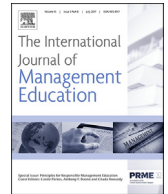




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## Course format and learning: The moderating role of overall academic performance



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### ABSTRACT

This article investigates undergraduate-level student learning in an International Business course taught both online and face-to-face, with an emphasis on identifying students who are likely to learn better online. Theory on student learning differences between course formats suggests that overall academic performance interacts with course format to affect learning. Analysis of 269 students in a comprehensive university BBA program, using an objective measure of learning, shows that students in face-to-face classes learn better than those in online ones. In addition, there was a moderating effect with overall academic performance. Online students with higher overall academic performance learned about as well as face-to-face students. However, students with lower overall academic performance learned significantly better in the face-to-face format relative to online. These findings suggest that students with lower academic performance have a learning risk when taking online courses. Some implications for institutions are discussed, including revising online course enrollment and management policies.

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## 1. Introduction

In setting policies on course format offerings, colleges and universities may be guided more by students' demand for convenience and accessibility than by their learning. Online education is growing for various reasons (Allen & Seaman, 2014; Mitchell, Parlamis, & Claiborne, 2015; Volery & Lord, 2000), but the traditional face-to-face course format has its defenders and institutional inertia (Mitchell et al., 2015; Redpath, 2012). Undergraduate students therefore often take courses online, where they can control the pace of their learning, but also face the challenge of disciplining themselves to do the work (Coates, Humphreys, Kane, & Vachris, 2004). Or they may take face-to-face courses, where they may benefit from the professor's presence, but may be overly stressed by classroom socio-emotional environments and information overload. In spite of the voluminous research on this topic, the effect of course format on learning is not clear. Due to the importance of the course format decisions in curricula, and the necessary investment by institutions and faculty in developing online course platforms, this topic merits further attention. This article investigates a) students' learning differences across course formats using improved statistical methodology and b) characteristics of students who may learn better in online and face-to-face courses.

Understanding how students experience online and face-to-face courses appears to require a nuanced understanding of the qualitative differences across learning environments. The existing literature on student learning across course formats

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varies in quality, but most find no significant difference (Arbaugh et al., 2009; Bernard et al., 2004a; Russell, 2001; WICHE Cooperative for Educational Technologies, 2010). In contrast, a few researchers show that learning in face-to-face courses is greater than online (ex. Gopala, Paswan, & Qin, 2015). Students in online courses appear to have lower retention and satisfaction than those in face-to-face (ex. Lyke & Frank, 2012; Xu & Jaggars, 2013). The result of this research stream is a lack of clear consensus related to learning. Some students may learn better in one course format than another, but it is not clear how to identify them. As Lyke and Frank (2012) conclude (p. 249),

The need to more precisely identify which types of students learn which types of material best ... becomes increasingly important as higher education continues to move in the direction of a cafeteria model, striving to meet the demands of a diverse student body who [sic] require more choices on their higher education experience.

Additionally, there is a lack of research into student characteristics, such as overall academic performance, that interact with course format to influence learning. A review of the research found only one study that reported an interaction between GPA and course format associated with student performance (Cavanaugh & Jacquemin, 2015), but offered no theoretical explanation or policy implications. This article develops theory to argue for a moderated relationship between course format, overall academic performance, and learning in a course. It is unique in its combination of undergraduate focus (Arbaugh, 2010), examination of an International Business course, use of identical objective measures of learning for both course formats, adequate sample size, and inclusion of controls in the statistical analysis.

The remainder of this article presents theory related to the differences in student learning across course formats, methodology, and discussion aimed at improving institutional practice.

## 2. Theory

Early research into student learning across course formats identified two learning models that may apply: objectivist and constructivist (Alavi, 1994; Leidner & Jarvenpaa, 1995). The objectivist model assumes that the professors transfer knowledge to students, and the most effective way for them to learn is to let the professor control the pace and dissemination of information. The constructivist model assumes that students are the center of the learning process, and they learn by actively perceiving events and processing information. The resulting knowledge may be different for each student. Learning is enhanced when students control the pace and processing of information, and the professor is a mediator between students and the events they are studying. Face-to-face course formats have potential to maximize learning under the objectivist model, as control and pacing are largely set by the professor. Online course formats have potential to maximize learning under the constructivist model, as learners have flexibility within an instructor-provided schedule to control the pace and setting of their exposure to course content. The contrast between these learning models suggests that the course format that optimizes learning will depend on the nature of the course content (hard vs soft knowledge) and student learning styles.

Comparing student learning across course formats is complicated because teaching methods are not consistent. When professors teach courses in different formats, they may adapt teaching methodologies to optimize effectiveness (Arbaugh & Hwang, 2006; Coppola, Hiltz, & Rotter, 2002; Ross & Rosenbloom, 2011). Students also may adapt their learning styles to course formats (Daymont, Blau, & Campbell, 2011; Kock, Verville, & Garza, 2007; Nemanich, Banks, & Vera, 2009). Therefore, a practical comparison of student learning across course formats involves an optimized teaching methods–student learning approach for each format. For example, online teaching has rapidly developed to include characteristics such as adequate levels of student–student interaction and student–professor interaction, both of which may affect perceived learning (Arbaugh & Rau, 2007; Arbaugh, 2005). Teaching methods, technologies, and student learning styles can be change frequently, so isolating durable factors that differ between course formats should be the basis for research that has lasting application.

Two such durable factors are course media richness and students' autonomous motivation. Media richness theory offers a reason to expect differences in learning outcomes across course formats. Students' autonomous motivation offers a reason to expect an interaction between overall academic performance and course format, which in turn affects learning. Below are brief reviews of the relevant literature, which lead to hypotheses.

### 2.1. Media richness theory

Media richness theory describes how communication channels convey information from a sender to a receiver. As stated by Daft and Lengel (1986: 560), "Communication media vary in their capacity to process rich information." And "information richness is defined as the ability of information to change understanding within a time interval." Face-to-face is generally considered to be the richest communication medium, followed by telephone conversations, documents, and text messaging.

Richer media offer two main advantages, 1) multiplicity of cues and 2) spontaneous feedback (Daft & Lengel, 1986; Kahai & Cooper, 2003). Multiplicity of cues refers to voice cues, including the meaning of words, intonations, hesitations, emphases, and other paralanguage cues; and non-verbal cues from body language and gestures. Spontaneity of feedback refers to immediate response to receivers' questions or body language. Lengel and Daft (1988) and Daft, Lengel, and Trevino (1987) argue that richer media should be used for nonroutine, equivocal, unstructured, ambiguous, and complex messages. Also, richer media should be used for expression of the sender's personality. For routine, unequivocal, unambiguous, and simple messages, lean media can be appropriate.

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