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Cloud-Assisted Teaching and Ubiquitous Learning: Experiences and Reflections on the Implementation of Public Administration Courses*

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Abstract

Mobile cloud computing is the most powerful tool when executing ubiquitous learning in higher education, and it enables access to learning materials remotely anywhere and anytime. At the same time, this article introduces the experience of using cloud-assisted teaching in Public administrative courses to illustrate its impact on teachers and students. This research applied the in-depth interview and questionnaire survey and adopted the one-group pretest-posttest quasi-experimental design in each semester. From the perspective of empirical survey and interview results, students generally accept this learning method but lack the motivation and incentive to continue to use the cloud-based assistance system. However, the application of this system indeed brings about certain learning performances by changing the teaching strategies, and the integration of the system into the curriculum is also affirmed by the students.

Keywords: Cloud- Assisted Teaching, Ubiquitous Learning, Digital Learning Platform, Public Administration, Teaching Practice Research

I. Introduction

The rapid development of information technology has impacted all levels of society, including the field of education in universities. Especially with the emergence of smartphones in recent years, mobile cloud computing (MCC) is a new distributed computing paradigm, defined as infrastructure, applications, or processes, where data

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storage and processing migrated from smartphones to distributed cloud server technology (Dinh, Lee, Niyato, & Wang, 2013). MCC gained a lot of attention from organizations and individuals as a promising solution for ubiquitous learning environments, where data storage and processing take place on the “cloud” via the internet (Park & Kim, 2014:377). In other words, the use of mobile internet by smartphones provides students with ubiquitous information and learning materials. (Arpaci,2019:181)

On the other hand, Taiwan's introduction of public administration mainly originated from Western countries, especially the United States, and officially began to teach university courses in 1935. However, after more than 80 years of development in Taiwan, public administration has the following characteristics in actual teaching: firstly, the classic textbooks(compiled by local teachers) are still the first choice for teaching; secondly, the connection between theory and practice depends on the explanation of the lecture; thirdly, the application rate of English textbooks decreased deeply; fourthly, the paper-pencil test is the most important method of course evaluation (more than 50% of the subject grades); finally, official examinations, attendance, and classroom participation are the most common methods to evaluate student’s performance.

Since the university I serve is not the top-ranking, and based on 14 years of teaching experience in public administration, I found that students in this course generally have the following characteristics: lack of motivation to study, inability to discuss and speech, not sure about their expertise, addicted to the online world, and lack of sense of achievement and self-confidence. Accordingly, the Department of Public Administration at Chung Hua University started to introduce a cloud-assisted teaching system in 2015, and users can get answers immediately (multiple-choice questions only) by practicing the questions anytime and anywhere. This establishment aimed that students can regain their motivation and confidence in learning, and have certain advantages and opportunities for actual participation in relevant government examinations.

Based on the problems mentioned, this article focuses on how to enhance the benefits of students' use of cloud-assisted teaching systems and understand the real influencing factors. By adjusting the use of cloud-assisted systems and teaching strategies in the teaching of public administration, this article applied the student

questionnaires and in-depth interviews with stakeholders (graduates, teachers, students, system developer, and civil service examiner) to effectively improve the use of the system, and expand the benefits as much as possible.

II. Literature Review

A. Cloud Computing

Cloud Computing (CC) is a revolutionary step towards realizing the competitive demands of the education sector for higher agility, lower risk, and lower cost through computing (Kiran & Vikas, 2017:208). It enables students, faculty and administrators, and other university stakeholders, to access a vast array of cloud services through a novel computing paradigm. Universities are now migrating to the cloud for several reasons, especially for economic purposes (Mircea & Andreescu,2011; Mircea et al.,2011). CC is closely related to the e-learning system of higher education institutions, and it provides high-quality and low-cost computing solutions, as well as the ability to develop virtual computing environments, especially in areas such as distance or online learning and science education (Al-Zoube, et al. 2010; Ali,2019)

1. Features and Benefits

According to the National Institute of Standards and Technology (NIST), CC is "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that rapidly provisioned and released with minimal management effort or service provider interaction" (Mell & Grance,2011:2). Not only does it allow for rapid configuration and release with minimal administrative effort or service provider interaction, but it also provides greater scalability, flexibility, and mobility in using resources for instructional purposes (Alharthi et al., 2015; Scholten, 2017; Stergiou et al., 2018).

In addition to providing teachers and students with a variety of cloud-based applications and services available for formal and non-formal education, CC also provides greater scalability, flexibility, and mobility in the use of computing resources for teaching and learning purposes nature, enhance collaboration, communication and resource sharing, and allow institutions to build virtual communities for teaching and learning, such as customized learning environments (Ali et al.,2018; Askari et al., 2018; Willcocks et al., 2014).

Practically, universities face many problems, such as the need to change infrastructure and improve and modernize education that access to different categories of people, but some students are rapidly embracing e-learning and mobile learning, while others are not, at the same time. However, the adoption of CC provides educational institutions with a small amount of expertise and investment access to high-end technology (Shahzad et al.,2020:3). Additionally, CC is expected to replace traditional computing that builds data centers, and in-house management infrastructure (Masa'deh, 2016)

The collaborative learning approach is one of the main advantages offered by CC technology, and education institutions that are looking for computer-based technologies to enhance more socially and collaboratively oriented learning styles (Guan & Qian, 2013; Qasem et al.,2020). CC also facilitates e-learning in human computing interactions, as they utilize data access facilities such as monitoring and storage through cloud platforms, and provide a stable and economical infrastructure (Mokhtar et al.,2013).

Although cloud computing has so many benefits, as Morsy, Grundy and Müller (2010) pointed out, CC also has its security issues, such as the technology used, multi-users and isolation, Security management's design, and security component arrangement. Therefore, they believe that to solve the security problems of CC, it is necessary to strengthen the hardware infrastructure, so each user can see only his security configurations and contents, integrate, and coordinate with other security controls, and meet continuous environment changes and stakeholders' needs. However, the evaluation and selection process of CC Services is frequently conducted ad-hoc and lacks systematic methods to approach, and raises the awareness of indirect as well as hidden costs in CC (Martens et al,2012). Finally, CC usually lacks standardized technology in the IT system design and the compatibility issue between cloud and IT systems in different organizations (Latif et al, 2014:293).

2. Cloud Service Type

CC includes tripartite services: infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS). SaaS enables users to access applications through a cloud-based infrastructure, and it means that infrastructure such as servers, operating systems, and networks are removed from the users, and the users no longer need to care about this or other issues, such as data storage. The IaaS model

means that users deploy and run software of their choice by providing computing resources such as networking, storage, and processing. This can be achieved through a variety of software, which could be an application or even an entire operating system. Finally, PaaS provides users with a platform to deploy applications on the wider cloud infrastructure and allows them to create and modify their applications using libraries, services, and languages already developed by cloud platform providers.

Hussein and Hilmi (2020) pointed out that cloud-based learning systems are the future of e-learning technology and related infrastructure. Cloud-based e-learning systems are considered a subdivision of cloud computing in education. In addition, to enhance the traditional e-learning infrastructure, it has all the supplies including hardware and software resources.

The cloud-assisted teaching system discussed in this article belongs to the platform as a service (PaaS), in other words, the relevant teaching and testing software is built on the cloud. Teachers and students use it freely without dealing with data storage problems, and both parties query the records and results at any time. In addition, the system also allows teachers to create their own teaching materials and test questions, and download the students' learning data for analysis.

B. Ubiquitous Learning

Distance education and learning is a new trend in education that benefits from the development of information technology and tries to take full advantage of new technologies in different geographical locations (Al-Malah et al.,2021:2). Therefore, students can access educational services off campus from anywhere on their mobile devices. Faculty and staff can easily access their learning materials from their rooms and classrooms. Ubiquitous learning, a concept that can be defined as an everyday learning environment that provides learners with information anytime, anywhere through smart devices (Ogata, Matsuka, El-Bishouty, & Yano, 2009), is one of the ways that developed rapidly in recent years.

1. Learning Away from the Classroom

In traditional learning environments, teachers seem to be out of reach as the "sages on stage" in the classroom, and the learning process is often limited by space and time. However, with the rapid development of information technology over the past few decades, the learning approach in schools has evolved from e-learning (e-learning) to

mobile learning (m-learning) to ubiquitous learning (u-learning). Ubiquitous Learning is a new learning environment that combines the advantages of e-learning and mobile learning, but it is an "anytime and anywhere" model that depends only on individual curiosity (Mota,2019:2).

One of the most important goals of accessible computer technology is to place teaching activities in real life, which is one of the characteristics of ubiquitous learning (Resnick et al., 1995:443) This emerged learning approach can be used simultaneously, and content adapted and designed as interactive environments (Cárdenas-Robledo & Peña-Ayala, 2018). The most accepted definition of ubiquitous learning is "anytime and anywhere". This definition attempts to denote a learning environment that allows learners to use mobile devices connected wirelessly or via the Internet anytime and anywhere (Tahir et al,2018:180).

Erkul and Kert(2022) argued that ubiquitous learning provides students with a more efficient, effective, and comfortable educational environment. In addition, researchers also featured six main characteristics of a ubiquitous learning environment: permanency, accessibility, immediacy, interactivity, situating of instructional activities, and adaptability (Yahya, Ahmad, & Jalil, 2010; Ma & Yu,2019). Besides, using ubiquitous learning increases situational awareness and provides seamless usability through anytime, anywhere learning experiences (Aljawarneh, 2020:59).

2. Distance Learning by Using Your Device

Individual self-regulated learning is another characteristic of ubiquitous learning. Self-regulated learning helps students take over their learning process and achieve autonomy through factors such as cognition, metacognition, and social events. According to this view, a range of learning and social goals, as well as emotional factors, influence learning and lead to self-regulation (Yang et al., 2015:145). Vallejo-Correa et al. (2021) pointed out that ubiquitous learning applies the basic concepts of mobile learning, considering sensor technology, to enhance learning and promote active learning opportunities through more interaction between teachers and students. In adopting the ubiquitous learning process, mobile and portable technologies are seen as tools that allow learners to access information regardless of their physical environment (Pimmer et al.,2016:491).

Norris and Soloway (2011) also argued that we live in a mobile age where users expect to be connected anytime, anywhere via affordable and globally adopted devices.

Some universities applied the BYOD (Bring Your Device) programs for teaching and learning, and the BYOD program also encourages staff, especially students, to use their devices, such as smartphones, laptops, tablets, e-readers, etc., to facilitate access the licensed information and applications, and to participate in academic discussions. These mobile devices are ideal educational tools for new pedagogies as they facilitate experiential and active learning activities. Bristow et al. (2017) also pointed out that there are three main reasons for implementing a BYOD program: firstly, mobile devices are ubiquitous among college students; secondly, the BYOD program provides effective pedagogy that will enhance student learning; finally, these programs allow higher education institutions to reduce costs associated with computer labs and technical support.

Paramythis and Loidl-Reisinger (2004) pointed that adaptive learning is based on the idea of adapting learning methodologies to students' learning styles. The concept is to help students learn at a faster pace, more effectively, and with greater understanding. The adaptive learning process includes: monitoring student activity, interpreting the results, understanding students' requirements and preferences, and using the newly gained information to facilitate the learning process. From this perspective, ubiquitous learning is the practice of adaptive learning. It combines the advantages of an adaptive learning environment with the benefits of ubiquitous computing and the flexibility of mobile devices. Students have the freedom to learn within a learning environment which offers adaptability to their individual needs and learning styles, as well as the flexibility of pervasive and unobtrusive computer systems (Jones & Jo,2004:469). Moreover, the ubiquitous learning environment that was improved based on the meaningful learning evaluation method was able to enhance the learning effectiveness for low-achieving students (Huang & Chiu,2015:251).

C. Public Administration Education in Taiwan

1. System and Current Situation

According to the 2022 official statistics, Taiwan's population is about 23 million people, established 159 colleges and universities which 49 are public and 110 are private. At the same time, compared with other countries, Taiwan has a very high number and density of universities, and there is more than one university in every county and city. The university applied the semester system (not the quarter system),

and the academic year is divided into the first (September- next year January) and second semester (next year February-June) each with 18-week courses. Generally speaking, the main ways to admission to the university are selection, application, and group examination, and each department usually requires 128 credits within four years to graduate.

According to the information of the Taiwan Association for Schools of Public Administration and Affairs (TASPAA) established in 2003, there are 34 departments and institutions related to public administration, including political science, political economy, public administration (management), and public affairs. Among them, there are 17 departments directly under the name of public administration or affairs and 8 institutions without undergraduate programs.

As mentioned above, Taiwan began to introduce the teaching of public administration in 1935, and its content still has strong characteristics of American theory and experience. Public administration is a major course with 2 or 3 credits per semester in the relevant departments, and also the test subject for the public service examination. Except for a few postgraduate courses that use English textbooks, most of the current public administration courses mainly use classic textbooks or self-edited materials. There are few textbooks written by senior professors, and the content mainly introduces the theory and experience of the West and the United States. The content of classic textbooks includes specific sections: introduction, organizational theory, administrative operations, personnel administration, government budget, etc., however, it can’t be fully taught in the course.

2. Cloud-Assisted Teaching System in Case Study

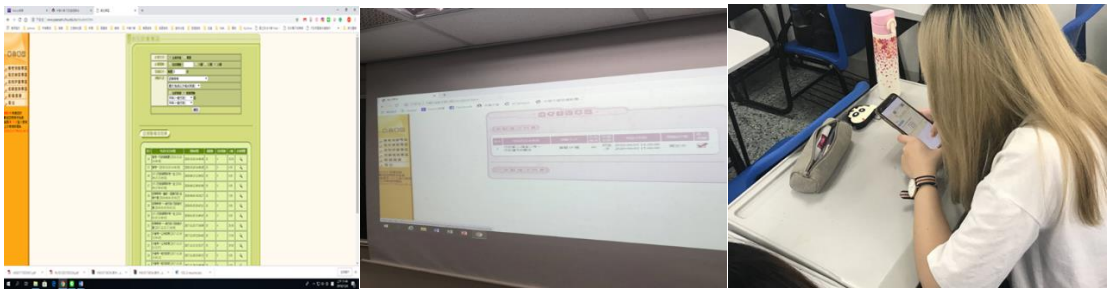
In 2015, the Department of Public Administration at Chung Hua University began to promote the construction of characteristic experimental classrooms, this program conducts the simulated exercises and online real-time tests through a professional online examination platform. It aimed to cooperate with teachers' explanations in the course, make students more familiar with the course content, and improve their answering accuracy. Therefore, the main features of the system are: firstly, it supports smartphone devices and tablet devices without installing the additional APP, in other words, smartphones, tablets, NB and desktop computers can connect to the server through the internet; secondly. students apply the system for self-practice questions anytime, and hold formal exams designated by the teacher; thirdly, in addition to the

built-in question database, teachers also can build their question database for the online tests, and get the test results immediately (multiple choice questions only); finally, there are more than 10,000 questions related to the Public Administration course.

In Taiwan, the establishment of this system is the first initiative for the Department of Public Administration, and the teachers and students both give a high score of satisfaction. However, I also found many potential problems from actual application and observation: firstly, except for the specified test courses, the student entry rate is very low during the rest of the time; secondly, to get the test score immediately, it usually applies multiple choice questions. The main consideration is to facilitate the system to calculate the score automatically. However, this means that students could know the answer only by memorizing and reciting; thirdly, many colleagues and students are not very familiar with the system, and refuse to use it (because it is too cumbersome); finally, in addition to the course requirements, students lack incentive and motivation to enter the system and practice the questions.

Figure 1

Cloud-Assisted System Interface and Application[1]



III. Research design and methods

As mentioned above, this article focuses on how to improve the effectiveness of students using the system, understand the real reasons behind it, and redesign how the system is used and teaching strategies. Therefore, there are mainly two research approaches for analysis:

Firstly, the Student feedback questionnaire: It is conducted in conjunction with the mid-term and final examinations of each semester. The questionnaire contains three scales, which were modified after referring to relevant literature, namely “the curriculum engagement scale” (Ahlfeldt, Mehta & Sellnow, 2005; Handelsman, Briggs,

[1] Pictures taken from the actual teaching process of this study.

Sullivan & Towler, 2005; Langley, 2006), "the self-regulated learning strategy scale", refer to Weinstein's (1987) Learning and Study Strategies Inventory and Pintrich, Smith, & Mckeachie's (1989) Motivated Strategies for Learning Questionnaire (MSLQ), and "the willingness and reasons to use the system scale" based on the integrated technology acceptance model (UTAUT model) proposed by Venkatesh (2003). The sample size is 98 (including students from the other departments), and 4 questionnaires were conducted to inquire about the opinions and attitudes of the students. The reliability of the student feedback questionnaire is shown in Table 1.

Table 1

Reliability of Student Feedback Questionnaires

Scale	Cronbach' alpha
Curriculum Engagement (22 items)	0.938
Self-Regulated Learning Strategies (29 items)	0.905
Willingness and Reasons to Use the System (28 items)	0.959

Secondly, In-depth interviews: Through in-depth interviews with stakeholders (graduates, peer teachers, students, system developer, and civil service examiner), to understand the following related issues: factors affecting learning motivation, system planning and construction, learning results and evaluation, teaching strategies, and system improvement.

Table 2

Stakeholder Interviewees

Status	Number	Reason for selection
A former student in the department (has transferred to another school)	1	Excellent performance in Public Administration courses, and won the academic Scholarship
Student in department	2	Excellent academic performance and preparation for the civil service examination (1 person), and regular students (1 person)
Off-campus Public Administration peer teacher	5	1. Teachers who publish administrative textbooks (4 person) 2. Chairman of Taiwan Association for Schools of Public Administration and Affairs (TASPAA) (1 person)

Graduate students of the department	2	1. Have passed the civil service examination and serve as a civil servant (1 person) 2. Prepare for the civil service examination (1 person, and then pass the local civil service examination)
System developer	1	Be familiar with system design and management, and provide suggestions on teaching design based on experience
Civil service examiner	1	National Civil Service Examination planner

The survey and interview were executed during 2019-2020, and funded by the Ministry of Education Teaching Practice Research Program (code: PSL1080036) in Taiwan. This research applied the one-group pretest-posttest quasi-experimental design in each semester, and paired sample t-test (pre-test and post-test self-comparison) to analyze the differences in students' learning motivation, attitude, and use of the system (see Figure 2).

Figure 2

Research Design

First Semester O_1 X_1 O_2

Second Semester O_3 X_2 O_4

Therefore, this research cooperated with observation and questionnaire surveys at the beginning (O_1, O_3) and end (O_2, O_4) of each semester and applied different teaching strategies (X_1, X_2) in each semester.

In the first semester, teaching strategy 1 is that students practice the question database in the system within the teaching scope, and the mid-term and final exams are selected from them again;

In the second semester, teaching strategy 2 adopts the suggestions provided by the in-depth interview and takes the quiz immediately after the lecture according to the chapter (the teacher adds the questions, and the students do not practice by themselves before). After the test is completed, the questions will be placed in the system, students

can practice by themselves anytime (anywhere), and the questions will be random sampling from the database of each chapter in the mid-term and final examination.

At the same time, the differences in content and difficulty of teaching subjects during the semester are interference factors in this study.

IV. Results and discussion

This article applied the original teaching strategy 1 in the first semester, conducted 2 student feedback questionnaires, and executed the in-depth interviews with 12 people in 5 categories. In the second semester, referring to the suggestions for changing teaching strategies provided by in-depth interviews, applied the teaching strategy 2 in the course, and conducted 2 feedback questionnaires. Therefore, the important findings of the in-depth interviews and student feedback questionnaires were analyzed as follows:

A. In-depth Interviews with Stakeholders

Based on the opinions of 12 respondents, it is summarized here as follows:

Firstly, Students' learning motivation: students pointed out that they don't read or review the content before and after the course, while peer teachers think that this part is influenced by whether they want to take the civil service exam or are encouraged by their peers;

Secondly, The application of cloud-assisted systems in teaching: most of them emphasize that question database should added frequently and adjustment functions to facilitate chapter-by-chapter practice (teachers, system developer), and the test questions should classified according to the chapters (students, peer teachers, system developer, civil service examiner);

Finally, The suggestions for improvement in teaching: they recommended expanding the application in different courses, increasing the frequency of quiz tests (students, peer teachers, system developer), and reinforcing the importance of open-ended questions in the test (peer teachers, system developer).

According to the opinions of the interviewees, the three findings are outlined here: First, the cloud-assisted teaching system: instant response to learning results is the main feature, and the answering method can show the development trend of the current field, but the disadvantage is that the system design still has flaws and is not user-friendly

enough; Second, practical teaching application: Questions can be set and reviewed according to the classification of teaching units. However, if the teacher does not force the use of this system, students will not actively enter the system to study.; finally, learning motivation: the system must rely on teachers to promote its use, and students lack active learning motivation.

B. Student Feedback Questionnaire

This survey, conducted 4 questionnaires, excluding the miss samples in the pre- and post-test, and there are 98 valid respondents. The following are the key findings from the survey (see Table 3):

Firstly, The curriculum engagement scale.: according to the analysis results, there is generally an improvement effect, especially in the parts of reviewing the hand-write notes and raising hands to ask questions in the course;

Secondly, The self-regulated learning strategies scale: the results of the first semester are somewhat worrying, such as the problem of cramming, careless checking before handing out the answers, and inability to concentrate on reading, etc. Fortunately, in the second semester, the above problems not only disappeared but also transformed in a positive direction, for example, they can self-review their learning methods and strengthen error correction, etc.;

Finally, The willingness and reasons to apply the system scale: there is no significant difference in the results of the first semester. However, in the second semester, there are two different views. The positive is that students will continue to use the system, but the operation and stability of the system have a negative concern.

Table 3

Paired Sample t-Test Results for Student Feedback Questionnaires

Scale	First Semester	Second Semester
Curriculum Engagement	● Review the notes before class to make sure I can understand the course content (p=0.042)↑ ● I raise my hand to ask questions in class	● Review the notes before the course (p=0.044) ↑ ● I raise my hand to ask questions in class (p=0.042) ↑ ● I will help my classmates to study (p=0.026) ↑

	(p=0.009) ↑	
Self-Regulated Learning Strategies	● I almost crammed every exam (p=0.007) ↑ ● After writing the test paper, I will check it carefully before handing it out (p=0.025) ↓ ● When I sit down to read, it takes a long time to concentrate (p=0.020) ↑	● When I encounter learning difficulties, I will review the learning methods and try to solve them (p=0.005) ↑ ● After each test, to truly understand, I will carefully correct the wrong answer questions (p=0.047) ↑
Willingness and Reasons to Use the System		● I'm not sure the information passed correctly when sending the answer (p=0.040) ↑ ● I will continue to use the system (p=0.010) ↑

V. Reflections and Feedback

However, after one year of teaching and application experience, here are some reflections on teaching：

1. Course preparation and explanation: Since public administration is the core course of related departments such as "Public Administration", "Public Management" and "Public Affairs", it plays an important role in guiding students to the entry of this science. In practice, how to transform the difficult theories and concepts of textbooks into easy-to-understand content, really requires a lot of examples and localized experience. This part depends on the teaching skills and abilities of the lecturer;

2. Familiarity with the system and question design: although this system has its excellent characteristics and irreplaceable advantages, however in actual operation, the teacher needs to be proficient in the logic of system design, and can immediately eliminate various situations caused by students' misusage, such as can't log in, can't submit, log in using an incompatible interface or software, etc.;

3. Maintenance and update of the system question database: usually, the multiple-choice question database has about 5 years of service life, mainly because it avoids the negative effects of repeated propositions and guessing. Similarly, the system used in this article also has similar problems, except to increase the number of questions, it is also necessary to constantly update.

From the results of the in-depth interviews, it can be found that students would not actively enter the system to practice after school, and only use it before the exam. In addition, students' overall satisfaction with the system is on average 80-85% and generally has not changed drastically.

Finally, according to the actual test results, teaching strategy 2 applied in the second semester, had a slowly increased correction rate (61% to 75.5%), and indicated that students began to adapt to this teaching method. However, the correction rate of the mid-term and final exams is 82.25 to 88.89%, which is much higher than that of the quiz. Because this part of the test is known in advance, students ensure that they can get the score by continuously entering the system to practice (see Table 4).

Table 4

Correction Rate in the Second Semester

item	scope	correction rate
In-class quiz	Informal organization	61.1%
	Non-profit organizations	70%
	Organizational development and learning	58.4%
	Organizational diagnosis	65.1%
Mid-term exam	Mixed question design	**82.25%**
In-class quiz	Leadership	66.4%
	Motivation and incentives	66.7%
	Communication	75.5%
	New Concept of Organization Operation	67.7%
Final exam	Mixed question design	**88.89%**

After actual practice and changes in teaching strategies, this study found that there are some shortcomings in using the cloud-assisted teaching system, which requires follow-up efforts:

1. Emphasis on the practicality and importance of system assistance: This study observed that students' mentality in using cloud-assisted systems is limited to course requirements and ways to obtain scores, and teachers will only use the system when the requirements are strong. At the same time, in-depth interviews with students also pointed out that the cloud-assisted teaching system has its characteristics and is helpful, but it still has a long way to go before it can truly prepare for the civil service examination, especially in question bank updating and question analysis (the system has this function, but requires manual processing). In other words, the above still returns to two basic issues: systematic management of resources and teacher enthusiasm.

2. Increase students' interest and frequency of use: Generally speaking, the cloud-assisted teaching system is an open digital teaching platform. It not only helps in taking civil service exams but can be used for any certification exams as well. Therefore, in addition to enhancing the use of courses, what is more important is the diversity and richness of system content. This allows students to immediately get help from the cloud-assisted teaching system according to their course needs and get more help in learning.

VI. Conclusion

MCC is the most powerful tool when executing ubiquitous learning in higher education, and enables access to learning materials remotely anywhere and anytime. At the same time, this article introduces the experience of using cloud-assisted teaching in public administrative courses to illustrate its impact on teachers and students. From the perspective of empirical surveys and interview results, students generally accept this learning method but lack the motivation and incentive to continue to use this system. At the same time, during the two semesters of practical application, doubts about memorizing and reciting answers still existed, which showed in the results of the mid-term and final exams of each semester.

However, it is not easy for teachers to use the cloud-assisted teaching system. They must be familiar with the system and strengthen the construction of the question database. At the same time, they also need to carefully design and arrange the course. Fortunately, the application of this system indeed brings out certain learning performances by changing the teaching strategies, and the integration of the system into the curriculum is also affirmed by the students.

Finally, teaching and learning on the cloud server is still in progress now. The experience and findings of this article are still preliminary results, which need to be verified and modified by other further research.

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雲端輔助教學與無所不在的學習：行政學課程的實施經驗與反思*

胡至沛**

摘要

行動雲端運是在高等教育中執行無所不在的學習時最強大的工具，因為它可以隨時隨地遠端存取學習材料。同時，本文呈現行政學課程雲端輔助教學的使用經驗，說明其對教師和學生的影響。本研究採用深度訪談和問卷調查的方式，每學期採用單組前後測的準實驗設計。從實證調查和訪談結果來看，學生普遍接受這種學習方式，但缺乏繼續使用雲端輔助系統的誘因和動力。可是透過該系統的應用，改變教學策略確實帶來了一定的學習效果，此外將系統融入於課程教學亦獲得到學生的肯定。

關鍵字：雲端輔助教學、無所不在學習、 數位學習平台、行政學教學實踐研究

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