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The use of flipped classrooms in higher education: A scoping review ☆

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ABSTRACT

There is increasing pressure for Higher Education institutions to undergo transformation, with education being seen as needing to adapt in ways that meet the conceptual needs of our time. Reflecting this is the rise of the flipped or inverted classroom. The purpose of this scoping review was to provide a comprehensive overview of relevant research regarding the emergence of the flipped classroom and the links to pedagogy and educational outcomes, identifying any gaps in the literature which could inform future design and evaluation. The scoping review is underpinned by the five-stage framework Arksey and O'Malley. The results indicate that there is much indirect evidence emerging of improved academic performance and student and staff satisfaction with the flipped approach but a paucity of conclusive evidence that it contributes to building lifelong learning and other 21st Century skills in under-graduate education and post-graduate education.

1. Introduction

Institutions of higher education are facing increased scrutiny to improve student learning and demonstrate programme effectiveness. Even though academics have access to numerous online teaching tools we know that teaching and learning is not all about the technology. The literature tells us that one of the primary components of effective teaching is student engagement and that engagement is critical for learning (Barkley, 2010; Coates, 2006). This is also supported by Bryson and Hand (2007) who established that students were more likely to engage if they were supported by educators who established inviting learning environments, demanded high results, and challenged higher order thinking. Hockings, Cooke, Yamashita, McGinty, and Bowl (2008) suggest that students who are most deeply engaged will reflect, question, conjecture, evaluate and make connection between ideas. In contrast students who are disengaged appear to take a surface approach to learning by copying out notes, focusing on fragmented facts and jumping to conclusions.

Current educational approaches within higher education utilise blended learning; where students may for example, receive a combination of traditional face to face (F2F) instruction in class and are also required to complete activities outside of the class, facilitated through a range of technological resources. Blended learning has become increasingly popular in higher education globally, forming the cornerstone of curriculum design and providing opportunity for learning not previously possible or available to students (Lage, Platt, & Treglia, 2000). Reflecting this is the rise of the flipped classroom or inverted classroom (Lage & Platt, 2000), first popularised in secondary education in the United States (Bergmann & Sams, 2009).

The flipped classroom paradigm has recently emerged from K-12 education (Ash, 2012). Most descriptions of the flipped classroom suggest that multimedia lectures be recorded so students can view them out of class and at their own pace (homework). This asynchronous approach frees up in class time for student centred synchronous learning activities. Advocates in K-12 recommend a range of in-class activities including individual practice (e.g. completing maths problems) so that the teacher can then provide individualised help or large scale in inquiry projects (Prober & Khan, 2013). In higher education courses it has been suggested that class time should focus on knowledge application (Pluta, Richards, & Mutnick, 2013). It may also allow the teacher a better opportunity to detect errors in thinking.

It could be argued that the flipped classroom has been in existence within the broader educational sphere for a number of years, through the requirement of students having to complete preparatory work before attending class to discuss concepts at a deeper level (Strayer, 2012). Flipped classrooms take what was previously class content (teacher led instruction) and replace it with what was previously homework (assigned activities to complete) now taking place within the class (Pierce & Fox, 2012). In addition, the flipped classroom fosters student ownership of learning through the completion of preparatory work and being more interactive during actual class time. Proponents of flipped class suggest that this pedagogical approach is advantageous for a number of reasons; it allows students to learn at their own pace and that

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they may have flexibility of when they engage with electronic resources, it frees up actual class time for robust discussion and associated problem solving activities related to the aforementioned resources, and that these discussions could be initiated by the students, not the staff member. This model then puts more responsibility for learning on the students so students can work towards mastery of the material. The flipped learning approach is significant as it has the potential to fully equip students, and those already in the work force, with skills to address 21st Century health care or other discipline-related problems.

Economic restraints on behalf of universities may also see the flipped approach as a means of delivering cost-effective, student-centred curricula in the face of increasing student numbers and/or decreases in state or national funding or institutional structures that favour faculty research over student learning. Advancing digital technologies within the higher education sector are challenging both the pedagogical stance of traditional didactic teaching seen for decades within universities and equally offering dynamic and innovative opportunities for student learning. Additionally, universities need to be seen at the cutting edge of technological and educational advancement, to maintain student throughput and graduate outcomes.

Research would suggest to best engage students and to promote learning, teaching approaches that go beyond traditional lecture instruction are the most effective (Ferreri & O'Connor, 2013). This is important and indeed necessary for two reasons; one, there are a suite of technologies available to enhance student learning and two, students particularly those of the current millennial generation (born after 1980) expect it. Simply, for this generation they require learning and engagement to be reactionary and immediate. In response to these expectations, universities internationally have recognised over the last ten to twenty years that in order to promote learning, maintain student engagement and to increase student satisfaction, the utilisation of technology with or without traditional pedagogical approaches is considered essential.

Within the literature there is increasing indirect evidence, such as increased student satisfaction and course grades, promoting the flipped learning approach (Mason, Shuman, & Cook, 2013; Wilson, 2014). As the higher education sector is moving more towards online delivery of courses, and with the wider adoption of flipped classroom, the purpose of this scoping review was to provide an indication of the current literature relating to flipped classrooms. In particular, it was designed to establish how key aspects of the flipped class contribute to its effectiveness and to an improved student learning experience. These key aspects include; the design and conceptual framework of the flipped class, as well as the types and utilisation of specific technologies to engage students. In addition, the authors wished to explore whether economic drivers as well as pedagogical acceptance by key stake holders were important factors effecting student flipped learning outcomes.

Despite scoping reviews being a relatively new addition to searching the literature (Davis, Drey, & Gould, 2009), scoping reviews (or scoping studies) are becoming increasing widespread as a means to summarise literature in a topic area such as allied health, workforce planning and education. Whilst there is no precise definition of what constitutes a scoping review, it usually consists of one or more components, which may include literature mapping, conceptual mapping and policy mapping (Anderson, Allen, Peckham, & Goodwin, 2008). Scoping reviews differ from systematic reviews in that the latter are utilised to answer precise questions, with defined methodologies to assess article quality (O'Brien, Wilkins, Zack, & Solomon, 2010), whilst the former are relevant in fields containing a paucity of rigorous evidence, therefore incorporating literature that encompasses a broad range of study designs (Levac, Colquhoun, & O'Brien, 2010). Mays, Pope, and Popay (2005) suggest that a scoping review is an effective means of highlighting the relevant literature to the researcher, with the aim of rapid mapping of key concepts underpinning a research area. Davis et al. (2009) argue that a scoping review is a robust method of identifying primary and secondary sources of literature with its success based on both developmental and intellectual approaches. The authors contend that a scoping review affords meaning to the 'what' and the 'why' explanations of inquiry as opposed to the 'who', 'where' and 'how', providing a comprehensive overview of the research under question (2009, p. 1387).

Arksey and O'Malley's (2005) work on scoping reviews focuses on four potential reasons why researchers undertake such a review. That is, to examine the extent and nature of research activity; to identify whether a systematic review is necessary; to summarise and disseminate research findings; and to identify potential research gaps within the existing literature (2005, p. 21). The approach to scoping reviews taken in this article considers research findings and draws conclusions from the existing literature regarding the state of research activity. This type of scoping review facilitates the identification of gaps in the evidence base where no research has previously been conducted, with the potential to summarise and convey findings, as well as identifying the relevance of the need of a systematic review or otherwise (Arksey & O'Malley, 2005).

2. Methods

The approach for the scoping review is underpinned by Arksey and O'Malley's (2005) five-stage framework, which adopts a rigorous process of transparency, enabling replication of the search strategy and increasing the reliability of the study findings. The five stages of Arksey and O'Malley's framework; (1) identifying the initial research questions, (2) identifying relevant studies, (3) study selection, (4) charting the data, and (5) collating, summarising and reporting the results were utilised in this review of the flipped classroom literature.

2.1. Identifying the initial research questions

The focus of our review was the exploration of key aspects of the flipped class that influence its effectiveness and contribute to an improved student flipped learning experience. To ensure that a substantial range of literature was captured relating to the topic of interest, we posed the following initial research questions to guide the search:

1. What technologies are being used to engage students in a flipped class?
2. What considerations are there pertaining to the economic and time constraints required to implement a flipped class?
3. What is known about the pedagogical acceptance by both staff and students?
4. What are the educational outcomes arising from a flipped class?
5. What is known about the conceptual framework used to design a flipped class?

2.2. Identifying relevant studies

Arksey and O'Malley (2005) suggest that a wide definition of key words for search terms should be adopted to glean a 'broad coverage' of available literature. Key concepts and search terms were developed to capture literature that related to flipped or inverted classroom, flipped or inverted teaching within higher education from Australian and international perspectives. A university librarian was consulted who was a subject specialist in the field of teaching and learning. Their input was useful in the refinement of key search terms and identifying databases most likely to produce the results sought. Techniques for searching included the use of search tools such as educational subject headings and Boolean operators to narrow, widen and combine literature searches. The linked descriptive key search terms that were developed to guide the search are outlined in Table 1.

In being as comprehensive as possible in the identification of primary evidence, and cognisant of the practicalities of time and monetary