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Formative Assessment as an Online Instruction Intervention:
Student Engagement, Outcomes, and Perceptions

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ABSTRACT

Online education has long been suffering from high dropout rate and low achievement. However, both asynchronous and synchronous online instructions have to become effective to serve as a quick response to maintain undisrupted learning during the COVID-19 outbreak. The purpose of the present study was to examine student engagement, learning outcome, and students' perceptions of an online course featured with frequent tasks, quizzes, and tests as formative assessment. Data were collected from the first five weeks of a course that was temporarily converted from blended learning to be fully online in time of school closure. Analysis of students' learning records and scores indicated that students engaged themselves actively in all of the online learning activities and had gained high scores in all tasks, quizzes, and tests. In addition, students held positive perceptions towards the formative assessment.

KEYWORDS

Formative Assessment, Learning Outcomes, Online Instruction Intervention, Student Engagement, Student Perceptions

1. INTRODUCTION

The year of 2020 has witnessed the worldwide COVID-19 outbreak. For the sake of containing the spread of the global pandemic, governments all around the world had to close their educational institutions (UNESCO, 2020a). As a response to such crisis, educational institutions in every country gradually provided both asynchronous and synchronous online instructions to students enrolled at different levels of education, in an attempt to ensure that learning remains uninterrupted in time of school closure.

To support such unplanned and rapid move to online education, UNESCO (2020b) has launched the Global education coalition, provided technical assistance, selected digital learning resources, etc. to promote inclusive learning opportunities for students. In response to sharply increasing demand on asynchronous and synchronous online instruction tools, many online learning platforms and live streaming providers are offering free access to their services (Li & Lalani, 2020).

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Nevertheless, the students and teachers' temporally and spatially separated status in this unprecedented period is subject to the long-term criticism of distance education—it is challenging to monitor and diagnose student learning (Cheng et al., 2013), giving rise to compromised teaching effect. Research has shown that students feel isolated in online education (Hammond, 2009; Vonderwell, 2003; Woods, 2002), resulting in high dropout rate (Carr, 2000; Hodges & Kim, 2010; Rovai, 2002), high rate of boredom and low achievement (Chapman et al., 2010; Fredricks, 2015).

One of the best solutions for such dilemma might be effective pedagogical design that provides students with formative assessment in both asynchronous and synchronous online instruction settings.

Formative assessment, referred to as "assessment for learning", is generally considered as a planned process in which different assessment activities are scheduled to elicit evidence of student learning, leading to teachers' instructional adjustment or students' learning tactic adjustment (Black & Wiliam, 2009; Looney, 2011; Popham, 2008; etc.). If used appropriately, formative assessment could promote student learning and achievement (Black & Wiliam, 1998a; Black & Wiliam, 1998b; Andrade & Heritage, 2018).

In fact, online formative assessment implemented with forum discussion tasks (Cheng et al., 2013; Cooner, 2010; McKenzie et al., 2013), quizzes (Jia et al., 2012; McKenzie et al., 2013; Zainuddin et al., 2020; etc.), and tests (Harnisch & Taylor-Murison, 2012; McKenzie et al., 2013), etc. has been proved to be effective in improving student engagement (Cheng et al., 2013; Gikandi et al. 2011; Zainuddin et al., 2020) and improve learning performance (Cooner, 2010; Dalby & Swan, 2018; Faber et al., 2017; Harnisch & Taylor-Murison, 2012; Jia et al., 2012; McKenzie et al., 2013; Peat & Franklin, 2002; Zainuddin et al., 2020; etc.).

Nevertheless, online formative assessment in the aforementioned studies were conducted with a blended learning approach that deliberately combines online and face-to-face instructions (Graham, 2006), little is known on whether such formative assessment could bring about similar teaching effect in fully online instruction.

In fact, research on formative assessment that engages students actively in both of the asynchronous and synchronous online instructions and improves the learning performance as well would shed light upon online teaching as an emergency response and even for regular online education and blended learning in the future.

Therefore, the present study would design frequent tasks, quizzes and tests as formative assessment in the whole online instruction process and would collect data to examine students' learning performance, in an attempt to answer the following three questions:

1. Does the formative assessment engage students in the whole online instruction process?
2. Does the formative assessment generate an impact on students' learning outcomes?
3. What are students' perceptions of involvement in the online formative assessment?

2. THE PROPOSED FORMATIVE ASSESSMENT INTERVENTION IN ONLINE INSTRUCTIONS

Considering the probable benefits of using formative assessment in online instruction and the importance of well-designed tasks and activities for formative assessment (Johnson-Smith, 2014; Ray, 2004), this paper would like to propose a careful use of frequent tasks, quizzes and tests as formative assessment to involve students in the online learning process and facilitate their learning as well (see Figure 1).

Figure 1 depicts formative assessment for both asynchronous and synchronous online instructions. Asynchronous online instruction could be delivered via learning management system (LMS) such as Moodle, providing videos, drill and practices, discussions, tests, assignments, etc. Firstly, the drill and practices can help students practice the skills illustrated in the videos; whereas the asynchronous discussions would direct students to reply to threads that invite case analysis, evaluation, solutions,