Blended Learning

Overview:

One of the main challenges of addressing the effectiveness (or otherwise) of blended learning stems from the difficulty of defining it. Typically, courses are categorized as 'face-to-face', 'blended / hybrid' and 'online'. These three categories are both overlapping and impossibly broad. When does face-to-face become blended? What counts as blended? (is a course really 'blended' if only two weeks of a course was replaced by blended content and activities?). When does blended become online? Even within a categorization, there is room for such a wide variety of learning designs and sequencing of activities, that courses in the same category can look far more different than they do similar.

Despite this challenge, there are a good number of reported studies of the effect of introducing a particular online tool or technology to support student learning. In view of the need of widening the perspective and scope of the findings of individual studies, different academic, governmental, and independent groups have extensively surveyed the empirical literature with the goal of getting a fuller picture of the ways in which digital technologies have impacted teaching and learning across disciplines and institutions. The focus and scope of such reviews is varied. Halverson, Graham, Spring, Drysdale, and Henrie (2014) identified the following areas:

- Instructional design - strategies and best practices, design process, implementation
- Disposition - perceptions, attitudes, preferences and expectations
- Exploration - nature and role of blended learning, benefits and challenges
- Learner outcomes - performance, satisfaction, engagement, motivation and effort, independence in learning, failure and retention rates
- Comparison - blended vs face-to-face vs online, blended vs face-to-face, and blended vs online
- Technology - comfort with, effect of, types of, and uses/role of
- Interaction - student-to-student, student-to-instructor, collaboration, community and social presence

The research findings summarized in the many published reviews are mixed. For instance, Wu (2015) reports that some studies found better outcomes in online and blended sections, some found effectively no difference and some others found significantly worse outcomes. On the other hand, a study commissioned by the US Department of Education (Means, Toyama, Murphy, Bakia, & Jones, 2009) undertook a meta-analysis of published research into the effects of face-to-face and online methodologies on student learning outcomes between 1996 and 2008; of the 45 studies that met their requirements of rigor in methodology, researchers found that student assessment results for online and blended learning environments were better than those for entirely face-to-face contexts.

The National Academy of Science recently published a meta-analysis of 225 studies that compare student performance in STEM courses under conditions of active learning vs traditional lecturing by looking a performance on diagnostic tests, examinations and failure rates (Freeman et al, 2014). Although not specifically requiring that the courses be blended in nature, practically all of them incorporate this as a mechanism to free up class time for more interactive elements, though not necessarily reducing class time. Across the many studies analyzed, mean failure rates dropped from 34% (traditional lecturing) to 22% (active learning), and learning gains showed significant improvement when looking at exams scores and concept inventory performance (Freeman et al, 2014).

The many existing literature reviews have also highlighted the variety in the methodological designs employed across individual studies, and it has been indicated that relatively few studies employ methodologies that permit generalization of results, or the establishment of a causal inference between events.

Courses & student enrolment:

Instructors have implemented a blended classroom approach in various subject areas that include, but are not restricted to, STEM disciplines (chemistry, biology, statistics, engineering and math), information systems and computer sciences; economics; psychology; medicine and health disciplines (nursing, nutrition, stress management); library and archival studies; teacher education; social sciences and the humanities (sociology, languages, ESL, political science); the arts (liberal arts, creative writing); special education; veterinary; architecture; and accounting. Courses that have been modified into a blended format range from 100 to 500 level courses, mandatory, prerequisite, capstone, specialization courses, theory and laboratories, experiential and community service. Reported enrolments range from low (~20 students) to high (500+ students).

Evidence of impact:

The empirical literature often presents a mixed picture of the effectiveness of different delivery modes, for instance in what refers to student outcomes, interactions, and satisfaction. Despite careful research and analysis, and some meta-analyses of large quantities of published work, findings are far from definitive. Overall, methodological diversity and shortcomings, the timescale over which measurement of improvement takes place and artificial lumping of essentially different courses into the same categorical space are all factors that contribute to the lack of clarity in an area so widely studied. It can be argued, however, that context is of paramount importance and that the particular circumstances of a given course will impact the outcomes of a blended classroom approach. The following contrasting potential benefits and limitations have been reported in the blended learning literature:

Potential benefits of a blended learning environment:

- Enhanced opportunity for student control their learning
- Free up class time for more interactive elements
- Increased learning opportunities as a result of a greater variety in teaching modalities, approaches and resources
- More flexible access to content and instruction at any time, from any place
- Possibility of tackling multiple issues when a problem is multi-faced

Potential limitations of a blended learning environment:

- Design and implementation challenges
- Instructors are required to feel comfortable working with and managing technology
- Instructors need time and practice to develop the skills required to achieve the intended outcomes of an in increased use of teaching and learning technology
- Risk of overloading students

Vignettes:

“Learners' individual needs should motivate the use of a particular blend and each component of the blend should be designed to deal with a significant pedagogical problem.” (Boyle, 2005).

“The literature on alternative online learning practices has been conducted for the most part by professors and other instructors who are conducting research using their own courses. Moreover, the different research conditions have often been ad hoc rather than theory based. As a result, the field lacks a coherent body of linked studies that systematically test theory-based approaches in different contexts.” (Means et al., 2009)

"We live in a world in which technological innovation is occurring at break-neck speed and digital technologies are increasingly becoming an integral part of our day-today lives. Technological innovation is also expanding the range of possible solutions that can be brought to bear on teaching and learning." (Bonk & Graham, 2012).

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