The Strategy of Implementing the Internet and Cloud Computing in Teaching

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Abstract: Innovation is a brand-new idea or method different from the tradition. Innovative teaching primarily applies new-style teaching tools or methods, such as the project-based learning with the Internet is a typical application of digitalized equipment cultivating the high-level thinking of students. The emergence of cloud computing has continuously pushed new teaching methods out; however, teachers are not completely familiar with the new-style teaching method. This study tends to demonstrate the process and procedure of schools and teachers applying cloud computing to teaching so that teachers are provided with references in the change of teaching environment. The utilization of broadband has become popular that e-learning allows learners to learn individually without being restricted by time or space. With the combination of cloud computing and ubiquitous learning (u-learning), one can acquire the latest educational contents with the Internet and precede collaborative learning and interaction with peers at any time to increase the learning opportunity in the virtual world without being affected by the time and the space of the physical environment so as to enhance the learning effect. Confronting the reform of the global education, teachers used to appear less flexibility or even refuse to change. This study aims to introduce the method and the procedure led in E-teaching innovation, as the reference for schools and teachers to follow in the reform of teaching environment.

Keywords: E-learning, cloud computing, innovative teaching, personal e-environment, digital learning

1. Introduction

Responding to the global competition, the Taiwan Government particularly listed the establishment of digital Taiwan as the significant construction in “Challenge 2008 - The National Development Plan”, where e-learning was one of the key sub-plans. Cloud service is the network service with Web 2.0 technology that accesses to, operates, and serves with browsers and the Internet that users can simply save the teaching materials in the remote server of the Internet Service Providers (ISP). Besides, the operation has completely made the best of the convenience of the Internet that the ISP could update the information or the service software at any time. For instance, the cloud services, such as Blog, YouTube, Wikis, Google Docs, and Facebook, are provided by famous ISP that the reliability is trusted by the users. Regarding the learning materials or the learning portfolio of students, when there is the connected device, the mobile learning (m-learning) could be promoted to u-learning that the combination of cloud and u-learning has appealed the attention of the academic and the supervisors in industries [1-5]. The following cases are the examples of applying cloud service to teaching. Taiwanese scholars [6] applied the community site in Facebook with Mac iPod touch to recommend the situational materials for communication, and, through the familiarity among the community members, further evaluated the learning satisfaction of students on the collaborative learning platform. Zorko [7] utilized wikis to develop a learning environment with supporting functions and active construction of knowledge. This kind of learning environment allowed college students to complete a shared task in the English cooperative learning. The findings showed that the cooperative behaviors among students and the communication between the teacher and the students were increased in the Wikis learning platform, proving that the utilization of Wikis could enhance the English learning and effectively construct knowledge with cooperation.

The occident and Taiwan, with high popularity rate of technology, are making waves of high-speed downlink packet access (HSDPA), which, also named 3.5G wireless communication technology, can help the application of cloud service [8-10]. Taiwanese scholars [11] presented the similar viewpoints that, with the 3.5G HSDPA and broadband IP sharing, ubiquitous and real-time communicative learning environment could be established. It is believed that it will be widely and diversely applied to various situational learning. The cloud operation and service could be combined with collaborative learning [12-17], which focuses on communicative interaction, that both the task work and the teamwork are achieved. The implementation of the task work plays an important role in collaborative learning performance, as it emphasizes the lack of decision efficacy when the team members do not present the ability for the task work and effectively work together. Computer supported collaborative learning (CSCL) could break through the territorial restrictions so that the application of CSCL on cloud learning can assist the learning of students. In the near future, the learning field of cloud will allow students to learn ubiquitously with mobile devices. Some CSCL systems have noticed that the improvement of the task work in collaborative learning could provide suggestions for students to maintain the dialogue focus and to arouse the reflection on the task [18, 19]. Other CSCL systems present the function to remind students of the task progress or to indicate the sequence of the task [20-22]. More systems are aware of the conflict on the task,
aiming at the difference between the individual and the team work, provide proper suggestions [19, 21, 23], or, according to the learning contents, remind the students of learning [24-26]. The relevant research on the combination of m-learning and CSCL is named MCSCL. Some scholars [27] successfully utilized mobile devices to support the collaborative learning on the Internet as well as effectively improved the lack of interaction and negotiation among members in the traditional CSCL.

2. Innovative E-teaching

E-teaching is divided into the dimensions of “teaching” and “learning”, where “teaching” has teachers, as the center, utilize e-equipment to proceed the instructions, while “learning” allows students, as the focus, to apply the Internet to learn.

2.1 E-learning

With information technology, e-learning provides students with various efficient learning activities, also known as digital learning. It contains the following styles.

- Digitalized teaching materials. The teaching materials are uploaded to the Internet for students to access to.
- Learning community. The teacher and the students can discuss on the Internet.
- E-school bag. The traditional learning materials and pens can be stored in digital devices.
- Project-oriented learning and the learning activities like digital storytelling, games, and simulation-based learning.
- International communication, including Language learning and cultural exchange.
- Virtual classroom for learning on-line.

2.2 E-teaching

Electronization, also known as computerization, aims to reduce the cost and enhance the operation performance. E-teaching presents the teaching activities assisted with electronic information technology that establishes an automatic teaching operation mechanism with electronization to assist the teachers activating the teaching activities, such as “automatically” recording the process of teaching activities, reporting and compiling statistic evaluations, sending notices to the students and the parents, and establishing the learning process database. Basically, E-teaching applies the network and the information equipment, like the Internet, computers, digital desks, projectors, interactive e-whiteboards, and web cameras to precede the instructions. With the Internet as the medium, the E-teaching materials are transmitted to the remote learners. It is featured that the Internet is utilized as the teaching medium that the learners and the instructors could synchronously and asynchronously communicate through the Internet to achieve the learning. The advantage contains that it is not restricted to time and space, the learning and the interaction can be preceded at any time, the learning population is not limited, the teaching materials can be repetitively used, and the learning process can be recorded by the learning system.

3. The procedure of introducing E-teaching

With the fashion of the Internet in recent years, the concept of cloud has emerged that the e-learning has received more concern. As long as the learning with information equipment can contribute to the promotion of quality E-teaching, it has become the endeavored direction to promote e-learning. The Government used to promote Integrating Information Technology into Curriculum and widely adopted the suggestions from experts to expand the subsidy of the domestic demand for improving the hardware equipment in schools and establishing the teaching material resource center, to provide digitalized teaching materials and the selection of seeds schools for promoting and popularizing E-teaching and e-learning, and to hold several seminars and trainings for promoting with concepts and enhancing the skills. It gradually led all teachers in elementary and junior high schools to apply information technology and the network to classroom teaching and student learning.

In the promotion of informatized teaching, both computers and the network are inevitable, but various schools do not seem to be familiar with the teaching methods of digitalized materials. The teaching effect would be affected by the application skills of computers, the presentation process of information, and the course explanation of teachers. In this case, the teaching effect depends on individual utilization of teaching aids, the demonstration of the materials, and the ingenious application. To pay off innovative E-teaching, teachers’ basic abilities of information literacy and the teaching strategy are quite important. This study makes a brief introduction of the school promoting innovative E-teaching and expects to provide other schools with the conformity when promoting E-teaching. Previously, in the process of introducing the teaching, teachers had to consider the reconstruction of the environment in spite of developing the teaching of unit material. The application of media teaching aids was a required teaching competency. In addition to teaching media, the establishment of digital environment, the promotion of teachers’ information skills, and the digitalization of teaching materials were the key to promote E-teaching seeds schools. To introduce schools into E-teaching, four steps are classified.

3.1 Step 1: The improvement of school information equipment

- The establishment of the server host in the school. To establish various server hosts, such as WWW Server, FTP Server, Mail Server, Media Server (MMS), LMS, and learning management system (Moodle, Xoops, Sharepoint).
- Wire and wireless network environment in offices and teaching area.
- Teachers equipped with notebook computers (or PDA) with wireless Internet.
- The teaching allocation of classrooms, such as computers and projectors.
- Computer classrooms with various teaching equipment.

3.2 Step 2: The promotion of teachers’ information ability

- Homepage editing, including static web page, like Frontpage, and dynamic web page, such as the Active Server page of ASP.NET
• File management, such as the access of FTP files.
• Multimedia. The basic ideas contain the editing and transfer of texts, graphs, sound, images, animation, and object files.
• Network concept, such as the plan and establishment of the network and cloud serving resource.
• The access, application, and management of the network resource.

3.3 Step 3: The establishment of teaching resource
• Digitalization of teaching materials. To compile the traditional teaching information into various media files.
• Teachers’ personal teaching resource placed in cloud, like BLOG, WWW, and FTP Server to share with others and students.
• Establishment of network learning community.
• Introduction of e-learning for students, such as class web page, student learning portfolio, and personal digital file management.

3.4 Step 4: The integration and the application of teaching resource
• The integration and the application of present teaching resource. To understand the present resource, to establish a teacher’s digital storehouse, and to select suitable network environment from various cloud services.
• With present network resource, applying information equipment to classroom teaching.
• Integrating information into subject curriculum, such as E-teaching materials and methods to reinforce the knowledge share and communication.

The previous introduction steps are divided into two dimensions that steps 1 and 2 require external support or the policy subsidy for schools to further integrate, while steps 3 and 4 allow teachers to proceed on their own. With the establishment of personal teaching resource and the digital knowledge management, the personal information integration and application are placed in the web server hosts in schools or at home for ordinary teaching. The processing items of the above steps 1 to 4 are demonstrated, and the constructions are also sequenced. Each scholar or teachers’ association, with personal background and ability, will focus on different points. However, when the infrastructure is not strong and the rooting is not steady, the promotion will become an idea which cannot be prolonged.

4. Activities for E-teaching
The indicative work items are listed in the above four steps, but the introduction strategy and the direction need to be adjusted based on the capability of each school. The introduction of innovative E-teaching should start with teams, and gradually promote to teachers when the idea is formed. The promotion strategy of Peer coaching is based on the team with 3~5 teachers who help and learn from each other. From the growth of information ability and the establishment of the environment, the application of resource appears detailed working index and promoting process. It is expected to present a definite result after the 3-year plan. There are several important activities listed below.

• Conducting information trainings for teachers, including the ability of the information operation of Information Communication Technology (ICT) and the basic concept of teaching methods integrating subjects.
• Definitely drawing up the working process and index, reviewing and controlling the schedule at any time, and recruiting experts for regular evaluation.
• Inviting experienced teachers for the speech of introducing the practice and the experience.
• Planning the school network, including the establishment of servers and the provision of wireless network nodes so that teachers could browse the Internet with notebook computers or digital mobile devices anytime and everywhere.
• With the school-built network resource or cooperating with Internet Service Providers (ISP), teachers are provided with space to store the web pages, where the space could execute interactive web pages. Moreover, sufficient disc space in the network should be provided to teachers for access so that they are encouraged to file the E-teaching materials and establish personal teaching information storehouse to be applied to teaching.
• Increasing the ratio of teachers equipped with notebook computers to enhance the management ability of digital files. In addition to the provision of the network resource in schools, teachers are introduced to utilize the home computers to establish server resource so that teachers have usable resource both at home and in schools. Besides, the information in the both ends can be exchanged that teachers can, at home or in schools, access to or update the personal resources with wireless Internet.
• Assisting teachers with the editing of personal web pages and the saving of supplement resources for teaching. Having the web page as the bridge for the communication between the teacher and the students, students can interact, do tests, hand in homework, or leave message, discuss, and state personal learning experience through the Internet.
• Moreover, compiling general materials with the integration of resources for the application of teachers from other schools.

In the learning process, students should cultivate critical thinking skill, creative thinking skill, and problem solving skill. The recognition of digital technology and the control of information and message are the required skills for students. Teachers, therefore, have to be introduced to the informational environment so as to lead the students into information.

5. The application and method of teaching with information technology
To apply digital equipment to teach, there are various methods and tools for teachers, and the applications are also wide. A lot of new teachers are willing to apply digital equipment as well as collect and store personal teaching information to make the teaching materials easy manage and be repetitively used that would help a lot in teaching. Table 1 shows the preparation of teachers when applying information technology or teaching materials, as well as the applications and the methods.
Table 1. Application and method of teaching with information technology

<table>
<thead>
<tr>
<th>Application</th>
<th>Tool</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplement materials for teaching</td>
<td>Internet</td>
<td>Information collection, classroom tips</td>
</tr>
<tr>
<td>Interaction between teachers and</td>
<td>NetMeeting, E-mail</td>
<td>Establishment of learning community, provision of teacher-student communication, problem shooting, peer learning, on-line discussion</td>
</tr>
<tr>
<td>students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-line test and assessment</td>
<td>ASP &amp; WWW</td>
<td>After-class exercises for students to understand the learning performance and to collect the teaching feedback</td>
</tr>
<tr>
<td>Collaborative learning</td>
<td>Internet</td>
<td>Cross-schools or cross-nations interactive learning or networked collaborative learning</td>
</tr>
<tr>
<td>Virtual classroom</td>
<td>Internet</td>
<td>Moving tradition classrooms to the Internet for all traditional teaching activities</td>
</tr>
<tr>
<td>Competitions</td>
<td>Internet</td>
<td>Providing students with creation exhibition and conducting learning activities on the Internet</td>
</tr>
<tr>
<td>Student homework</td>
<td>Office, internet</td>
<td>Students practice, hand in homework, and learn with computers.</td>
</tr>
<tr>
<td>Class and student information</td>
<td>Excel, ACCESS, ASP</td>
<td>Management of student information</td>
</tr>
<tr>
<td>Parent-teacher communication</td>
<td>E-MAIL, Web</td>
<td>Communication book</td>
</tr>
</tbody>
</table>

6. The establishment of digital resource for teachers

With the emergence of cloud, the size of notebook computers is reducing and the functions of smart phones are enhancing that both devices are the required tool for learning. To present the advantage of knowledge sharing and communication in network teaching, teachers have to manage the equipment which digitalizes the application of personal teaching materials. To have the information get in and out of the network, the digitalization of teaching materials is the primary step. Since the digital information can be stored in the cloud space, it is convenient for teachers to access to as well as for students to download and browse. The most common network service applied on the Internet contains:
- E-mail. For teachers and students to communicate.
- Web storage. For the teaching materials being shared and accessed to.
- Web page and Blog. For personal use and teaching.
- Learning community, such as Google side and Windows Live.

Within the four cloud services, e-mail is a convenient communication; web storage allows teachers to save files for sharing with the students or the access of certain account; web page allows teachers to post messages with multimedia objects so that the users are easy to browse; and applying for Blog is the most common learning community, as a kind of interactive web page, that browsers can leave message in Blog or participate the discussion, and share the experience.

7. Personalized E-teaching

Teachers normally utilize the Internet in school and at home, as shown in Fig. 1. The network in schools is equipped with basic server, such as DNS, Mail, and Web, while it is generally dialed up to connect to the Internet with float IP at home. Since plenty teachers are equipped with mobile devices, which require WiFi or 3G wireless Internet, a wireless IP sharing equipped at home has become a trend. Moreover, information teachers would apply fix IP from the Internet providers so that they can easily establish network service at home.

![Figure 1. Personalized E-teaching](image)

Presently, the proportion of teachers with mobile devices, like notebook computers and smart phones, is increasing. Generally, teachers could utilize the network server equipment in schools or the free resource from ISP; however, other teachers can utilize wireless Internet at home. Fig. 1 shows the framework to establish personal server environment for teaching service.

8. Conclusion

The promotion of E-teaching in schools depends on the practice of teachers. Nevertheless, teacher can seldom follow the change of information technology, and the equipment renewal in schools often falls behind. In innovative E-teaching, scholars suggest, based on the steps of constructing the environment, cultivating teachers, and digitalizing teachers’ teaching materials, to well-apply the feature of digital environment, put E-teaching into effect, and sequentially promote to class or course teaching so as to achieve the objective of innovative E-teaching. Teachers are at the frontline of teaching that they need to accept new concepts, adjust teaching methods with the change of the e-environment, prepare personal mobile devices, establish personal cloud...
teaching environment, develop the advantage of computer technology, and enhance the teaching quality. Teachers should regard teaching as a sustainable career and store teaching materials, like supplement materials, on the Internet. As a consequence, abundant personal teaching resource will be saved to enhance the teaching competence. From the aspect of long-term effectiveness, the digitalization of teaching materials is beyond question. The introduction of new teaching method requires the support of system and technology as well as the acceptance of new ideas. In the beginning of the promotion, difficulties and problems are inevitable. It is expected that schools would present the perseverance persistence and innovative decision to develop E-teaching in schools and lead students into the information world as soon as possible.

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Reference