Institutional Roles in Blended Learning Implementation: A Case Study of Vocational Education in China

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This longitudinal study examines the roles of the institution in blended learning (BL) implementation in Chinese vocational education. Informed by existing research and our BL practices, this study first proposes an analytical framework that structures BL as a system of learning with constant interactions among its six essential sub-systems (institution, teacher, technology, content, learning support and learner). The framework was enacted in the evaluation of the BL implementation in a Chinese vocational institute over a 4-year-and-3-month period. Findings exhibit the roles of the institution and the ways it interacts with the six subsystems in the BL implementation of the institute. This study bridges a gap between BL research and practices, by examining the intricate process of BL implementation in vocational education in China.

Keywords: blended learning, institutional implementation, systems approach, vocational education

INTRODUCTION

The last ten years have witnessed an exponential growth of blended learning (BL) in terms of research and practice. This growth has been particularly accelerated by the development of Massive Open Online Courses (MOOCs) and the recent interest in flipped classrooms. However, a review of the BL literature between 2003 and 2015 indicates that BL still remains peripheral in vocational education both at the theoretical and empirical level (see a review of BL literature by Wang, Han, & Yang, 2015). So, there is a need to understand why blended learning, despite its seemingly many inherent advantages, has not been adopted more widely in many more institutions (Owston, 2013). Further, the review of literature indicates that most BL studies have been conducted at a

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course or program level, with little or no involvement by the institution as a wholesale strategy (Wang et al., 2015).

Research on institutional involvement has only begun to receive more academic attention recently as represented by the studies of Graham, Woodfield and Harrison (2013), Taylor and Newton (2013), Porter, Graham, Spring and Welch (2014) and Porter and Graham (2016). All these studies investigate BL in higher education and little research can be found relating to BL in vocational education. In the research described and discussed in this paper, we aim to contribute to the understanding about the roles of the institution in BL implementation, in vocational education. To achieve this goal, we adopt a systems approach that places BL in historical context and regards it as a complex and evolving system invigorated by the interaction between its subsystems. Guided by this approach, we proposed an analytical framework to capture the major impetuses that drive the developmental changes through the stages of BL implementation at the institutional level. This framework was applied in a case study of a vocational institution in China, Fujian Chemical Engineering Institute (FCEI), between March 2012 and June 2016, and it is that evaluation process and the findings arising from it that are advanced here.

THE ROLES OF THE INSTITUTION IN BLENDED LEARNING

Our literature review identified that only a few studies have investigated the role of the institution in BL implementation (also see Wang et al., 2015). This finding is also supported by Porter et al (2014), who claimed that scholars have conducted course-level investigations of the effectiveness of BL, and only a few have provided guidance for how it might be adopted at the institutional level. Indeed, much of the literature refers to specific initiatives rather than a systematic institutional level BL implementation. Consequently, institutional roles in BL have received some academic attention only recently. For example, Owston (2013) commented on the importance of the institutional involvement by identifying two major prerequisites for successful scaling up of BL: the alignment of goals at all levels of the institution from senior administration through to students and an advocate at the early stages of implementation. This was echoed by Moskal, Dziuban, and Hartman (2013) who pointed out that BL needs support at all levels: organizational infrastructure, course and faculty development, and consistent learning support. Perhaps the study by Taylor and Newton (2013) represents the most comprehensive investigation of the important factors for BL implementation, as it addresses curriculum design, students' experiences, staff experiences, educational technologies and institutional factors. It acknowledges the importance of the alignment of university systems and processes with the expectation of the learner and the faculty, pointing out that strategic change "will only happen if there is a shared vision and energy that touches all parts of an organization" (p. 59). Garrison and Vaughan (2013) also called for a committed collaborative leadership that engages all levels of the institution. Despite of this awareness of the concerted efforts from all parties involved in BL, none of these studies focus on such efforts as a subject of investigation.

One of the most highly cited studies on institutional involvement in BL adoption is that by Graham et al. (2013). They proposed a three-stage framework for BL adoption: Stage 1, awareness and exploration, Stage 2, early adoption and implementation, and Stage 3, mature implementation and growth. For each stage, they also identified specific strategies, structures, and support to sustain institution-wide implementation (also see Porter et al., 2014). This framework was applied to their study of six institutions in the US higher education and identified important strategies, structures and support that determined the success of BL, providing guidance to administrators for facilitating the

transition from one stage to another. Porter et al. (2014) continued the work of Graham et al. (2013) to further examine 11 U.S. institutions of higher education that were transitioning from the awareness and exploration (Stage 1) to the adoption and early implementation (Stage 2) stage, and identified institutional strategy, structure, and support markers as well as issues that administrators should address in the facilitation of such a transition. The recent study by Porter and Graham (2016) finds that adequate infrastructure, technological and pedagogical support, evaluation and an institution's purpose for BL adoption were the significant factors that influence faculty's involvement in BL. All these studies identify institution as the facilitator and supporter to BL implementation in terms of strategies, structures and support. The interrelationship and constant interaction between the institution and other players in BL such as the teacher and the learner have not received much attention. Besides, all of these studies concern with BL implementation in higher education, leaving vocational education out of the BL picture.

METHOD AND PROCEDURES

VOCATIONAL EDUCATION IN CHINA

The main stream vocational education in China is state-run and consists of three levels: junior secondary, senior secondary and tertiary. Among them, senior secondary institutions are the mainstay of vocational education in China aiming to train graduates with specialized skills (Chinese Vocational High School Research Team, 2013). This is also where the current study focuses, for two main reasons. First, the findings from this research would have the widest application and implication as almost half of the students aged between 16 and 18 are from the 13,093 vocational institutions at this level in China, forming the main future workforce in this age group. Second, in comparison to vocational tertiary level, blended learning is perhaps more urgently needed in vocational senior high level in China because of the challenges facing these institutions. These challenges include teachers' lower digital literacy and awareness of BL, students' lower motivation and academic competency, and poorer digital learning environments in these institutions (Chinese Vocational High School Research Team, 2013). We also hope that the findings from this research will shed light on similar challenges common to BL implementation in vocational institutions around the world.

It was precisely these challenges that prompted FCEI, to adopt a BL approach to reform its curriculum in March 2012. In July 2013, a steering committee was established and drafted their BL Master Plan, which features a "2+1+N" model, reforming its entire curriculum through technology. In brief, "2" represents its short-term objective to incorporate online learning into its two-year on-campus courses. This is followed by "1", the mid-term objective to develop online support mechanisms for the one-year internship with the industry, when the students are away from the campus. "N" refers to their long term objective to offer their graduates continuous and lifelong learning after they graduate. All the initiatives specified in the BL Master Plan were timetabled and supported with specific funding from a national initiative for piloting e-learning. This research focuses on their short term objectives to transform their curriculum using technology.

RESEARCH FOCUS AND ANALYTICAL FRAMEWORK

This research is essentially a 4-year-and-3-month case study examining the roles of the institution in BL implementation in a vocational education setting. The case study approach allows us to explore and understand the multiple facets of institutional roles in

their particular contexts and through a variety of lenses rather than one lens (Baxter & Jack, 2008). In addition, the adoption of a case study approach was further justified by the longitudinal nature of the study that traces the stages of the institute's BL implementation. Within this case study, we used a mixed-method approach to integrate both qualitative and quantitative data in to our analysis. We seek answers to the following two research questions:

1. What are the key roles that the institution played in each period of its BL implementation?
2. How did these roles evolve when the institution interacted with other players in their BL development?

In view of the aim of the research and the magnitude of the data collected, we developed an analytical framework for data analysis (see Figure 1) based on the research by Graham et al. (2013) and Yang et al. (2015). First of all, our initial analysis of the data seemed to point to a BL implementation trajectory of multiple periods, thus the three stage approach proposed by Graham et al (2013) was used as a reference in developing our analytical framework. Secondly, we found that the dynamic and complex nature of the BL implementation called for a robust approach to encapsulate the various key stakeholders and their interaction that drove BL implementation from one stage to another. Thus the Complex Adaptive Blended Learning System (CABLS) framework proposed by Wang et al. (2015) forms the basis of the proposed framework to account for a wider range of key factors influencing the development of a BL adoption. The CABLS framework principally differs from existing BL models in that it sees BL as a system of learning consisting of six key complex entities, namely, the learner, teacher, institution, content, technology and learning support. All of them constantly interact and impact on one another. As illustrated in Figure 1, in each stage, our data analysis focuses on the six key stakeholders proposed in the CABLS framework to see how they evolve from period to period and in what ways they interact with one another.
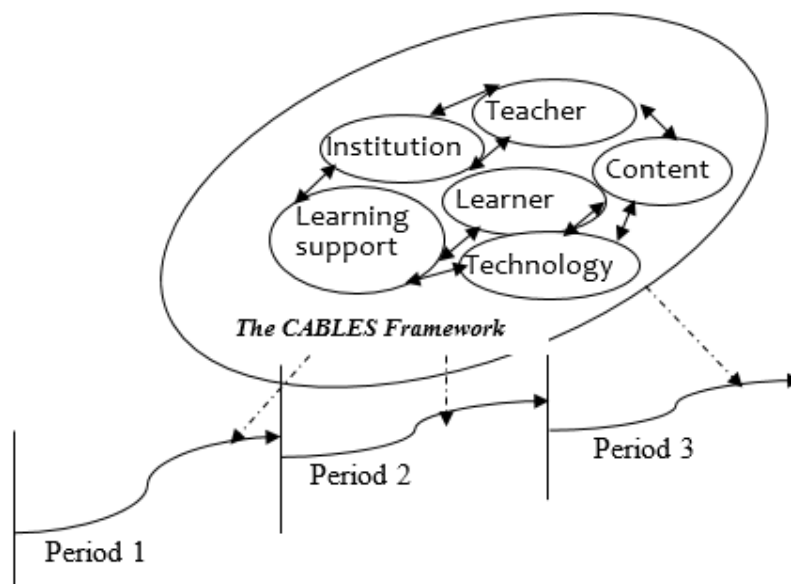

Figure 1. The proposed analytical framework for BL implementation

DATA COLLECTION

A combination of data collection methods were employed to gather both qualitative and quantitative data from multiple sources. Permission was obtained from the Institute and all participants to use their data, and their anonymity was protected by using pseudo

names whenever necessary. Table 1 presents data collection instruments and data sources, in relation to the six components of BL implementation: the institution, teacher, learner, content, technology and learning support.

In relation to the institute's policies and implementation framework and procedures, we collected data from the institute's BL documents including the FCEI Blended Learning Master Plan (hereafter, the BL Master Plan), and the FCEI Handbook for Designing Blended Learning Courses (thereafter the BL Handbook). To evaluate the BL implementation at the course level, apart from using the course, "Two Dimensional Cartoon Making" as a case study, we also collected quantitative data from their LMS. Contributions were sought from the director of the institute's IT department, the teacher teaching the above-mentioned course and the BL advisor. All of them were interviewed following the initial analysis of their written reflection to clarify issues that were not sufficiently discussed in their reflection journals.

Table 1. *Data collected in relation to research focuses*

Research focus	Data instrument	Data source
Institution	Institute documents	The FCEI BL Master Plan.
		The FCEI BL Handbook.
	Reflective journals	Institute's IT director and BL advisor.
Teacher	Institute documents	FCEI Professional development policy
	Reflection journals	documents.
	Interviews	Data from reflection journals by the teacher teaching the BL course. Interview recordings with the same teacher.
	Platform data search	LMS - Teacher participation
Technology	Interviews	Recordings with the IT director.
	Institute documents	The FCEI BL Master Plan.
Content	Course site screen captures	Course site of *Two Dimensional Cartoon*
	Interviews	*Making*.
	Surveys	Interview recordings with the students.
	Platform data search	Interview recordings with the teacher.
	Platform data search	Student evaluation surveys
		LMS - Platform visits
		LMS - BL course offerings
Learning support	Institute documents	The FCEI BL Handbook
	Screen captures	The course site of *Two Dimensional Cartoon Making*.
Learner	Survey	Student satisfaction survey.
	Platform data search	LMS - Learner online activities

DATA ANALYSIS

Data analysis followed a two-step procedure. We first translated all the Chinese data into English and the accuracy of the translation was confirmed by a qualified translator. The interviews were transcribed and verified with the interviewees. Data from the reflective journals, and interviews were coded independently by two researchers. The quantitative platform data regarding course offerings, teacher and learner participation and platform visits were analysed using Excel.

The next step was to conduct a thematic analysis, using the proposed analytical framework contained in Figure 1, to identify and categorize themes (i.e., the institution,

the technology, the teacher, the content, the learning support and the learner) in all the qualitative data.

To ensure accuracy and validity, we triangulated the data whenever possible by referring to the pertinent literature and cross-checking the different kinds of data collected. When interpreting findings, we concur with Graham and Dziuban's (2007) emphasis on evaluation being interpretive, contextual and authentic.

RESULTS

This section presents (a) the quantitative analysis and results of the major achievements from Period1 to Period 3 to demonstrate the dynamics of the BL development in FCEI, and (b) the qualitative analysis and results relating to the six subsystems.

QUANTITATIVE ANALYSIS AND RESULTS

Data were collected from the institute's LMS over a 9-semester period between March 2012 and June 2016, with regards to the number of BL courses, the number of faculty members teaching BL courses, the number of students learning through blended mode, and the number of course visits. As shown in Figure 2, although BL officially started in March 2012, there was no BL courses offered in the first two semesters between March and February 2013. We thus classified this stage as Period 1. A turning point emerged since Semester 3 when BL courses commenced. The number of BL courses kept increasing each semester from 10% of the total courses offered in the institute, in Semester 3, to 14%, 24%, 25% in semesters 4, 5, and 6 respectively. As a result, the number of teachers teaching BL courses also increased from 10% to 18% during these four semesters. This indicates that the institute entered a stage of growth that can be regarded as Period 2. A further analysis of Figures 2-5 led to our classification of the third period starting from Semester 7 when the number of BL courses stayed more or less unchanged at 35% with the exception of Semester 8. Figure 2 indicates a drop of 10% of BL courses in Semester 8 and then the number regained the 35% mark in Semester 9. According to the institute's IT director, the drop was caused by the absence of two teachers teaching a great number of BL courses. They were on maternity leave in Semester 8. This is also why a reduction in the involvement of the teachers and students in BL in that semester was evident in Figures 3 and 4. Traits of normalization of BL began to appear in this period. For example, the number of BL course site visits surged in the last three semesters, which could indicate that the students had grown used to visiting the course sites regularly, and learning online had become an increasingly important part of their learning activities. However, it is worth noting that BL courses did not grow linearly since Semester 7.
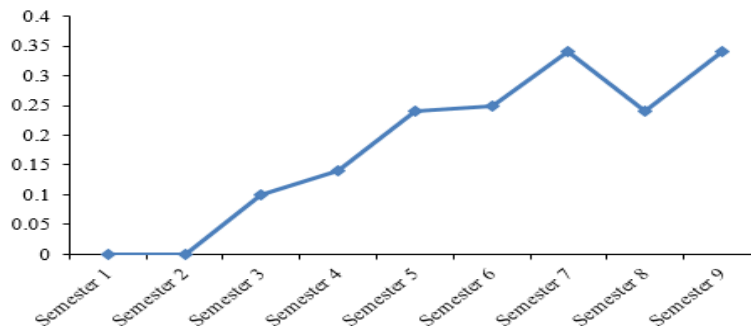

Figure 2. The percentage of BL courses in each semester between March 2012 and July 2016
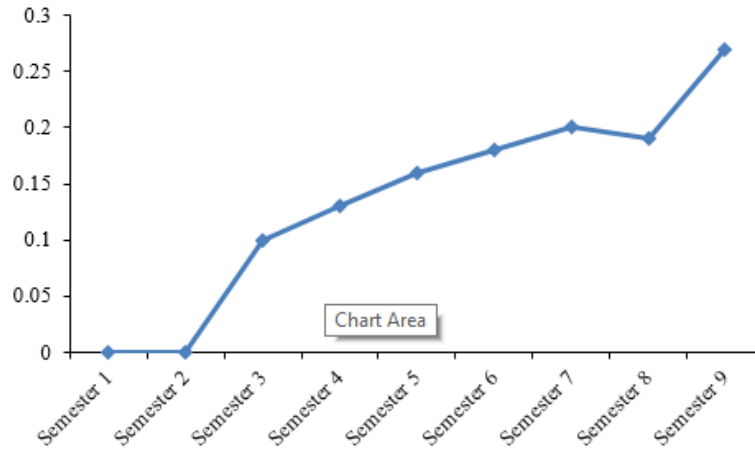
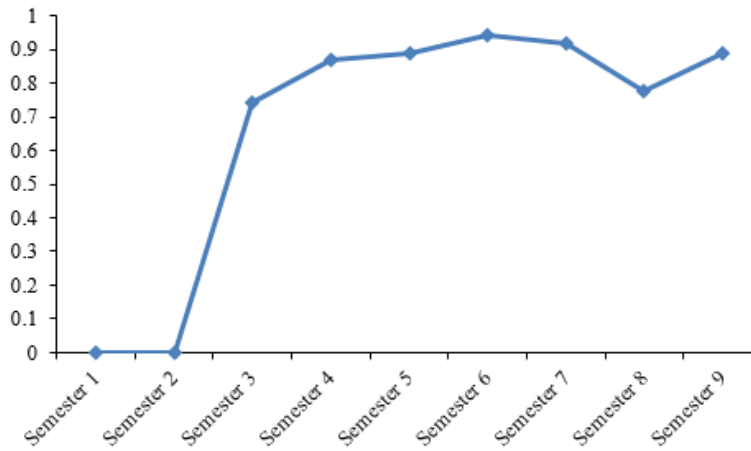*Figure 3*. The percentage of teachers teaching BL courses in each semester between March 2012 and July 2016

Figure 4. The percentage of students in BL courses in each semester between March 2012 and July 2016
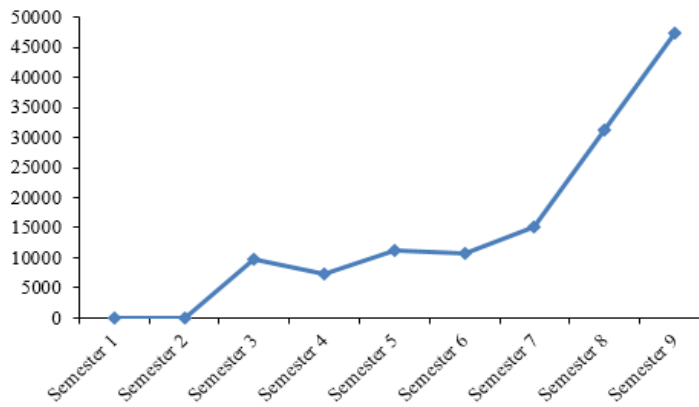

Figure 5. The number of BL course site visits in each semester between March 2012 and July 2016

QUALITATIVE ANALYSIS AND RESULTS

In this section, using the proposed analytic framework (see Figure 1) we first summarize, in Table 2, the key achievements in each of the three periods of the BL development in FCEI, to provide an overview of their BL trajectory. The ensuing sections unfolds these achievements by presenting data and initial discussion relating to each of the six subsystems, namely, the institution, the technology, the teacher, the content, the learning support and the learner.

Table 2. *The BL implementation periods in FCEI*

Component	Period 1 (Mar. 2012 – Jan.2013)	Period 2 (Mar. 2013 – Jan.2015)	Period 3 (Mar. 2015 – July. 2016)
Institution	Initiated BL adoption; received the *National Initiative for Piloting e-learning*. Formulated the BL Master Plan	Published the *FCEI Criteria for Selecting Courses and Teachers for BL Implementation* and *FCEI Criteria for Selecting the Best BL Courses in FCEI*. Developed the BL Handbook.	Refined and standardized governance at different administrative levels. Disseminated their BL achievements.
Technology	Formulated the *FCEI Digital Campus Initiative*; Established an IT Centre.	Completed the two-stage of digital campus building; installed A LMS; expanded the IT centre.	Further expanded the IT centre.
Teacher	Little involvement	Promoted BL to teachers through seminars and workshops; conducted professional development workshops; offered incentives to teachers; formed a BL team; engaged a video production company; participating teaching reached 18%.	Conducted regular workshops to share BL experiences; refined BL Handbook.
Content	none	Redesigned 25% courses, conducted and evaluated these courses; Adopted flipped classrooms.	Redesigned 35% courses; conducted and evaluated these courses; implemented the one-year BL internship model.
Learning Support	none	Learning Support was specified in the BL Handbook.	Constantly refined learning support at both the task and course

		Learning Support was offered at both the task and course level.	level.
Learner	No involvement	90% attended and evaluated 33 BL courses.	89% learners attended and evaluated 40 BL courses.

As shown in Table 2, Period 1 is characterized by a strong leadership role that the institution played where the other five components remained inactive; in Period 2, all the other five components became active, although the institution was still instrumental in providing strategies, structures and support. Period 3 saw a stable development with a reduced institutional role.

The Institution

As indicated in Table 2, the roles of the institution decreased as the institute's BL implementation progressed from one period to another. According to the reflection by the institute's IT director, their BL adoption was initiated by its management in March 2012. In July 2012, the institute management proposed the BL Master Plan as the key policy for guiding their BL development. In November 2012, the institute succeeded in their bid for the national initiative for piloting e-learning funded by the Chinese Ministry of Education.

In the second period, especially in the early stage of this period, the institute was proactive in issuing a series of policies for developing and implementing BL courses, such as the FCEI Criteria for Selecting Courses and Teachers for BL Implementation (2013) and FCEI Criteria for Selecting the Best BL Courses in FCEI (2014).

To closely monitor and support course redevelopment, in June 2013 the institute formed a BL team consisting of external BL advisors, the institute's IT director and course teachers. In 2013, under the guidance of external BL experts, the institute composed a 25-page BL Handbook covering course design and delivery principles, procedures and a variety of exemplars of best practices. In Period 3, the institute focused on sustaining, improving and expanding BL implementation through the standardization and systematization of strategies, structures and support, especially at the course level. For example, informed by the two periods of BL implementation, the institute oversaw the updating and refining of the BL Handbook.

The above data indicate that the institute played the role of BL initiator, advocate and implementer in Period 1, instrumental in the start of the institute's BL adoption. The institute became the strong supporter of BL implementation in terms of strategies, structures and support in Period 2 when other players (especially the teacher) came on the scene. When the BL became stable in Period 3, the institutional roles were reduced further.

The Technology

To some extent, we can say that the institute's BL adoption started with their digital campus building. As early as May 2012, the institute management proposed a two-stage digital campus building initiative to condition the institute's overall IT infrastructure for BL implementation. The first stage digital campus building formally started in March 2013 and completed by March 2014, featuring the installation of a Learning Management System (LMS) and a vast amount of online learning resources, such as e-books and well-known speeches. This LMS supports a variety of functions for online learning, such as video and audio playing, discussion forums, online journals, quiz tools and homework

submission function. This is where the BL courses were developed and conducted. 13 computer rooms were equipped with 50 personal computers each, all with an Internet connection. Also, 60 multimedia classrooms were refurbished with projectors, computers and Internet access. The second stage digital campus building was completed by September 2014, with the installation of Cloud Computing and broadband intranet.

Another key initiative from the institute was the establishment of an IT Centre, consisting of a director and 4 technicians in Period 1, responsible for digital campus building and day-to-day technical maintenance. In Period 2, the Centre was expanded twice, to increase its staff members from 5 to 7 and again from 7 to 10, in response to the new needs arising from blended course design and delivery. Two positions were created specifically for supporting the technical needs of the faculty in BL. The Centre continued to grow in Period 3 to recruit two more members, again, specifically for supporting BL teachers. This constant expansion of the Centre's profile indicates that the institute increased its support for the development of the faculty's digital literacy and competencies needed for blended instruction.

The Teacher

As indicated by Table 2, there was no involvement of the teachers in Period 1. However, the relationship between the institution and the teacher became closer and stronger in Period 2. To increase the teachers' awareness and understanding of BL, the institute accelerated its promotion of BL concepts and potentials to the faculty and administrators at all levels. Between May and June 2013, the institute invited leading national BL advisors to conduct six seminars on BL; attendance at these seminars was compulsory. Following these awareness raising activities, the institute commenced preparation for BL course development in August 2013 when 12 seed teachers and four administrators, and a technician were selected to attend a week-long intensive BL course development workshop delivered by national leading BL experts. The workshop focused on innovative course content and assessment design as well as delivery models, such as flipped classrooms. At the end of the workshop, 10 individual course sites were set up on the institute's LMS for further developing their online contents after the workshop. Since 2014, regular workshops were held to share BL experiences and improve BL pedagogy. In Period 2 and 3, training new teachers for BL became a standard practice. For example, in September 2014, 10 new graduate teachers completed a professional development program in BL.

To ensure a uniform standard for all micro video lectures and to reduce faculty pressure and anxiety in using new technology, the institute engaged a professional multimedia production company to help produce these lectures for each course. The BL team also guided the teachers to complete reflection journals on their blended teaching experience and to evaluate their BL courses through surveys and interviews with students. The following reflection was from a teacher, pseudo-named Ling, who was selected by the institute to transform her course, "Two Dimensional Cartoon Making," into blended learning mode.

Ling first learned about BL at a seminar organized by the institute in early 2013. After attending the workshop as one of the BL seed teachers in August 2013, she continued to redevelop her course guided by the BL team to incorporate online components. During March and June 2014, she delivered the course and applied flipped teaching to her BL classroom.

When asked at an interview what roles the institute should play in BL, Ling summarized two roles: a leadership role and a support-provider role. In her own words,

> The teachers should not be left to work on their own. Instead, the institute should support the whole process of BL from curriculum design, the design and production of micro video lectures, and the course site development, to the actual teaching of the courses. The institute should focus on the process of the implementation, not just on its targets or quotas and then the end product.

With regard to the institution's role as a support provider, she provided the following example:

> For instance, the institute should provide an expert who can better communicate the needs of the BL courses to the video production company, offer technical advice on video lecture design and production, and assesse the video lectures in terms of their creative use of multimedia. This is because faculty members do not possess video production expertise and the video production company often does not know enough about the pedagogical needs of a course.

Ling also appreciated the institute's endeavour to promote BL, especially offering teachers the opportunities for professional development in BL, hiring a video production company to record video lectures, and purchasing computers for the teachers. She also recommended the support of an onsite IT expert to help with course site development.

Another key support from the institute is a detailed incentive scheme which was institutionalized and promoted to all the teachers in Period 2. This scheme provided opportunities for both domestic and international academic visits and professional development to those willing to adopt BL. The incentive scheme also funded an annual competition for the best BL courses in the institute with honorary and momentary rewards. Ten best BL courses were awarded in each of the two semesters in 2014. The first 30 teachers involved in BL in Period 2 each were rewarded with a laptop computer. However, as BL had become more stabilized, institute-wide incentive schemes discontinued.

As shown in Figure 2, the number of participating teachers in BL increased semester by semester and reached 27% by June 2016. However, this percentage is still low, especially when comparing it with the percentage of students participating in BL courses (89%). According to the IT director of the institute, the low participation rate of the teachers was attributed to the fact that most teachers in the institute were quite senior and they would like to remain in their comfort zones until their retirement.

Content

Institutional support and guidance proved to be instrumental to the production of high quality content design and delivery in Period 2 and Period 3. To better meet the faculty's need for on-going guidance for BL design and delivery, and to standardize quality assurance for courses across the whole institute, the institute elicited the expertise from outside in writing its BL Handbook. This covers BL course and assessment design principles, methods and procedures (see Figure 6), BL course delivery approaches such as the flipped teaching, analysis of BL environments and the design of learning support and course evaluation. An online component for each course was designed and delivered, featuring micro video lectures, online quizzes, discussion forum and online reflection journals etc. As scheduled, all the first 15 courses were implemented in the third semester, between March and June, 2013. They were subsequently evaluated by the IT

director, the teachers and students for feedback. 36 (25%) and 44 (35%) courses were offered and evaluated in Period 2 and 3 respectively.
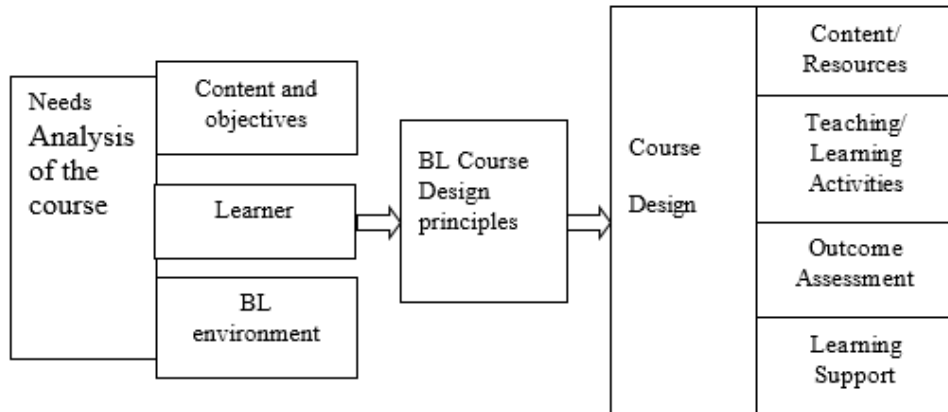

Figure 6. A BL course design template in the FCEI BL Handbook

The course "*Two Dimensional Cartoon Making*" was chosen as an example here to illustrate the content design and delivery of a BL course. The micro video lectures were produced with both the video of the teacher and flash animation to demonstrate cartoon design step by step (see Figures 7 and 8). According Ling, a fundamental change in the classroom occurred when the flipped teaching was applied. That is, as students learnt the basic steps of cartoon making at their own pace with the pre-recorded video lectures, and discussed them via the online discussion forum with their teacher and peers, more class time was spent on hands-on practice and problem solving. When reflecting on her BL experience, Ling was highly appreciative of the effect of exploratory learning on students' mastery of content. She pointed out in her reflection journal that "one of the major innovations was to teach theories after hands-on experience", the inquiry-based learning pedagogy that she learned in her BL course developing experience. "Learning about theories usually did not appeal to students". However, in flipped classrooms, "theories became more easily and deeply understood as they had been exposed to hands-on experiences". This was also concurred by Student Interviewee 3 who commented that "discovering and solving problems by myself helped me to easily retain what I had learnt".
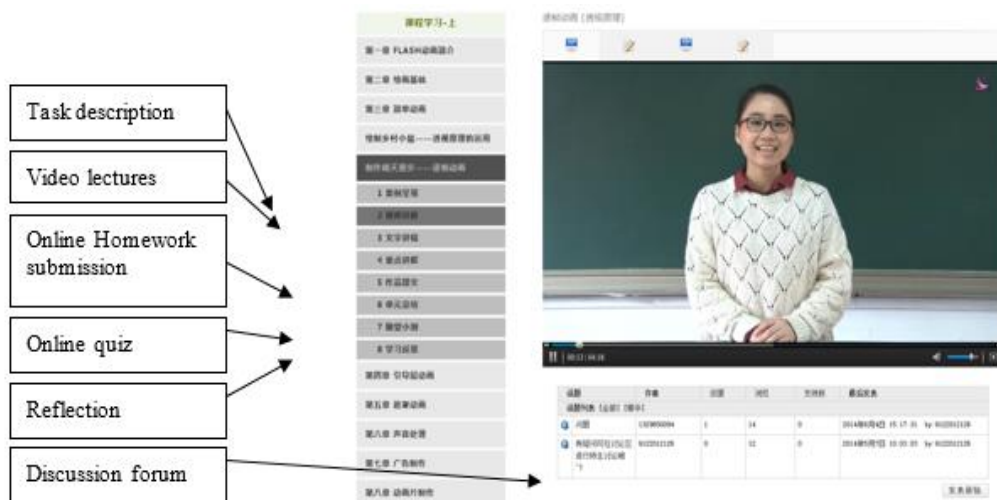

Figure 7. Screen capture of the video lecture and course site

Figure 8. Screen capture of the video lecture - flash animation

Learning Support

The provision of learning support was strongly promoted in the institute's policies and its professional development programs. More specifically, the institute engaged the BL team in overseeing the design of learning support at both the course and task levels. At the course level, five kinds of learning support were promoted in the BL Handbook and were implemented in course design and delivery:

- cognitive support – support for students to understand course content and requirements;
- technical support – service and support for the effective use of technology by students;
- learning strategy support – helping students to develop effective BL strategies for autonomous and collaborative learning;
- support for practice - promoting the use of on-campus laboratories for hands-on activities;
- affective support - support for developing positive relationships between the teacher and students and between students themselves.

At the task level, discussion forums, online quizzes and online reflection journals were embedded in the task design as support to task completion and as a way to help with students' mastery of specific contents (See Figure7). Learning Support was further refined in Period 3 based on students' feedback. As a result, more-customized learning support at both the course and task level was incorporated into course design as the teachers gained a deeper understanding of BL.

The Learner

In Periods 2 and 3, the learners became increasingly involved as they attended and evaluated the BL courses. Improvements in learning outcomes and the development of learning strategies were reported in all the 40 courses. Take the course "*Two Dimensional Cartoon Making*" as an example, 74% confirmed that they had become more autonomous, engaged and motivated after one semester of BL intervention. Sixty percent indicated their satisfaction with this mode of teaching. Figure 5 also indicates that

students became used to online learning as the number of course site visits surged each year.

In summary, the CABLS-based analytic framework allowed us to effectively trace the BL development in FCEI and to examine the key players that drove this development in each period. The section below further explores the evolving roles of the institution in the three periods when it interacted with the teacher, the technology, the content, the learning support and the learner.

DISCUSSION

This section focuses on answering the two research questions: the key roles that the institution played and its relationship with other players in each period of its BL implementation. This discussion further probes the findings presented above while drawing on existing research as references.

EVOLVING RELATIONSHIP BETWEEN THE INSTITUTION AND TEACHERS

Data discussed above clearly show that the relationship between the institution and the teachers was the most important and dynamic relationship that drove the BL implementation forward. In Period 1, the institution played the role of the leader and architect, making strategic moves in BL adoption and implementation while the teacher was quite passive. This is particularly relevant to China where vocational institutions are mostly teaching institutions with basic IT infrastructure. Without a BL vision and sufficient leadership from the top, it would be difficult for the faculty to initiate and maintain BL adoption, especially at an institutional level. The limited studies on blended learning in vocational education have also acknowledged vocational education teachers' reluctance to adopt blended/e-learning (see Callan, Johnston, & Poulsen, 2015).

However, distributed leadership between the institution and the teachers began to emerge in Period 2 with increased teacher involvement. The teachers began to play a key role in course redevelopment, implementation and evaluation. The institution was still pivotal in BL policy making, setting course redevelopment targets and criteria, and initiating and supporting professional development and course redevelopment for BL. In Period 3, the teachers played an even more prominent and crucial role as BL implementation became the focal task, supported by well-established policies and structures, while the institution retreated more or less into the background.

EVOLVING RELATIONSHIP BETWEEN THE INSTITUTION AND TECHNOLOGY

The institution emerged strongly as the decision maker and financial provider for the overhaul of its IT infrastructure, especially in the first two periods during its digital campus building. Such a large-scale project contrasts sharply with what was reported by Porter et al. (2014, p. 192). Among the 11 institutions surveyed in their study, "only one university reported upgrading its servers and bandwidth to accommodate increased quantities of online materials" as BL was mostly driven by the faculty in these institutions. In this regard, we could argue that a strong leadership role of the institution is critical, especially in terms of rebuilding its IT infrastructure for institution-wide BL adoption.

EVOLVING RELATIONSHIP BETWEEN THE INSTITUTION AND THE CONTENT

Although institutional involvement was not direct in the redesign of specific course content for BL, the institution did play an indispensable role in Period 2 in the start of BL content development. At the policy level, the institution ensured, in the form of the BL Handbook, a uniform course quality framework across the institute to standardize the BL

course design and content quality control. At the implementation level, the institute superintended the formation of a BL team to guide the process of course design, ensuring the redeveloped courses best take advantage of both the face-to-face classroom and the online environment. Taylor and Newton (2013, p. 54) also stressed the importance "for an institution to define and support course design processes and policies that ensure all students, regardless of geographical location, have equitable access to educationally appropriate core learning experiences".

EVOLVING RELATIONSHIP BETWEEN THE INSTITUTION AND LEARNING SUPPORT

Our data shows that the institute promoted and financially supported the implementation of various support mechanisms at both the course and task levels. The institution's leadership role became the strongest during the BL course development and initial implementation phases in Period 2 when learners were first involved. The need for supporting "deep and meaningful student learning" was also stressed in Bliuc et al. (2012, p.253). Porter et al. (2014, p. 194) also recommend learning support for learners "who may lack the necessary skills to thrive in a BL classroom".

EVOLVING RELATIONSHIP BETWEEN THE INSTITUTION AND LEARNERS

No direct interaction between the institution and the learners emerged throughout the three periods. However, as the ultimate aim of the institute's BL initiatives was to improve learning outcomes through addressing students' needs, the learners were at the centre of all the institution's efforts. The needs analysis of the learners informed the institute's policies, strategies and support.

In summary, the institution interacted in a non-linear fashion, both directly and indirectly, at different levels, with the teachers, technology, content, learning support and learners. At the same time, the roles of these components evolved along with the progress of the BL implementation. Indeed, Porter et al. (2014, p. 192) also contend that for BL to succeed, "an institution should identify and address the objectives of all stakeholders". We also recognize that the degree of institutional involvement varied in the three periods when interacting with different components in BL. To be more specific, a stronger and a more direct relationship existed between the institution, the teacher and the technology, and a weaker, less direct interaction between the institution and the learner, the content and learning support. A distributed leadership materialized between the teachers and the institution in Periods 2 and 3, especially at the course level, with the teachers playing an increasingly stronger role as the BL implementation deepened. This is partly because the quality and sustainability of a BL course can depend on individual teachers' BL competence and dedication, and partly because the institution had established the necessary conditions and environments for BL implementation

CONCLUSION AND FUTURE DIRECTIONS

Using the CABLS-based analytical framework, this research is able to answer the research questions with the following conclusions. First, the institution played a significant leadership role in the BL implementation in a typical vocational institute in China. This forms a distinct contrast to the facilitating role that the institution has been portrayed in existing studies. This leadership by the institution led to a sustained, coordinated institution-wide BL implementation of a uniform standard. Second, this leadership role became less prominent as the institute's BL implementation progressed from stage to stage. Third, the six components in the BL system interacted with and acted upon one another to form an organic synergy.

We acknowledge that the length of the paper only allowed us to examine each of the subsystems in the CABLS framework at a macro level, while each could be a worthwhile topic to be further investigated at a micro level. In this paper, we tried to present an overall picture of what happened in a vocational institute in China in their BL implementation. Here we would like to point out that a strong leadership role is contextual and contingent on institutional and even national culture.

This research contributes to BL research and practices in important ways. Firstly, it contributes to our understanding of the characteristics of BL development in Chinese vocational education, bridging a gap in BL research which mostly focuses on higher education in western countries. Secondly, it advances our understanding of institutional roles in BL implementation in a Chinese context. Thirdly, the CABLS-based analytical framework proposed by this research provides us with a wider lens to examine the roles of the institution in relation to other subsystems in the BL system.

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