

Exploring the Relationship between the Pedagogical Applications of Information and Communication Technologies in the Class and Students' Engagement and Satisfaction

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Abstract. This paper focuses on exploring the relationship between the pedagogical applications of information and communication technology (ICT) in the class and students' engagement and satisfaction. This essay aims to assess the degree to Chinese universities which applied ICT to assist in improving students' satisfactions and promoting students' participation in scope of classroom teaching. How to wisely implement ICT in education, especially in the higher education system, and narrow down the scope to the classroom teaching has become one of the most important research topics among the Chinese universities recently.

Introduction

With the continuous development of information and communication technology (ICT), teaching technologies such as MOOCs, Micro-lectures etc., supported by mobile internet technology have emerged continuously. Nowadays education systems, especially higher education institutions, express great interest in how to apply these emerging technologies in education and daily teaching. The management of universities expects new teaching modes to motivate students' engagement, strengthen the interaction between peers and between teachers and students, and improve the learning effect and students' satisfaction.

However, will the pedagogical applications of information and communication technologies in the class enhance students' engagement and satisfaction? If 'yes', how can we stimulate students' engagement, activate the classroom's atmosphere, fuse learning resources and materials better together through curriculum design, combining teachers, students and education technologies in an organic manner? If 'no', what are the barriers that reduce the positive impact of using these new ICTs in our daily teaching? Based on the questions above, this paper will review the past debates on these topics and discuss them in the context of higher education.

1. Background

With the rapid development of information technology, education informationization presents unprecedented development momentum, the deep merging of the technology and education promoting the reform of innovation in education systems. Information and Communication Technology (ICT) has brought new thinking and a new perspective to the innovation of education theory and practice. The advent of the information technology era provides the opportunities for innovative education theory, education practice and educational pedagogy reform (Liu, 2014). Most of the countries making the education informationization development strategy as a prospective option to promote the development of education reform, promote the competitiveness of their nation. After decades of development, Chinese education informationization has been made remarkable achievements, but there still remains an obvious gap compare to the informationization level of developed countries. To promote education informationization to the level of a national strategy, the

Chinese Ministry of Education issued a guidance paper named "Decade Development Plan of Education Informationization (2011-2020)" (MoE, 2012). The provincial and municipal education agencies at various levels have also started developing education informationization development plans.

For the socio economic development, education is always an important factor. This mobile internet era expects the education system can be aligned with the developing of modern technology. In Chinese education system, even if the application of ICTs won't be able to solve all the current problems, providing an alternative solution to these problems in the conventional educational system would be one of the considerations. ICTs are not only able to provide education and knowledge in distance education, online courses, e-learning technologies, but also can link tremendous information resources with the suitable curriculum design and implementation in the classroom setting of higher education. Because of the underestimate of distance education and network curriculum, the Chinese Ministry of Education divided Chinese college degree education into two categories: recruitment full-time education and adult education (also called continuing education). Remote education and network courses belong to the category of adult education, based on national conditions and historical and cultural factors in China, such as the category of adult or continuing education not having been seen as competitive formal education so far; therefore, this essay does not include distance education or e-learning with ICT application in its scope. That is the reason why the essay concentrates in the scope classroom teaching of recruitment full-time higher education.

MOOCs, Micro-lectures and Flipped classes are all the application of education informationization, which is also a part of ICT application in classroom teaching. In China, the conventional pedagogy is focusing on 'teaching', in which knowledge is given priority, and students passively accept it. The reasons for this are complicated, including cultural influence, shortage of educational resources and large class teaching. The blended pedagogy aims to accelerate the transformation from traditional teaching methods to an inquiry teaching mode which involving ICT implication. From this perspective, we have more reasons to study whether the new teaching method that combines ICT can improve student learning enthusiasm, participation, and satisfaction.

Actively implementing blended teaching in college and finding means for effective use of open education resources is also a hot topic to researchers nationally in China. With the further development of open education resources worldwide, the internet has brought together more and more quality open education resources to the public, such as MOOCs, famous universities public classes, the Khan Academy micro video, speech video and a variety of open courseware resources. According to investigation carried out by the Sloan Consortium which is an American non-profit organization, these precious high quality education resources have not been effectively shared and used at present. Among existing use of applications in domestic colleges and universities, most of them have stayed in the network coaching course stage only (Liang& Xia, 2016). It means most universities optimize the traditional teaching with the help of information technology online courses. How to transfer network coaching courses to blended courses teaching development in more practical classroom teaching will be the main problem needing to be urgently solved for higher education informationization development.

The pedagogical reform of classroom teaching with new ICT teaching methods involved has unpredictable potential. How to use these valuable emerging ICTs into higher education field is a challenge to traditional universities in China. Analyzing the effects on ICT application in classroom teaching, the purpose is to promote new pedagogical approaches which involve ICT in the teaching and learning process and effectively improve the students' engagement, strengthen the interaction between peers and between teachers and students, and improve the learning outcomes.

2. Literature Review

For the subject of ICT application in the education area, there are quite different directions and aspects between international researchers and domestic researchers.

2.1 Overseas Research Status–Application of ICT in Higher Education

ICT has been interest in many education projects around the world over the last two decades. Researchers who participate in the teaching in person and get the first hand materials did lots of work aiming to study proving the learning outcomes. Seymour and Hewitt (1997) showed that many of the students who drop out of university courses or programs do so not because they are the weaker students, but because they are not engaged with their learning and feel dissatisfaction with their educational instruction. Sammel in his study named "The Pedagogical Implications of Implementing New Technologies to Enhance Student Engagement and Learning Outcomes Alison" (Sammel et al., 2014, p.104) pointed out:

Research has found strong links between successful courses, effective use of technology and student achievement and contentment (Liaw & Levy, 2008). Specifically, technology used to support university courses can directly affect student satisfaction and success through promoting ease of interaction and understanding of course materials, increase facilitation between students and faculty, improve feedback, and encourage interactive and independent learning (Selim, 2007).

Goodhue and Thompson (1995) suggested that "in order to have a successful outcome with technology usage, the user(s) need to distinguish the goals for the task and the fit between the task and the technology" in their study named "Task-technology fit and individual performance". With this in mind, Alison Sammel's study examined how three academic staff members and their students assessed certain digital technologies in the promotion of student engagement, and staff and student satisfaction (Sammel et al., 2014). Their research data obtained from the students and staffs who participated in this project has pedagogical implications for employing digital learning technologies in higher education. As an illustration of this, Sammel (Sammel et al., 2014, p.112) mentioned:

Both the staff and the students involved in this study were asked to reflect on their goals and expectations around digital technologies, the degree to which the technology supported the task asked of it, changes in student engagement within the university course, and levels of satisfaction with technology. If technology is going to have a positive impact on outcomes and satisfaction, then the technology must first meet the needs of the user.

However, this research focused on the distance education program in higher education system. Especially in China, ICTs need to be more using to assist and enhance face to face teaching and learning process, as teaching staff who already tried blended pedagogy with ICTs in their own class suggests, since still a huge number of students prefer face to face teaching.

2.2 Domestic Research Status–Application of ICT in Higher Education

In 2015, the Chinese State Council launched the "industry guidance paper: promoting Internet +", and application the Internet in a wide range of industries; thinking in internet logic has become a hot topic. Actually the development of "Internet + Education" dated back to 2012, the first year MOOCs emerged in China. MOOC's fast development provided education management and education providers the best chance to implement education informationization and its teaching reform.

Nowadays, most students will catch up with new forms of ICTs spontaneously that it would seem to be a common view. In pedagogical methodology perspective, the combination of network approaches and traditional teaching methods has change to the increasing use of "blended teaching". Which is combined with the application of ICTs through facilities such as computers, cell phones, and video conferencing, blended teaching has the capacity to encourage teachers and students, to experience a variety of information channels at their any level of study. This means that traditional face to face classroom teaching can be explored more and more forms through lectures, grouped we chats, blackboard forums and seminars, which are supported with recommended group discussion, recommend reading, teamwork can be complemented with facilities that mentioned above. In the terms of pedagogy, blended teaching means the combining all the resources, techniques and methods in an organically way to pursue a better teaching outcome. With the development of blended teaching strategies, it has indeed offered increasing opportunities for personalized, flexible, and independent learning. However, aiming for all kinds of teaching and learning methods blended together

satisfactorily, a significant investment of time must be put forth to ensure that happened, at the beginning. "The initial restructuring of materials and resources to complement ICTs engagement take time, but in the course of time, they only need annual minor updating and tweaking. As a result, students are encouraged to become independent learners and to reduce their dependence on teacher-centered instruction (Fincham, 2013)". This result is exactly what Chinese universities want to fulfill in classrooms teaching finally.

The development of blended teaching has become a consensus in the field of higher education informationization. The advantages of blended teaching have been claimed to include its flexibility, interaction, the ability to integrate complex multimedia and technical makes it of high practical value. The research on blended teaching has provided more and more valuable practical results. It shows that the new pedagogy has developed into a relatively mature research field, but the blended teaching theory system needs to be constructed. Therefore, the university expects to integrate the teaching strategy planning using ICTs and the talent cultivation target mode. At the tactical level, the blended teaching will be actively implemented with the aid of more and more open educational resources and native digital resources developed by the teachers and government.

3. Discussion

3.1 The ICT Application Status in the Scope of Classroom Setting from Policy Perspective and Practice Perspective in China

Nowadays, the Chinese Ministry of Education gives tremendous support to the program of educational informationization construction from both policy and financial perspectives to help Chinese education institutions applying these ICTs in the teaching process. For instance, investment in scientific research projects, the construction of excellent network courses and increasing index weight on construction level of teaching informationization for various kinds of teaching evaluation program. In terms of individual acceptance, for college students who are the generation after the 1990s, the information technology has been widely used in their daily life. Even if the university management in all levels is willing to try this blended pedagogy for the reform of classroom teaching. As far as I know only few of them has founded an independent educational technology service-centre for supporting and helping teachers and students in educational technology application and promotion in Henan Province. So far, the speed of application of emerging education technology in teaching and learning is disappointing.

There are two main changes obviously emerging in the higher education system as well as in classroom settings. As Lei and Jian (He & He, 2015, p.126) asserted:

One is the changes of knowledge acquiring channels. In traditional form, the ways of learners to acquire knowledge was mainly from teachers. Because of the single source of the information, the knowledge learners can get is very limited. In the internet era, networked and more diverse environment, the information which can be accessed by learners has become wider and wider. Teachers are no longer the only source of students to acquire knowledge. The second change is the way of communicating.

"One-way communication media has changed to two-way or multidirectional communication media." Lei He and Jian He pointed out in their study named "The Revolution of Communication Media and Its Impact on Education"; they said "the most important revolutions of the medium are the change of its interactive function." They (He & He, 2015, p.126) also mentioned:

Educators are no longer merely imparters of knowledge, and no longer the teaching process controller or authority. Learners are no longer just the passive recipients of knowledge, too. They became the active selectors of knowledge in the communication process. The position between the teachers and students has fundamentally changed. They are more equal to each other.

How to adjust the Chinese traditional pedagogy with these two obvious changes in the new generation for improving the quality of education? In Ningbo University, teachers who successfully

used this blended pedagogy with ICT applications in the actual classroom, found it does motivate students' engagement, strengthen the interaction between peers and teachers to students, and improve the learning effect and students' satisfaction. When students participate in an actual classroom they answered the questions by typing on the cell phone and sharing their desktop. Students also are allowed to use emoticons to express their feelings and responses among peers, when given rights by the teacher. On the integrated teaching platform, lots of ICTs can be used to support teaching and learning process, no matter in a virtual or actual classroom.

3.2 The Obstacles to the Development of ICT Implementing in Classroom Teaching in China

In 2016, the Sloan League which is a non-profit professional organization sponsored by Sloan Foundation, investigated the influencing factors of the online education development in American colleges and universities, which include: students need more discipline, teachers need more time and energy input, and teacher's acceptance of ICT (Liang & Xia, 2016). According to the previous researches, factors hindering the development of the Chinese higher education ICT application are mainly in two aspects: teachers and students.

3.2.1 Teacher Factors

There are researchers investigating the investment cost of blended teaching methods in colleges and universities. What can be found is that most colleges and universities (especially those who have already launched ICT application in daily teaching) consider the curriculum design consumed much more of teachers' time and energy. As the professor Liang referred in her paper, even if in the U.S. the data from a series of survey shows that teachers' attitude toward blended teaching which involved ICT applications is not optimistic. In the past decade, acceptance rate of ICT application has been maintained at 20%-25% among teachers (Liang & Xia, 2016). And there are even decreased percentages in recent years unless the university managements offer more attractive policies promoting the new pedagogy.

Research at home and abroad have analyzed the reasons why college teachers are reluctant to conduct ICT application: From traditional pedagogy using ICT is a change of teaching behavior, teaching habits and the way of teaching. The conventional pedagogy is focusing on "teaching" in which knowledge is given priority, and students passively accept. The blended pedagogy accelerated the transform from traditional teaching methods to inquiry teaching modes which involve ICT implication. Therefore, teachers engaged in blended teaching need to change their ideas about learning, and adapt to different teaching principles compare to conventional ones. Furthermore, applying ICTs for many teachers is not just a kind of new way of teaching, it also means more work and time input; for instance: redesigning the curriculum teaching plan; relearning how to use those ICTs and how to integrate ICT resources in to daily teaching process. In university management level, teachers engaged in ICT application and blended teaching methods commonly lack the required compensation incentives and services support that also could be an important obstacle.

3.2.2 Student Factors

Students factors mainly indicate in two aspects: one is the students' motivation and their self management. The other is how to improve the students' course finishing rate or student retention. As the new era of ICT application in classroom setting emerged, universities used to choose elective courses as a set of pilot programs. A part of this blended pedagogy features as a separation between teachers and students occasionally, separating of teaching in the perspective of time and space. The blended teaching method is a student-centered approach to learning; at the same time it requires students' higher autonomous learning ability and better self management ability. Students who participate in these kinds of courses need to have a stronger learning motivation, be responsible for their own learning, and also need to have a strong information and digital learning ability.

In fact, the course completion rate (student retention) has always been a top problem in the sustainable development of ICT application courses as well as distance education. In the field of teaching practice, as we mentioned these curriculums involved ICT application are mainly elective courses which means students can re-choose these courses at anytime during their university learning

process. Many students take part in ICTs involved courses and finally drop out due to various reasons, including those who register for the courses without considering their interests, quit after learning begins, stop attending the course but do not quit, participate in the course but do not meet the requirements. How to improve the student retention rate of blended courses in classroom setting is an important consideration for practice of Chinese higher education.

Conclusion

Through the questionnaire collected from teachers and students in previous study which mentioned in the literature review, we found that the ICTs application played a positive role in motivating student learning enthusiasm, strengthening the interaction between teachers and students as well as peers, improving students' learning effect and satisfaction. Although using the educational technology into the blended pedagogy is inevitable trend of the future development of education, most of the domestic researches still focused on the exploring phase of blended teaching theory, and short of actual application case study, put forward some practical problems while the solution still need to be examined by the further research.

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