present, and they are all open source system [9] [10].

Sakai includes course management tools, project tools and other components, and can be connected to the library resources. Sakai is developed by Indiana University, University of Michigan, Stanford University and MIT in 2004 [11] [12]. As of September 2013, the number of

people using of Sakai learning platform has a total of 67000. The maximum of online people for using of Sakai is more than 6000. Sakai has a lot of university users in English speaking countries, also the universities and colleges in China, such as East China Normal University, Huazhong Normal University, Beijing University of Posts and Telecommunications, Fudan University, Shanghai JiaoTong University, Zhengzhou University, and Henan Polytechnic University. The largest user of Sakai is the Beijing University of Posts and Telecommunications in China. Part of traits of Sakai is shown in Table 1.

**Table 1.** Part of traits of Sakai

Order Number	Part of Traits of Sakai
1	Free and open source project
2	More than 160 institutions use Sakai as teaching system
3	Modular system framework and easy for second development
4	Plugin support structure, convenient for customization system

### 3. The Application of Sakai in Henan Polytechnic University

#### 3.1. Henan Polytechnic University

Henan Polytechnic University, with a long history, is the first mining university in Chinese history as well as the earliest higher college in Henan province. Now Henan Polytechnic University has the right to grant a doctorate and has developed into a multi-disciplinary coordinated development university of teaching and research which covered science, technology, management, art, law, economics and education, etc. [13]. The University has 4 primary discipline doctoral, 20 subordinate discipline doctoral, 4 centers for post-doctoral studies, 81 master sections and 75 undergraduate professionals. The size of full-time students is reaching 36000 of the University.

Henan Polytechnic University devotes itself to promoting international academic exchanges and cooperation with institutions of higher education of foreign countries. Since 1980s, it has established sisterhood relationship with 15 countries and more than 30 universities and research institutions in USA, UK, France, Canada, Australia, Poland, Russia, Japan, Korea, etc., and has made great achievements in teachers exchange, students exchange, scientific research and academic cooperation [13].

#### 3.2. The Application of Sakai in Henan Polytechnic University

##### 3.2.1. Beginning Use of Sakai in Henan Polytechnic University

In the second semester of 2012-2013 school year of Henan Polytechnic University, 12 teachers (that is 12 courses) in School of Computer Science and Technology,

School of Electrical Engineering and Automation, are chosen to test the Sakai system installing in the school server. And the test results indicate the suitable use of Sakai for the selected courses. The use effect of Sakai is good, and Sakai has been recognized by the involved teachers and students.

At this stage, the teachers using the Sakai system in their classes should complete one application form for Academic Affairs Office. And the application form includes course name, serial number of the course, order number of the same course, classroom teacher, department of interrelated teacher belonged to, etc..

##### 3.2.2. Expand the Use Scope of Sakai in the University

In the first semester of 2013-2014 school year, the Academic Affairs Office of Henan Polytechnic University expands the use range of Sakai and chooses 2 courses in each specialty, 2 teachers of five basic public courses to use Sakai system.

###### (1) Organizational and Management

The Academic Affairs Office of the University is mainly responsible for the organization, management, evaluation, and establishing a system of management and incentives.

The Modern Education Technology Center of the University is mainly responsible for technical support, system maintenance, secondary development and training of teachers of Sakai system.

Each college and specialty is responsible for the selection of courses and teachers, also the organization, supervision and management of the college to participate in the Sakai system course.

###### (2) Appraisal Mechanism

Course website construction of Sakai includes: Curriculum (course introduction, teaching syllabus, reference materials and exam outline, etc.), class schedule, etc..

Site usage of Sakai includes: The use of interactive answering room and discussion section, the total number of messages and posts, the homework placement, the number of correction of the homework, the number of test times and upload resources, etc..

Evaluation by students: The Sakai system comes with a tool of investigation, and can establish a unified questionnaire. After the end of a course, teacher can post a survey, which carried out by students of the course. The evaluation results can be seen by steering group.

###### (3) Incentives

In view of the Sakai system is in use stage, an evaluation is carried on basing the application condition and the teaching effect of evaluation. The evaluation is divided into three levels, and the proportion is 10%, 20%, 30%, respectively. According to the evaluation results, different rewards are given for interrelated classroom teachers.

###### (4) Training Arrange

Because of the different degrees of familiarity with Sakai system for teachers, and the different colleges and specialty for the use of Sakai, several different trainings are

conducted. Figure 1 shows one of the training programs of the University.



Figure 1. Training program of Sakai used in Henan Polytechnic University

Parts of graphical interface of the Sakai system used in Henan Polytechnic University are shown in Figure 2, 3, 4, 5 and 6 [14] [15] [16].



Figure 2. Main graphical interface of Sakai used in Henan Polytechnic University



Figure 3. Site settings interface of Sakai used in Henan Polytechnic University

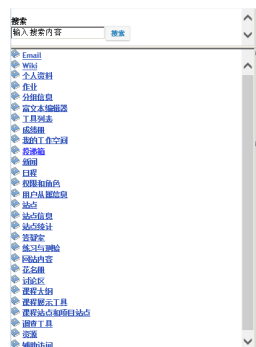


Figure 4. Help interface of Sakai used in Henan Polytechnic University



Figure 5. User preferences interface of Sakai used in Henan Polytechnic University



Figure 6. Resources interface of Sakai used in Henan Polytechnic University

As can be seen in Figure 2 - 6, the main modules of Sakai system used in the University include: homepage, personal information, site schedule, resources, notice, site settings, user preferences, account information, my work space and help.

The main functions of Sakai system used in the University include: course outline, schedule, notice, module, resource, distribution, test, questioning, testing center, transcript, resource upload and download, discussion and personal information, chat, site statistic, podcasting, voting, survey, discussion, blog, introduction, etc..

### 3.3. Comprehensive Promotion of Sakai System

In the second semester of 2013-2014 school year, a comprehensive promotion is conducted in the whole University. All teachers are guide to using the Sakai for their classes. And in this stage, there is no reward for the use of Sakai.

## 4. Experience and Advice for Sakai Using in University of Science and Engineering

### 4.1. Traits of University of Science and Engineering

Major in science and engineering with a broad field, and contains a variety of application and combination of physical, chemical, biological, engineering, astronomy, mathematics and in combination of the above six categories of subjects. Courses of science and engineering mainly

focus on linking theory with practice [14] [15] [16].

Sakai is a collaboration and learning environment, and is exploited by academic institutions, business organizations, and individuals to cooperate in the development of interactive learning platform. The use of modern teaching methods, such as Sakai, can expand the horizons of students, and can cultivate students the ability to question and to solve actual problem.

#### **4.2. Advantages of the Application of Sakai**

Sakai has a lot of advantages, such as easy to set up, easy to use. Tool selection and combination mode is flexible. The system itself is easy integration with other systems, and the effective application of convenient resources. The system itself emphasizes on cooperation and interaction in a new learning concept. Open source code is modified, and the personalized demand is satisfied easily. Open source code so that anyone can contribute by themselves. The improvement for the enthusiasm of participation is good. The construction of the system with many learning community can provide timely help to any user.

The use of Sakai can help to construct a new teaching mode, and to create personalized teaching.

Convenient communication and cooperation between teachers and teachers, teachers and students, students and students, can help the effective application and function evaluation of Sakai system.

#### **4.2. Several Aspects Needing to be Improved in the Future**

(1) The Chinesization of Sakai system. There are two main issues for the Chinesize of Sakai, the tools and the help documentation. This work is still inadequate at present.

(2) There are some temporary system errors that cannot be prediction, and need further optimization.

(3) Many open source software are integrated in Sakai, and the entry barriers is higher of customization and development.

(4) The document is not enough in detail.

(5) The API changes are larger between different versions, and it is difficult to upgrade.

(6) The standards for educational resources support are weak.

(7) The formula input of homework is inconvenient, and the input process is complex and trivial, both for teachers and students.

## **5. Conclusion**

In order to give full play to the advantages of network teaching, and to improve the teaching quality and teaching level, the reform in education and teaching is improved by the use of information technology, such as Sakai system. Sakai has the functions of curriculum resources sharing, online homework, online testing, online discussion, teaching auxiliary function and all kinds of statistics and

other records, and has the trend of potential application in university of science and engineering.

The arranged training plan and practical application of Sakai in Henan Polytechnic University from 2013-2014, helps to make a good comprehension of the teaching functions of Sakai, and contributes to the implementation of educational reform in using network platform for education. The sustained implementation of the program in future will be arousing the learning enthusiasm of students, and having the positive significance to improve the teaching reform, to promote teaching effect of the University.

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