Chapter 48
Incorporating Technology in a Cooperative Learning Environment

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ABSTRACT

Cooperative learning is largely considered a powerful instructional method. Decades of research based on the interdependency theory has created a strong framework on how to design an effective cooperative learning environment. In recent years, new technological innovations have emerged, creating a new field of research known as Computer-Supported Collaborative Learning. This chapter examines how technology can be incorporated using the foundation set by cooperative learning, the challenges such incorporation solves, and the challenges it creates. Additionally, this chapter poses some recommendations for both practitioners and researchers of cooperative learning.

INTRODUCTION

Cooperative work and socialization have been an ever-increasing presence in the world. New technologies have allowed humanity to erase vast distances between people in other countries. This enables people to develop friendships and collaborations between countries and continents. Additionally, the workforce has seen a gradual shifting from isolated manufacturing and artisan jobs towards a more service and information industries that require employees to interact and work with others both within and between departments.

With such social and economic shifts, new educational initiatives have risen to develop the skills to thrive in this new environment. However, changing educational goals is not an easy task. Schools in countries, such as the United States, the public education systems and subsequently their goals were created during a time of industrialization. The skills necessary for students to obtain were very different. The instructional methods developed during the early stages of education to teach these skills is still a common sight in modern classrooms. Getting to class before the bell, rows of desks facing forward, and

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the teacher acting as a "sage on a stage" imparting knowledge to waiting vessels are all reminiscent of the industrial sector in which it was created. This industrial model well reflected the skills students would need as they joined the workforce with arriving on time, following explicit instructions, and following a hierarchy with little interaction with their peers.

However, with technological, social, and economic life shifted, these industrial sector skills are no longer useful. The teacher-centered model of education no longer addresses the needs of the students or the economy. Starting in the late 1970s and early 1980s, a call for the shift toward active learning, or student-centered instruction began to gain ground. This instructional style gave students greater independence to discover and explore on their own with teacher guidance rather than direction. The rise in active learning led to decades of research into effective instructional methods including Cooperative learning. This specific version of active learning has only increased in popularity with the rise of technology, which allows for increased communication across vast distances and the breaking down of barriers between positions and industries.

Research done in the field of cooperative learning has developed a framework of what variables affect the success of instruction. While cooperative learning has benefited from decades of research in a wide variety of contexts, the development and attempted incorporation of new technologies into a cooperative learning environment is riddled with mixed results. This paper examines the uses of technology in cooperative learning environments based on previous research in the field in an attempt to guide practitioners in the successful implementation and highlight areas in need of additional research.

Background in Cooperative Learning

While cooperative learning is not new and can be traced back to ancient times with the likes of Socrates. In terms of modern education, cooperative learning began to receive more attention following World War II, when psychologists found that learning in groups had potential advantages compared to learning individually. These studies in combination with Constructivist learning theories from the like of Vygotsky, Piaget, Bruner, and others who promote knowledge is created based on individual perceptions, have led to a boon of research and understanding of what benefits are offered, how group learning occurs, and what variables matter in determining its success or failure.

Students learn better across a vast range of skills and knowledge in a cooperative learning environment compared to a traditional teacher-centered environment. Research conducted in a variety of contexts and across age groups have shown cooperative learning to increase achievement score in reading, writing, mathematics, and science more than traditional learning methods (Johnson, Johnson, Roseth, & Shin, 2014; Slavin, 2018; Slavin & Lake, 2018). In addition to the increases in achievement outcomes, cooperative learning also improves desirable soft skills including relationship building, conflict management, creativity, and critical thinking (Cohen, Lockheed, & Lohman, 1976; Johnson & Johnson, 2009; Martin & Dowson, 2009; Slavin & Oickle, 1981). The skills and knowledge gained from working in cooperative learning environments strongly align with the 21st-century skills thought to be important for the modern workforce and sought after by companies (Haseski, Ilic, & Tugtekin, 2018; Kivunja, 2014). Countries with higher rates of cooperative learning score higher on the international test PISA suggesting students exposed to more cooperative experiences will be more competitive in the workforce (*PISA 2015 Results (Volume I)*, 2016).

Though the benefits of cooperative learning are great, they are not realized simply by having students work in groups (Cohen, 1994). Many variables moderate the success of cooperative learning that must