Chapter 4
Applying Learning Theories to Computer Technology Supported Instruction

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ABSTRACT
The purpose of this paper is to share an approach articulating how learning theories can be used to inform computer technology in classroom instruction. This report is based on a course introducing student teachers to using cutting-edge computer technology in their future classrooms. An analysis of three exemplary responses to course assignments revealed that student teachers demonstrated a sophisticated understanding of how to apply the behaviorist, cognitivist, and constructivist theories of learning to computer technology for classroom instruction. This chapter also provides ideas about how students and educators can contribute to the development of educational apps that can support teaching and learning.

INTRODUCTION
Computer technology is a ubiquitous presence in our world, and K-12 students are among the demographic most “wired” to the latest forms of the technology (Palidino, 2015; Rideout, Foehr, & Roberts, 2010), so much so that children spend countless hours fortifying their fascination with this phenomenon. Quite likely, teachers who do not co-opt the technology in their classrooms are at the perilous risk of becoming irrelevant. Although many teachers make the effort to support their instruction with computer technology, this author has found no evidence in the literature that their decisions are informed by established pedagogical theories. The purpose of this chapter therefore, is to provide a framework for using principles of major learning theories to inform the application of computer technology to elementary classroom instruction.

The chapter is inspired by EDUC 396 Seminar in Recent developments: Computers in Education, a course that the author teaches to early childhood, elementary, and special education student teachers. EDUC 396 is geared towards introducing students to ideas and practices regarding how to employ com-

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Computer technology to support their work as future teachers, and teachers of the future. In Collaborative Learning Teams (CLTs), students explore and demonstrate how the latest apps and other software can support instruction, classroom management, classroom assessment, and students with special needs. The scope of the discussion however will be limited to how learning theories can inform technology to support instruction. Basically, this chapter is a report on how the author teaches the course, and how it can be a model for introducing prospective teachers to an approach to using cutting-edge computer technology in their classrooms. Teacher educators working with pre-service teachers on the use of technology, in-service teachers, and policymakers should find this chapter useful.

THE CASE FOR LEARNING THEORIES

To further set the stage for the ideas, applications and insights that will be subsequently covered, a brief rationale is provided for the use of learning theories to inform computer technology in classroom instruction.

The author contends that a major reason for employing learning theories to inform the application of technology in the classroom is their compatibility. As will be discussed and illustrated in greater details later, principles of the major learning theories logically connect with the technical applications of computer software. For example, one principle of the cognitive theory of learning is that learning is made up of the component processes of attention, encoding, storage and retrieval (see the work of Atkinson & Shiffrin, 1968). Computer applications engage the human brain using these four components. As will be shown, behaviorism and constructivism comport the same compatibility with computer technology.

Another argument for using learning theories to inform computer technology for instruction is that this synergy has a strong potential to enhance cardinal principles of teaching and learning. In particular, it provides instructional direction and potentially, learner motivation. A fundamental consideration for the teacher when planning and implementing lessons is to formulate, and be guided by clear instructional objectives, which articulate intended learning outcomes (Ormrod, 2011; Darling-Hammond & Bransford, 2005; Wiggins & McTighe, 2005; Saphier & Gower, 1997; McCown, Driscoll & Roop, 1996). The instructional objectives in turn inform the methods and materials that will accomplish the goals of the lesson. Methods and materials will therefore, involve the learning-theory-informed-technology the teacher selects for supporting the lesson. In terms of learner motivation, because students are so fascinated by computer technology, it is reasonable to assume that such passion will positively influence their engagement with the lesson.

Instruction informed by learning theories is also likely to reduce the romanticism of computer in the classroom. The romanticized view (Bransford, Brown, & Cocking, 1999) or fantasy effect of the technology may drive teachers to believe that heeding the call of integrating computers in their classrooms will solve teaching and learning challenges. Indiscriminate use of computers will be no more effective than not using the technology at all. Applying principles of learning theories requires teachers to be more deliberate in the use of the technology. In that way, the application of the computer is likely to make learning experiences more meaningful and potentially more effective.

The thoughtful use of computer applications for instruction is likely to provide targeted flexibility in the teaching and learning process. In particular, the teacher and/or students can use computers at any point during the course of a lesson. For example, the teacher might opt to present a YouTube video at the beginning of a lesson in order to arrest students’ attention and stimulate interest in the rest of the les-