Send Orders for Reprints to reprints@benthamscience.ae

The Influence of MOOC in the Cultivation of the College Students of Electrical Engineering Based on the Cloud Platform and Moodle

Yanyan Yin*

Chongqing City Management College, Chongqing 401331, P.R. China

Abstract: This paper explores the influence of MOOC for the improvement of college students of electrical engineering based on the cloud platform and Moodle. MOOC-'Massive Open Online Class' is a new way of providing education along with the integration of network information technology and the educational teaching. It is widely recognized and favored because it has some advantages, such as being large- scale, none spatial-temporal constraint, free open source, which can provide new knowledge acquisition mode for learners. Electrical specialty is the main subject in universities of technology and its graduates are the backbone of the national power system, as well as future builders and successors of the state. The significance of this paper is to make good use of the effective platform of MOOC to produce outstanding electrical students.

Keywords: Cloud platform and moodle, college students, electrical engineering, the center point, MOOC (massive open online class), .

1. INTRODUCTION

With the rapid development of network technology and the awareness of the concept of open education resources, the availability and sharing of educational resources based on the network have shaped the future trend of the society. Massachusetts Institute of science and Technology MIT firstly used network video open class as teaching forums, which resulted in the emergence of MOOC - (massive open online course). MOOC was introduced as a learning type group to promote lifelong learning. In addition, it is being pursued continuously by learners worldwide especially for young learners for its new mode of large-scale knowledge transmission with no boundary, flexibility, low cost, and easy access [1]. As an important engineering course in science and engineering colleges, electrical specialty should keep pace with the trend of the times, to improve the teaching level and impart high quality education m to students with [2, 3].

In recent years, with the rapid development in the field of information technology, the computer has become an indispensable tool in people's life and work. Mastering the basic computer application technology mainstream has become the essential skill for people in the workplace. But having knowledge of the computer's hardware and software with updates , is beyond people's imagination and due to the fast pace of life, people have fewer opportunities to explore about computer , therefore it is far better to have guidance of a teacher [4-6]. For this purpose, , college education in the workplace, has facilitated people to improve their ability level which is a very important way, because, students can not only acquire knowledge under the guidance of a teacher, but can also achieve diploma of national recognition through examination.

*Address correspondence to this author at the School of International Education of Chongqing City Management College, Huxi University City Shapingba District Chongqing, P.R.China; Tel: +86-13243564007;
E-mail: yyyqueen@sohu.com

China College Education is also known for its rapid development and expansion. It has various forums , and has played a role in economic construction and scientific and technological progress that cannot be ignored. However, the needs of social and economic development have not met the desired standard, therefore the current process has been formulated with the intent to provide quality education in colleges which is mainly accomplished by centralized instruction, self-study and examination procedure. But these links, including teaching content, self-study content and the test questionnaire are designed by the instructor. Students in the teaching process are passive and only submissive to teacher's instructions, resulting in the lack of input at their end and thereby inactive participation. Due to restricted communication between teachers and students, and also students and students, teachers can only provide theoretical knowledge to their students, and the teacher's sole responsibility is to fulfill the academic requirements. Students concern about obtaining a degree is not enough to enhance their ability and team cooperation, as only consciousness cannot carry out effective promotion, there should be enthusiasm and dedicationin the students to participate in college education programs to enhance their working ability, efficiency. and team awareness through knowledge . The only aim is to complete the work despite deficiencies in theoretical knowledge. Therefore, in the process of learning, with no power to take initiatives, the students lack the ability to grasp learning content [7]. The cloud platform uses large data processing method which is shown in Fig. (**1**).

2. APPLICATION OF MOODLE IN THE CLOUD PLATFORM

Cloud platform: The main characteristic of cloud platform is to achieve virtual management, scheduling and application of hardware resources by software. It has flexible customization, dynamic scalability, high reliability and safety, and high performance price ratio. Data software in the cloud (the server),

has large computation and storage capacity. It can use cyber source, computing resources, database resources, hardware resources and storage resources by the virtual platform users. Moodle stands for Modular Object Oriented Dynamic Learning Environment. It is a curriculum management system proposed by Australia's teacher Martin Dougiamas based on constructivism education theory, and it is a free open source software that is being widely used in various countries at present.

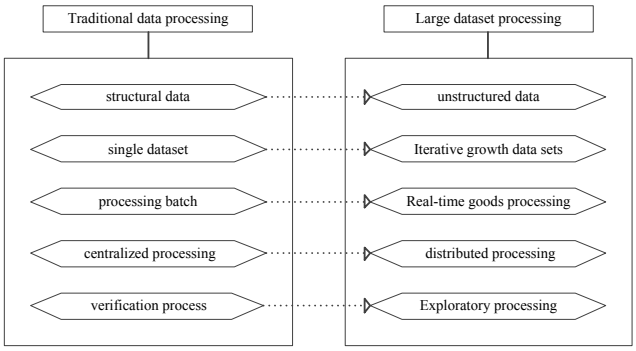

Fig. (1). Difference between large data processing and traditional data processing.

Fig. (**2**) shows the cloud computing system. The Cloud platform is being used widely in foreign countries at present. Microsoft cloud platform is a forerunner of some successful companies such as Amazon, Google, IBM, Yahoo, Salesforce, Facebook, Youtube, Myspace Domestic grand, Alibaba, Baidu, Sina, Huawei, *etc*.. Moodle offers good compatibilityand usability, and can be installed on almost any platform that supports PHP This paper selected the cloud platform, the ECS server in the product, and the PHP runtime environment based on tool (Centos 64 PHP5.4 Apache)to establish an integrated environment: PHP5.4.27, Apache2.2.27, MySQL 5.5.37, vsFTPd3.0.2. PHP is an English hypertext pre-processor for language Hypertext Preprocessor abbreviation. PHP is an embedded HTML language, which is a server-side implementation of the HTML document for embedded scripting of language. The language style is similar to the C language, and has been widely applied. It can generate Forms, Combo Boxes, Grid, Menus and components such as the data which is converted to XML/JSON format. Apache HTTP Server (Apache) is an open source Apache Software Foundation's Webpage server, thatcan run on most computer operating systems.Because of its multi-platform and security, it is widely used as one of the most popular Web server softwares. It is fast, reliable and can work through simple extensions of API, Perl/Python *etc* and is compiled to the server by the interpreter. (AUTHOR: Please review the highlighted) It supports the HTTP/1.1 communication protocol, the new owner configuration process, file support common gateway interface, supports IP and virtual host domain name in a variety of ways to support HTTP authentication, integrates Perl processing module, integrates proxy server module, supports real-time monitor server and custom server log, supports server that contains the instruction based on simple but powerful (SSI), supports Secure Socket Layer (SSL), providing a user session process tracking, FastCGI support, through third party module which can support Java Servlets. (AUTHOR: Please review the highlighted sentence) MySQL is a small relational database management system, developed by Swedish company MySQLAB, and was acquired by Sun in January 16, 2008. MySQL is widely used on limited websites because of its small size, fast speed, low total cost of ownership, and especially for being an open source. It is used in many small websites in order to reduce the total cost of ownership and the choice of Web site as a MySQL database. Vsftpd stands for "very secure FTP daemon", with security being one of its greatest features. Vsftpd is a UNIX like operating system running on different servers. It can run on Linux, BSD, Solaris as discussed above, forming HP-UNIX system. FTP server software is completely free, develops source code, and supports features of many other FTP servers. The normal operation of the PHP, Apache, and MySQL can support Moodle. FTPd is helpful for the modification of the site's source file modification.

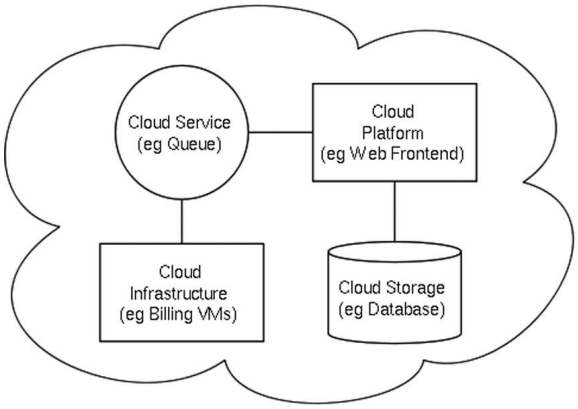

Fig. (2). The cloud computing system for manufacturing task scheduling.

3. THE DEVELOPMENT AND THE MODEL OF "MOOC"

Since 2001, Massachusetts Institute of Technology MIT has taken the lead in adopting the network video open class as a teaching forum based on communication. Hundreds of universities in the world have launched its own open courses. At the same time, the open resource alliance also came into being, and formed the international open education resources alliance gradually [8]. MIT OCW's leading officials have proposed that there are four elements in the school education, namely; teaching content, teacher-student communication, exams and diplomas and currently MOOC is also being considered to have these four aspects. In November 2011, Peking University, Tsinghua University and other 18 domestic famous universities combined to create the first 20 Chinese University video open classes which were open to the public free of cost through cooperation sites such as the love network curriculum and network television in China, NTES, *etc*. This marks that the Chinese video open class construction has been paid attention unprecedentedly and its production scale and level have achieved international standards gradually. Until July 2013, the total number of Chinese universities video open classes which were established or were in the process of establishment were 469, covering many novel, profound and meaningful courses, which provided opportunities for Chinese, especially college students to understand domestic premium education

Undergraduate education emphasizes overall improvement of college students but also aims at improving students' ability of problem analysis and solving [9]. Electrical specialty is one of the major topics of science, which not only requires electrical students to master the basic knowledge, but also needs combination of theory and practice as well as active participation in scientific research. The main problems of the traditional education teaching mode are as follows.

An excellent electrical specialty student should master the professional knowledge, but also foster scientific spirit. Scientific spirit can enable students to maintain a cautious attitude and a sense of innovation, meanwhile humanistic spirit helps to cultivate students' ability of thinking. Considering problems through humanistic spirit can help to form good ideological and moral quality culture. It is known that the , traditional pattern of education pays attention to professional knowledge, but the education of scientific and humanistic spirit is lacks focus.

The traditional mode of education is that dozens or even hundreds of students are in the same class. The teachers are dominant, who provide knowledge as much as possible in the limited time and the contents and problems of the answers take the teacher as the standard. (AUTHOR: the highlighted is vague) This mode lacks interaction between students and teachers. In some cases, teachers can not take care of all the students in terms of providing guarantee of clear comprehension to large number of students . In addition, the communication between teachers and students is less during the class. As a result, teaching impact varies from person to person and the mode is not personalized.

The traditional teaching methods and teaching materials provide same knowledge and theory, which cannot bring about rapid improvement and development the society. In addition, the updating speed is often unable to meet social needs, and traditional education often lacks the practice , which deprives students to practice what they have learned . This gives rise to the need to extend training to these students after being employed , which renders the teaching methods to be relatively outdated, which lack the opportunities for combining theory and practice. These factors are not conducive to produce excellent electrical engineering students.

The MOOC provides classes on the network and has a lot of advantages, specially speaking: Firstly, the MOOC is large in scope and the registration number is large. A good class can have more than ten million students ; students can study at any time in the open environment online without the limits of fixed time and place. In addition, it provides a variety of interactions, such as online testing, online video and online tutoring. Moreover, the MOOC resource is diverse, the same course can be provided by many universities and each has its own features and advantages, which breaks the boundaries of the universities. Moreover, the role of teachers and teaching methods are also very different from the traditional ones. Teachers organize the MOOC and provide knowledge; in addition they also become knowledge guides, sometimes the initiator of the discussion, or learners. Finally, the MOOC changes the learners' learning style and learners become the center of the learning process, where students can arrange their own learning time, learning progress, places of learning, learning content, and the knowledge in depth . The influence that MOOC in on the electrical students are is as follows.

The MOOC teachers should be highly professional and have a habit of continuous learning and improvement, When students find similar content and higher level courses, teachers may face the danger of being abandoned by the students, which forces the teachers to improve their professional qualities and keep fusing the latest knowledge into teaching. At the same time, other young teachers can improve their level through learning from speaker teachers in the MOOC.

The traditional teaching mode is that the teachers are the center of relationship between teachers and students. The learning content and question answers are determined by teachers; students only need to follow the rhythm of the teacher to complete the task of teaching. However, the MOOC tries to construct an equal and harmonious relationship between the students and teachers, facilitating discussion with professors and group learners at any time. When the number of the MOOC students is large, communication between students tends to be the main way. At the same time, speaker teachers can overcome the communication gap through interaction with the students, which is beneficial to the teachers' self-improvement.

The MOOC offers students the choice of knowledge they are interested in which provides students with a lot of courses which are of the same topics, but from different colleges and universities to meet the different needs of learners. Every student can learn according to his own pace, as students who learn fast can master more difficult content and the slower ones can repeat learning. The MOOC adopts 10 minutes of videos and fragments, which are comprehensive for students. In addition, online real-time interaction can make the students learn from teachers or other students. Learning content can be accessed by mobile phone, using mobile phone as the main tool of learning not only expands the way of accessing knowledge, but also enhance learning flexibility. The MOOC can also provide certification of the course through objective and automated online rating system.

4. THE CLOUDSIM AND GREEN FUNCTION ALGORITHM

The equation of motion is as follows:

$$\partial_j(C_{ijkl}\partial_k u_l + e_{kij}\partial_k \varphi) - \rho \ddot{u}_i = 0 \tag{1}$$

Under linear control relationship, basic electrostatic equation for piezoelectric media is:

$$\partial_j(e_{ijkl}\partial_k u_l - \eta_{kij}\partial_k \varphi) = 0 \tag{2}$$

Studying the simple harmonic vibration inside a media with frequency of ω, the linear differential equation can be expressed into the following simplified forms:

$$L(\nabla,\omega) f(x,\omega) = 0\,, \quad L(\nabla,\omega) = T(\nabla) + \omega^2 \rho \mathrm{J} \tag{3}$$

In which,

$$T(\nabla)=\begin{Vmatrix} T_{ik}(\nabla) & t_i(\nabla) \\ t_k^T(\nabla) & -\tau(\nabla) \end{Vmatrix},\ \mathrm{J}=\begin{Vmatrix} \delta_{ik} & 0 \\ 0 & 0 \end{Vmatrix},\ f(x,\omega)=\begin{Vmatrix} u_k(x,\omega) \\ \varphi(x,\omega) \end{Vmatrix} \quad (4)$$

$$T_{ik}(\nabla)=\partial_j C_{ijkl}\partial_l\ ,\quad t_i(\nabla)=\partial_j e_{ijk}\partial_k\ ,\quad \tau(\nabla)=\partial_i\eta_{ik}\partial_k$$

These functions can be expressed in the following form:

$$C(\mathrm{x})=C^0+C^1(\mathrm{x}),\quad e(\mathrm{x})=e^0+e^1(\mathrm{x}),\quad \eta(\mathrm{x})=\eta^0+\eta^1(\mathrm{x}),$$
$$\rho(\mathrm{x})=\rho_0+\rho_1(\mathrm{x}) \quad (5)$$

The value with superscript of 1 represents the difference below:

$$C^1=C-C^0,\quad e^1=e-e^0,\quad \eta^1=\eta-\eta^0,\quad \rho_1=\rho-\rho_0 \quad (6)$$

In addition, we can introduce the abbreviated formula:

$$g(x,\omega)=\begin{Vmatrix} G_{ik}(x,\omega) & \gamma_i(x,\omega) \\ \gamma_k(x,\omega) & g(x,\omega) \end{Vmatrix},$$

$$s(x,\omega)=\begin{Vmatrix} G_{ik,l}(x,\omega) & \gamma_{i,k}(x,\omega) \\ \gamma_{k,l}(x,\omega) & g_{,k}(x,\omega) \end{Vmatrix},$$

$$L^1(x,\omega)=\begin{Vmatrix} C^1_{ijkl} & e^1_{kij} \\ e^{1T}_{kij} & -\eta^1_{ik} \end{Vmatrix}, \quad (7)$$

$$F(x,\omega)=\begin{Vmatrix} u_{(i,j)}(x,\omega) \\ \varphi_{,i}(x,\omega) \end{Vmatrix} \quad (8)$$

5. THE COURSE DESIGN

The Moodle function is imperfect, supports the theory of Constructivism Based Teaching (collaboration, activities and assessment); provides 100% online teaching mode over the Internet and in a face-to-face combined way; a friendly interactive interface which supports of global database retrieval; provides the server running the course list; allows anonymous users, course classification and retrieval and can support thousands of network curriculum; Most of the text area (such as resources, forum, magazine) is available on WYSIWYG HTML editor. It also ensures system security by security mechanism, such as forum speech database consistency, cookies and so on; it also provides individual level comparison feedback *etc*.

Moodle modules include: site management, user management, course management, a selection module, the magazine module, forum, chat module module, resource module, operation module, quiz module *etc*. The current advanced education theory into teaching support platform. (VAGUE) (See Fig. **3**) In the college, education of computer courses, has 3 main parts: pre class, class and post class. Each process will need communication between the student and the teacher .

5.1. Before Class

Teacher arranges teaching resources, observes the learning effect, and the design of classroom activities, whereas students learn teaching resources, complete the exercises,

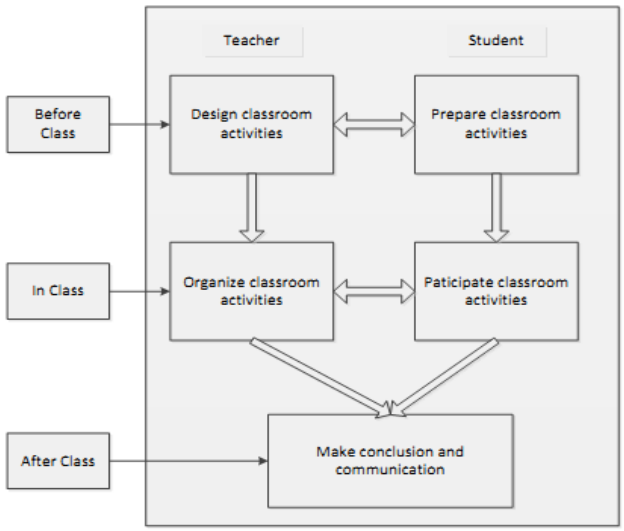

Fig. (3). System data flow diagram.

and the module covers curriculum management, the magazine module, and resource module

a. Preparation of teaching resources

In the process of teaching, teaching is generally provided by video courseware and lesson plans. These contents are completed by the course instructor and course team. Teaching resources are timely uploaded to Moodle. The purpose is to enable students to actively participate in video learning. In the production process of teaching resources, producers can refer to the open educational resources of national quality curriculum , combined with the characteristics of college education to record video teaching. In this way, it can not only help students access to the latest teaching contents of domestic outstanding teachers, and can make the video and curriculum goals, and course content completely consistent. Video content should be based on knowledge point as the cut-off point, is a point of knowledge for a video, generally does not exceed to 10 minutes in length of video, at the same time the video should be combined with the courseware and teaching plan as far as possible. (AUTHOR: Please clarify and re-write).

b. Specific exercises before the class

In order to urge the students to use resources for learning before class, teachers should arrangelearning content related to practice. Practice contents should be adopted with the course resources as the foundation. At the same time, students can use the cyber source for answers, and can also carry out online communication by the network to provide timely feedback to the students. Its purpose is to enhance student's ability of autonomous learning, supplemented by team cooperation. In today's society, due to economic globalization, and development of science and technology, people have to face and deal with a large amount of information, with rapid change in the environment, therefore educating students only through schools is not enough . To deal with the society in future, the students must adopt self-learning approach. However, autonomous learning requires people to learn independently of teachers and classroom . Self-learning ability is not innate, but acquired through training . The students can be engaged in the process

of practice, initially by practicing questions and by utilizing the ability of independent thinking, searching for information to constantly improve their autonomous learning. At the same time, students strengthen their ability of team cooperation by means of online communication.

5.2. In the Class

Teacher: organize classroom activities (ask questions)

Studentsparticipate in classroom activities discussing and solving the problems, - exchanging information) and using modules; such as forum module, chat module, and resource module. In the pre class learning activities, students' autonomous learning ability is fully utilized, thus extending the students learning time and improving learning efficiency. The purpose is to make the students self-study before the class, by mutual discussion, and knowledge assimilation. Therefore, classroom activities promote subjectivity of students, and help students to completely internalize the learnt knowledge.

a. The question design

Teachers need to provide feedback to the students according to the course content , and summarize some real life problems, or the students put forward meaningful questions, to be discussed in class. In this process, teachers can help in deciding the topic, and at the same time, selecting the same problem of students according to the number of grouping, with each group having 4-6 problems as appropriate. The group is handed over various tasks and the teacher learning group will issue guidance. Team members can hold discussions according to the division of tasks, and make collaborative inquiry together.

b. Training team

Teamwork is done by the individuals through dialogue, discussion, debate and other forms to fully demonstrate the research questions, to achieve the learning objectives. Team cooperation is conducive to the development of individual students' thinking ability, and enhances students' ability of communication between individuals and students' mutual tolerance. In addition, team cooperation results in developing skills of critical thinking and creative thinking among students, and has obvious positive effect to improve the communication ability of the students. In the classroom activities of flipped classrooms, teachers need to deal with dynamics of students at any time and guide students timely.

c. Exchange experience

Students can share their learning outcomes in the classroom after autonomous learning and teamwork, and can also exchange experience of learning . This sharing and exchange can take many forms, such as: exhibition, report, debate, small game, *etc*. In sharing, students can invite other class teachers and students or students' colleagues to participate. In addition to this, offline sharing or face to face conversation, can also encourage online sharing among students. Students can then upload their learning achievements to the network platform, and the teacher and students can make comments after watching.

CONCLUSION

This paper has described the influence of MOOC in the cultivation of the college students of electrical engineering based on the cloud platform and Moodle. In computer course teaching offered in colleges, it is required to pay particular attention to the college students, and also to meet the demand of practice in computer courses , therefore, traditional "spoon feeding" teaching has been unable to meet their demands. Flipping the classroom through teaching process is a reverse way, to students' subjective initiative, ability to train the students to solve problems, and promote study. At the same time, through group discussion, students can not only learn how to deal with team consciousness, but it also contributes to adapt to the teaching environment of computer curriculum in college. The emergence of MOOC has challenged the traditional education mode continuously. On one hand, it has made an influence on teaching strategies and teaching methods and promotes the reform of university education; on the other hand, it has changed student's passive learning into active learning. Universities should actively face the opportunities and challenges that MOOC has brought and introduce their own effective teaching classes as soon as possible. The universities should improve teaching quality and change the education mode of electrical engineering students by utilizing MOOC resources to introduce more "humanity" and "recognition" classes in the education curriculum of electrical engineering students to improve the students' ideological and moral quality which help to cultivate excellent electrical students.

CONFLICT OF INTEREST

The author confirms that this article content has no conflicts of interest.

ACKNOWLEDGEMENTS

This work was supported by the "Twelfth Five Year Plan" Education Science fund of Chongqing, China (No.2014-GX-134).

REFERENCES

[1] Z. Li, "MOOCs challenge and the future of the university", *The Chinese Journal of ICT in Education*, vol. 1, pp. 1-20, 2014.

[2] Q. Wang, "MOOC in science and engineering graduate student education thinking", *Course Education Research*, vol. 2, pp. 99-102, 2015.

[3] M. Zhang, "The changes and challenges of higher education in MOOC area", *China Electric Power Education*, vol. 1, pp. 191-201, 2014.

[4] H. Yan, L. Jiang, and L. Huang, "Flipped classroom and other research applications in the modern educational technology experimental teaching", *China Educational Technology*, vol. 4, pp. 110-115, 2014.

[5] J. Zhang, and Y. Wang, "Lobe flipped classroom model", *Journal of Distance Education*, vol. 30, no. 4, pp. 46-51, 2012.

[6] J. Zhang, "The key factor "flipped classroom" teaching mode", *China Distance Education*, vol. 10, pp. 59-64, 2013.

[7] Re Dan, R. Junli, "College education in Chinese universities Problems and countermeasures", *Education Exploration*, vol.11, pp.101-102, 2013.

[8] Y. Zhao, "Studied college education development strategy and management innovation", *Academic Exploration*, vol. 6, pp.128-130, 2012.

[9] Y. Zhao, "Traits influence college education students in college education teacher development", *College Education*, vol. 32, no. 2, pp. 61-63, 2012.

Received: June 16, 2015 Revised: August 10, 2015 Accepted: September 19, 2015