The Impact of the Coronavirus (COVID-19) Pandemic on Education:
A Model Toward Technology-Supported Synchronous Remote Learning

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ABSTRACT

During the COVID-19 pandemic, many universities have moved a large portion of their classes online. To better support students' online learning activities and to best resemble the face-to-face setting, the technology-supported, synchronous remote learning platform was adopted in most cases. In this study, the authors aim to investigate factors that could influence students' learning in this new environment during the COVID-19 pandemic. Specifically, a research model was developed and tested with 428 students. The result showed that students' IT competence had a significant impact on their learning satisfaction, while social influence had a significant impact on their intention to use the remote learning technology in future classes. As to technology-facilitating conditions, significant impacts were found from it (at both institution and student levels) to learning satisfaction. They also found that COVID-19-related mental impacts could influence student satisfaction on and intention to use the remote learning technology.

KEYWORDS

Impact of COVID-19 on Education, Learning Satisfaction and Intention, Model Development and Assessment, Synchronous Remote Learning, Technology-Supported Learning

1. INTRODUCTION

The coronavirus (COVID-19) pandemic has changed our daily lives and routines dramatically (Chen & Roldan, 2021; Majumder & Biswas, 2021; Pileggi, 2021). To better protect ourselves and the local communities, most of our daily activities have been moved online whenever possible via the use of information and communication technologies, including education (Bawa, 2020; Benhima, 2021; Shastri & Chudasma, 2021; Sun et al., 2021). Since the breakout of the COVID-19 in the US, the course content delivery model in the education system at all levels has changed significantly (Amzalag, 2021; Apak et al., 2021; Bawa, 2020; Carpenter et al., 2021; Dunaway & Kumi, 2021). For higher education, many universities have changed a significant portion of their traditional face-to-face classes to remote learning by leveraging online communication technologies and systems (such as Blackboard Collaborate Ultra, Zoom, etc.). This sudden and significant change requires faculty to devote more

time and effort to design (or re-design) their classes (Bawa, 2020; Carpenter et al., 2021; Tawafak et al., 2021). It could influence students' learning significantly (Bawa, 2020; Tawafak et al., 2021).

In general, there are two types of e-learning, including asynchronous and synchronous e-learning (Hrastinski, 2008). Until recently, the more popular type of e-learning is still asynchronous e-learning (Hrastinski, 2008). However, with the advancement of information and telecommunication technologies, synchronous e-learning has gained growing popularity. In asynchronous e-learning, students and their instructor typically interact via the use of e-mails and discussion boards, and there is no requirement for all students and the instructor to be online at the same time, which enables increased flexibility in student learning (Hrastinski, 2008). Differently, in synchronous e-learning, students and their instructor will meet online during the designated class meeting time via the use of videoconferencing tools. Students will have a higher level of involvement and feel less isolated, because synchronous e-learning provides the chance for them to interact with their instructor (such as asking questions) and classmates (such as conducting group discussions) at real time (Hrastinski, 2008).

In this study, we aim to examine factors that could possibly influence students' learning in technology-supported, synchronous remote learning environment during the COVID-19 pandemic. Potential factors from various perspectives were examined and a theoretical research model was then developed and tested. The model was tested with 428 students who took classes that adopted the technology-supported, synchronous remote learning instructional method during the COVID-19 pandemic. Overall, the results showed that task-technology fit and COVID-19 mental impacts could significantly influence both students' learning satisfaction and intention. In addition, students' IT competence had a significant impact on their learning satisfaction, while social influence had a significant impact on their intention to use the remote learning technology in future classes. As to technology facilitating conditions, significant impacts were found from it (at both the institution and student levels) to learning satisfaction. We hope findings of this research could better help educators understand factors that could influence students' learning in this new situation and bring some insights to high education under emergency situations.

The remainder of this paper is organized as follows: in Section 2 we discuss the related literature and provide the hypothesis development. Then, Section 3 provides details on the research method. Following that, data analyses and results are reported in Section 4. The paper concludes with a discussion of the research contributions and implications, and future research directions in Section 5.

2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1 Technology-Supported Learning

The advancement, broad coverage, and rapid development of modern information and Internet technologies have been dramatically changing our lives in recent years. With their help, a lot of our daily activities could now be done very efficiently and effectively online, from working to entertaining, from selling to buying, and from information searching to knowledge sharing. This is even true as to higher education. Different types of learning management systems and communication tools have been created and adopted to support students' learning in a remote manner, either synchronously or asynchronously. With their support, new types of instructional methodologies have been developed to better fit students' learning needs, such as e-learning, blended learning, and flipped classrooms (So & Brush, 2008).

The most traditional form of technology-support learning is the e-learning (So & Brush, 2008). As a big change from the face-to-face learning that had always been utilized in the education system in the old days, e-learning has brought a significant level of flexibility in students' learning. Without the time and location constrains, e-learning has opened the door of higher education to those who could not take classes on site (Kulkarni et al., 2013; Teo et al., 2018).

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