A Study on the Pre- and Post-Pandemic Media of Instruction and Learning Effectiveness in Information Systems Courses

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ABSTRACT

The objective of this study is to understand the effectiveness of medium of instruction based on student performance in courses offered face-to-face prior to the pandemic and virtual hybrid mode after the onset of the pandemic from a media richness theoretical perspective. This study analyzed data from 1157 students from 43 Information Systems courses over a 6-year pre- and post-pandemic period. This study analyzed student performance data from face to face and virtual hybrid courses across medium of instruction, type of course, course level, and gender. Overall, students performed better in face-to-face classes prior to the pandemic than the virtual hybrid courses. Across gender, and type of course, and course levels, face-to-face medium of instruction was found to be best for student performance. The post-hoc interviews with students and faculty indicated that face-to-face was the choice of instruction medium for technical courses and virtual hybrid mode was preferred for theory intensive conceptual courses, confirming the results from the data analysis.

INTRODUCTION

The COVID-19 pandemic caused almost all educational institutions worldwide to adopt a variety of online technology enhanced and hybrid modes to ensure effective course delivery while practicing social distancing and quarantine during the pandemic (Easop, 2021; Viner et al., 2020). The modes of course delivery were as follows: a) completely asynchronous online where the instructor and students may be separated by location as well as time and the instruction happens via the internet using audio, video, and other online tools; b) synchronous online where the instructor and the

students meet at a fixed time, but separated by location, and use technology such as such as Zoom, Skype, or Google Meet etc. as the medium of communication; and c) modified face to face classes which involved classroom meetings with social distancing, masking, and such safeguards appropriate during the pandemic period dictated by health guidelines. The mode of delivery was determined by various factors such as class size, course level such as introductory, intermediate, or advanced level, or graduate vs. undergraduate level, and the nature of the individual courses—conceptual, hands-on programming, lab, etc.

These technology enhanced online instruction methods have benefits as well as challenges (Bandi, 2021). Flexibility and adaptability have been one of the main advantages that online learning brings both to the faculty as well as the students (Ilgaz & Gulbahar, 2017; Zawacki-Richter & Naidu, 2016). However, past research on student readiness for online education suggests that the students may be ready for using the technology, but may not be completely ready for learning the course content online (Parkes et al., 2015). Other studies found that a blended form of learning combining both online and face to face mode of delivery, also known as virtual hybrid mode (virtual hybrid henceforth) is more effective than mere online education (Ma & Lee, 2021). Further, it is not just the online or face to face mode of delivery but the nature of the course, implementation, and learner characteristics that contribute to student learning (Ryan et al., 2015). The objective of this study is to understand whether the online or virtual hybrid modes of course delivery effectively communicate the course content to the students and help them perform well.

Media richness theory states that the robustness of communication depends on the media used for communicating a given information (Kwak, 2012; Lim & Benbasat, 2000). From a media richness theoretic (Lim & Benbasat, 2000) perspective similar to organizational or day to day communications, the choice of medium and nature of the course makes a difference in communicating the course content to the students for better learning outcomes. Course delivery is also a mode of communication where the faculty pass on their expertise and perspective in their discipline to the students and students interact with the faculty in order to fully understand the nuances of the discipline. Therefore, the choice of media is an important consideration when communicating the content (Lipowski & Bondos, 2018). A key issue in any communication is the choice of medium, and its attributes must align with the communication task characteristics (Koo et al., 2011). In the context of teaching Information Systems courses, the medium of instruction i.e., online (synchronous and asynchronous), virtual hybrid, or face to face is the medium of communication for course content. The nature of the course—i.e., whether an IS course is conceptual, theory-oriented courses (conceptual from here on), or hands-on intensive or technically oriented courses (technical courses from here on) can be considered as task characteristics proposed in media richness theory. Conceptual courses are defined as those courses where the focus is more on the theoretical aspects and may not involve labs or hands-on course work. Technical courses are defined as those courses that require considerable hands-on practice of syntax, for example programming or database courses. For the purposes of this study, all courses offered prior to the onset of the pandemic are considered face to face (pre-pandemic face to face courses from here on), because all courses used in this study were offered face to face. Similarly, all course data used in this study after the onset of the pandemic were offered either as fully online synchronously (where the class meets online using Zoom, Skype or some other form of technology at a pre-scheduled time), fully online asynchronously (where the instructor and the students may not meet at a scheduled time, but the course material is made available online for flexible access), or some form of online and face to face combinations. From here on these courses will be referred to as post-pandemic virtual hybrid courses.

This study addresses an important gap in literature of understanding what type of course delivery helps student learning better, given the type of courses. The previous research has examined the advantages of face to face classes as well as the advantages and flexibility offered by the online or hybrid mode of instruction (de Ocampo, 2023; Estelami, 2012; Harris-Packer & Ségol, 2015; Piccoli et al., 2001; Skylar et al., 2005). However, very few studies analyzed results from successive sections

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