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Designing for blended learning to foster deeper learning: Exploring the use of ICAP theory of cognitive engagement as a professional development activity to support academic teachers' practices

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Abstract

This study was aimed at increasing our current knowledge on how professional development initiatives can be structured to develop and strengthen academics' pedagogical practices in implementing blended learning (BL) in university education. We investigated the mindsets and processes of 2 groups of academics in a research-intensive university in Singapore. The first group of academics had implemented BL at the early stages of the university's efforts to encourage the broader adoption of this innovative approach, while the second group comprised academics who had attended a professional development course on BL conducted by the faculty development unit within the institution. Initial analysis of interview data revealed positive results on the effectiveness of the professional development course and the use of the ICAP framework to enhance academic teachers' practices in implementing BL.

1 Introduction

Blended learning (BL) refers to a hybrid of classroom and online learning approaches to help students learn (Garrison & Kanuka, 2004). Teaching in a BL approach has been described by Bonk, Kim, and Zeng (2006, p. 654) as a "complicated and multifaceted" undertaking. Other than teacher conceptions about blended teaching, teachers new to BL face the added challenge of having to design learning processes and strategies that best integrate online and face-to-face (F2F) settings to achieve better learning outcomes (Gerbic, 2011); this raises concerns of being able to effectively engage students with these offerings (Holley & Oliver, 2010). Yet, there is a paucity of literature on how teachers practice BL and how teachers learn to engage students to learn in this pedagogy (Torrisi-Steele & Drew, 2013).

In this explorative study, we first identified how early-adopters in a research-intensive university approached the design of learning activities for BL and how they learnt to design for BL. This was followed by an exploration of the influence delivering of the ICAP framework in a professional development (PD) course for teachers who were relatively new to the pedagogy. The guiding research question therefore concerned the extent to which academic teachers' professional development activities relate to their conceptions of BL, and the learning strategies they design for BL.

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2 Methodology

The present study commenced with interviewing of academic teachers from two different periods of implementing BL at a university in Singapore. The first group of teachers (n = 8), termed as the early adopters (EAs), had implemented BL at the early stages of the university's efforts to encourage the broader adoption of this innovative approach, while the second group (n = 5), termed as course participants (CPs), comprised academics who had attended a structured BL course and subsequently implemented BL in their own modules. Variations in terms of experience in implementing BL, disciplines and number of students in the module were taken into consideration to better represent typical teaching related demographics in the university. Content analysis was used to interpret the qualitative data generated by the interview transcripts and categorized into themes (Neuendorf, 2002).

2.1 Teachers' professional development activities for BL

The teachers within the institution are given considerable freedom in setting the course of their own PD. To identify teachers' PD activities, meaningful fragments about PD activities associated with the activities designed for BL were selected. The categories of PD activity used to code selected fragments referring to learning from the interviews were adopted from the Kwakman (2003) and Bakkenes et al. (2010) studies.

Analysis of the data collected from the EAs revealed 70 instances of reported learning activities (Table 1). Although some of the EAs spoke about formal PD activities (e.g., attending a standalone workshop) and being provided with resources (e.g., guidelines on preparing video lectures), none of these led to conscious thinking about their own teaching practices. Thus, these were not reflected in the reported activities.

Categories	Description	*f*	%
Considering own practice	Conscious reflection on action processes either in a self-initiated manner or from external stimulus (e.g., feedback from colleagues)	27	39.7%
Getting ideas from others	Consciously take notice of views or practices of others (e.g., from books, observing others), or with others (e.g., developing materials together)	23	33.8%
Experimenting	Purposefully trying out something new in practice with some form of reflection on it	18	26.5%
Avoiding learning	Avoid activities to learn how the new approach works	2	2.9%

Table 1: Types of PD activity

2.2 Conceptions of blended learning

Following Prosser and Trigwell (1994), four categories ranging from descriptions that portrayed more cohesive conceptions of BL (Con1 and Con2) to categories that provided more fragmented conceptions of BL (Con3 and Con4) were observed (Table 2).

Conception of BL	Description
Con1	Fosters awareness and preparation for professional lives and future learning
Con2	Orientating towards notions of investigation and enquiry
Con3	Improve students' access to learning and their practical needs
Con4	A means to transfer information

Table 2: Conceptions of blended learning

2.3 Design of activities within BL environment to foster deeper learning for students

The ICAP framework (Chi, 2009) describes students' interaction with teacher-designed learning activities. It is differentiated into four modes of engagement, namely ***I**nteractive*; ***C**onstructive*; ***A**ctive*; and, ***P**assive*. They have a hierarchical relationship in which one mode

subsumes another mode, such that ***I**nteractive* > ***C**onstructive* > ***A**ctive* > ***P**assive*. Teachers' design of BL consists of both out-of-class and in-class learning modes consisting of learning sessions such as lectures, tutorials/seminars, and laboratories. To compare and assess the activities, we focused on the main instructional strategies adopted by the respondents, and how they would want students to engage during the activity. Adopting the coding scheme discussed in the Chi et al. (2018) study, each directive for an activity was segmented based more or less on a verb, such as "watch", or "solve", along with a noun phrase (Table 3).

Mode of engagement	Overt behaviour	Code	Sample activities and how students were required to engage in the activities
Interactive	Purposeful interaction with peers to generate new ideas	I	Teacher allocates pre-laboratory group assignments. Students, with assigned roles, *work in pairs/groups* to *plan* and *determine* the underlying principle behind the experiment.
Constructive	Generate new ideas beyond what was provided	C	Teacher reviews solutions of the selected exercises from the problem sets with the students. Students work in groups to *solve* and *present* their solutions.
Active	Manipulate in some form of overt action without providing any new ideas	A	Teacher reviews questions and solutions of the selected exercises from the problem sets with the students. Students to *solve* weekly problem sets individually.
Passive	Paying attention without overtly dong anything else	P	Teacher may be conducting demonstration to show cause-and-effect, deliver a lecture, or showing problem-solving process. In these activities, students are expected to *listen* and *observe* attentively.

Table 3: Mode of engagement and sample activities from interview data

3 Early adopters' professional development activities, conceptions of blended learning and design of engagement activities for students

Initial analysis revealed that EAs who engaged actively in conscious reflection on action processes, whether upon interactions with colleagues and/or students or from reading articles relating to the practice, had a more cohesive conception of BL. Respondents were also more willing to experiment with new strategies or lesson formats following such interactions in order to observe potential effects on students' learning experiences. In general, EAs with a more cohesive conception of BL were able to consider the different functions for classroom and online contexts when implementing BL in their own modules and designing appropriate engagement activities for their students (see Table 4).

4 Incorporating ICAP as a professional development activity

The BL course consists of six 2-hour sessions and culminates in a 1-hour showcase session conducted by the faculty development unit within the university (Soong, Choy & Lee, 2016). The use of the ICAP framework is incorporated in the session entitled "*Developing Blended Learning Environments that Engage Students*". The session attempts to show how the ICAP framework can be used to design lessons to elicit student engagement in a BL environment. It helps teachers to (a) understand what cognitive engagement is in terms of ICAP, and (b) how to design lesson plans that incorporate higher modes of engaging activities. The ICAP session was delivered via a flipped classroom model, where the theory which underpins the ICAP hypothesis was delivered via an online video prior to the F2F session (pre-session), and application-based activities on using ICAP for lesson design were conducted via the F2F session (in-session).

5 Results and discussion

Other than participating in the PD course, all five participants spoke about engaging extensively in reflecting on their own teaching practice as well as on students' learning and functioning. With more cohesive conceptions of BL, the participants were able to make informed decisions to design learning processes and strategies that best integrated online and F2F settings. Participants were also consciously thinking about how the design of the learning activities would engage students in a higher mode of engagement during learning. As one of the participants stated, "It was really useful overall. Like what type of activities, cognitive level … mostly experience from other people doing the BL is very useful, what works, what doesn't work" (CP2).

Case ID	Conception of BL	Out-of-class		In-class		
		Online (i.e. video, quiz, forum)	Homework assignments to be addressed during tutorial	Lecture	Tutorial/ Seminar	Laboratory
EA1	Con2	Passive		Interactive		
EA2	Con2	Active		Constructive	Interactive	
EA3	Con4	Passive			Active	
EA4	Con1	Active			Interactive	
EA5	Con3	Active	*Constructive	Active	Active	
EA6	Con1	Passive			Interactive	
EA7	Con2	Active	*Constructive		Constructive	
EA8	Con1	Active			Interactive	
CP1	Con1	Active			Interactive	
CP2	Con2	Active			Interactive	
CP3	Con2	Constructive				Interactive
CP4	Con2	Active			Interactive	
CP5	Con2	Active			Interactive	

**Whether this led to generative behaviours as predicted by ICAP will depend on how the tutorial session was being designed to review the homework assignments with students*

Table 4: Data Display Matrix for Critical Variables

6 Limitations and conclusion

It is recognised that even well-designed lessons cannot guarantee that students enact the activities in the ICAP mode that teachers intended (Chi et al., 2018). Actual observations of how students respond to the instruction and the artefacts generated by students are needed to form a complete understanding of how well the instructions are enacted by the teachers.

In summary, this study supports the notion that teachers do not learn solely through formal learning activities. Nevertheless, as compared to single instance PD workshops, longer-term workshops allow faculty to practice applications and think through design issues in relation to their own course design and delivery (Cagle & Hornik, 2001). Despite the small sample size, there was evidence that the PD course on BL supports academic teachers in designing and implementing BL in their respective modules. In particular, the initial analysis shows that it was meaningful for the participants to learn about the ICAP framework and use it to design learning activities to engage students not just for BL, but also for a more holistic change in teachers' pedagogical approach.

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