Chapter 12
The Impact of Personal Response Systems on Students’ Learning Performance: Research Implications and Future Research Directions

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ABSTRACT

Personal response systems (PRSs) are prevalent across a range of educational settings, and this increasing importance has prompted many researchers to examine their various aspects. Their effects on students' learning performance have three main categories of antecedents: the learners’ characteristics, the instructors’ characteristics, and other contextual factors. A theoretical model is developed on the effects of PRSs on students’ learning performance. This chapter describes the characteristics of PRSs, reviews their advantages and disadvantages, and proposes a theoretical model of their antecedents on students’ learning performance. It concludes by exploring research implications and directions for future PRS research.

INTRODUCTION

Academic institutions in higher education have used advanced technologies and information systems as strategic resources to create better education environments. The field of teaching and learning is changing at a steady pace, and the learning formats in which instructors prepare their work with information technologies are being re-organized to enable changes in teaching. How students learn to meet challenges is also changing, as are the ways that their learning needs are satisfied (Eastman, Iyer, & Eastman, 2011).

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A more interactive way to learn new knowledge in an academic environment with a variety of teaching and learning tools in the classroom enables students to be better involved in the learning process.

In the past decade, the use of personal response systems (PRSs) in the classroom has become more common in the academic literature (Moss & Crowley, 2011; Chien, Chang, & Chang, 2016). The design of questions by PRSs for students to respond during lessons in higher education has steadily increased (Stowell, 2015). The use of PRSs has become a popular means to demonstrate the importance of teaching effectiveness and learning for individual learners. PRSs are widely used across disciplines and across a range of educational settings, including accounting, business, management, information systems, psychology, mathematics, biology, chemistry, engineering, and computing programs in higher education (Addison, Wright, & Milner, 2009; Carnaghan, Edmonds, Lechner, & Olds, 2011; Keough, 2012). For example, Rana, Dwivedi, and Al-Khowaiter (2016) reviewed the use of PRSs in the business and management discipline. In business schools, an instructor might pose a theoretical model and cases and ask students to indicate how they would act in a given business environment. PRSs have been used in large introductory courses (Bonaiuti, Calvani, & Piazza, 2015; Trees & Jackson, 2007), in smaller tutorial classes, and in laboratory classes (Rana, Dwivedi, & Al-Khowaiter, 2016). Barnett (2006) discussed the implementation of personal response units in large lecture classes.

Empirical studies have found that feedback is important to the effectiveness of PRSs (Lantz & Stawiski, 2014; Rana, Dwivedi, & Al-Khowaiter, 2016). Their use can help boost students’ attention, improve attendance, increase participation, and enhance learning performance (Buil, Catalan & Martínez, 2016; Hedgecock & Rouwenhorst, 2014; Roblyer & Wiencke, 2003). Students must respond to the questions, which helps to hold their attention, provide instant feedback for sharing, and encourage class participation (Boyle & Nicol, 2003). PRSs, such as “clickers” allow students to respond to review questions anonymously, and they have helped students become increasingly responsible for their own learning. PRSs can be one of the most useful tools in the new ongoing-learning process.

PRSs have the capacity to enhance learners’ engagement and understanding in the classroom, in real-time. However, a survey of the literature devoted to the use of PRSs from the past 10 years seems to point to a lack of agreement on how to best harness its potential (Kay & LeSage, 2009; Moss & Crowley, 2011). While our chapter examines the advantages and disadvantages in effectively implementing PRSs for effective learning and propose a preliminary framework to guide practitioners in the exploration of using the systems in the classrooms. To support teaching and learning effectiveness, it is beneficial to know the format and type of PRS conducted. For the latter point, this study is significant for academics and practitioners to better understand these issues. The purposes of this chapter are to (a) describe the characteristics of PRSs; (b) evaluate their advantages and disadvantages; (c) develop a theoretical model of their antecedents as strategy tools to support students’ learning performance; and (d) generate research implications and directions for future research.

Characteristics of Personal Response Systems (PRSs)

PRSs have been identified using a wide range of labels such as audience response systems, classroom communication systems, electronic voting systems, group response systems, wireless keypad response systems, student response systems, mobile phone polling, and “clicker-based technology” (Moss & Crowley, 2011). Our chapter uses the term “personal response systems” (PRSs) to refer to all of these labels, although despite the increasing use of the term, there is no universally accepted definition. PRSs