Chapter 53
Effectiveness of Student's Note-Taking Activities and Characteristics of Their Learning Performance in Two Types of Online Learning

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ABSTRACT

Aspects of learning behavior during two types of university courses, a blended learning course and a fully online course, were examined using note taking activity. The contribution of student's characteristics and styles of learning to note taking activity and learning performance were analyzed, and the relationships between the two types of courses were compared using causal analysis techniques. In addition, lexical analysis of the contents of notes taken was introduced. Features of notes taken, such as the number of terms, the word ratios of student's notes and the degree of coverage of the lecturer's notes were compared. The results of the evaluation of the two types of learning styles were summarized by determining the relationships between student's characteristics and metrics of the contents of notes taken. The metrics were significantly different between the two learning styles. The contributions of students' characteristics to learning performance were also different. These results provide points to consider for the design and organization of the two types of learning.

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INTRODUCTION

The internet has made various new types of learning possible, and the flexibility of these types of learning is supported by Information Communication Technology (ICT). The most popular and frequently used style is e-learning, which solves the problems of time and distance. E-learning can be defined using two types of learning, known as "online learning or technology enhanced learning (TEL) which adheres to the basic tenets of face-to-face teaching" (The Univ. of Sheffield). In this paper, the focus is on one of the styles, which is known as "fully online learning" and does not involve face-to-face learning sessions. The other, known as "blended learning", is a combination of online learning and face-to-face instruction. Both learning styles are types of "e-learning." E-learning permits the use of modern variations of learning activity, such as Massive Open Online Courses (MOOCs) (Seaton et al., 2014a, 2014b) and Flipped classrooms, which are based on blended learning (Hill, 2012).

However, learning performance in e-learning courses requires examination, as serious claims have been made about both their actual effectiveness and their return on investment. As the participant's learning activities were analyzed to determine the level of achievement, improvements were not easy to carry out (Nakayama et al. 2009). To maximize learning performance, learner's participation in the online system has been monitored and analayzed as a topic of research in modern learning analytics (Farguson and Clow, 2015). Another approach is to focus on the learning process of participants, such as using analyzing various records regarding a participant's learning, or using text mining techniques to examine note taking activity (Chibelushi et al. 2004). This analyses is frequently used to assess their authenticity (Buyarski and Landis, 2014). Therefore, the authors looked at participant's note taking activities (Nakayama et al. 2012c) as well as the previous studies (Bonner & Holiday, 2006; Bauer & Koedinger, 2006; Çetingöz, 2010). Note-taking is well known as a conventional index of learning progress (Kiewra, 1985, 1989, Kiewra et al. 1995) and learning performance (Nye et al., 1984; Kiewra et al., 1995; Nakayama et al., 2014). Various aspects of the relationships between these two activities have been discussed, and the details will be summarized in the following section.

Note taking surveys were introduced to both courses studied, one a blended learning course and the other a fully online course. Both types are defined as "e-learning" in this paper, and are typical learning formats which use an online learning environment. Since the learning format of the two styles is significantly different, the relationships between note taking activity and learning performance differ, due to various factors which concern the individual participants. As the quantitative investigation of these points may help improve the design and organization of the courses, data surveys and modeling analysis of the two courses were conducted. In a previous study conducted by the authors, students' characteristics affected note-taking activity and learning performance during a fully online course (Nakayama et al., 2014), and the dependency of this relationships on learning style should be examined.

In this paper, the following topics are addressed using surveys of participants in both blended and fully online courses:

- Note taking skill factors are created to compare participant's performance between the two courses;
- The causal relationships between participant's characteristics and learning achievement are measured and compared between the two courses;
- Features of notes participants took during the two courses are compared, to extract the differences in learning behavior between the two courses;