

Chapter 14

A Collaborative Skills Training Program Utilizing Information and Communications Technology for 21st-Century Children

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ABSTRACT

Research into “21st-century skills” has emphasized collaborative skills as a requirement for success in our future society. This chapter investigates the development of educational programs designed to foster collaborative skills among students and analyzes students’ self-efficacy for training. The analysis showed that students’ self-efficacy is higher in “collaborative skills” than in other areas. On the other hand, logical-thinking skills and relationship-building skills maintain low scores. These findings suggest that students follow a learning process in which they have to recognize collaborative behavior as an early step, and this behavior is re-recognized by the reaction of other students as the next step. Therefore, it is suggested that educators incorporate opportunities to recognize successful experiences through relationships with other students into the learning process.

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INTRODUCTION

Traditionally, the Japanese education system has focused on knowledge acquisition. However, it is becoming increasingly important for students to acquire the ability to collaborate with colleagues, formulate and develop their thoughts autonomously, and resolve issues independently, as the skill assessment test by the Program for International Student Assessment (PISA) suggests. Suzuki (2003chapter12, p.7) stated, based on an assertion by Branson (1990), that there is a need to transform the state of current education to cultivate the abilities that students need to participate successfully in an information society and global economy. Toffler (1980, pp. 50-51) called the previous education system the “education of the industrial age.” It emphasized producing a large number of excellent workers through one-way knowledge transfer from the teacher to students. However, the recent emergence of informatization and internationalization makes it necessary to construct a learner-centered education system that encourages students to devise their own solutions to the challenges they face.

PISA has emphasized “collaborative skills” and “problem solving” as abilities that students need to succeed in our future society and has been working towards an international measurement test focusing on “21st-century skills.” This test, which assesses personal and collaborative skills, has evolved into a computer-based test. The United Kingdom government has investigated the effects of information and communications technology (ICT) education, and the British Educational Communications and Technology Agency (BECTA) has reported that ICT education has a positive effect on student achievement (BECTA, 2007, pp. 11-12).

Japanese schools have similarly begun to focus on ICT education, in accordance with government policy. In 2009, the Ministry of Education, Science and Technology (MEXT) began to phase in the New Course of Study, and the use of ICT

in elementary and junior high school curricula has been under consideration. Furthermore, the Ministry of Internal Affairs and Communications (2011) launched a policy on collaborative learning utilizing ICT, entitled “Future School,”¹ and several studies have aimed to investigate how to introduce this new learning system.

This discussion clearly demonstrates the importance of properly cultivating collaborative learning skills among students. To this end, Saito and Tamaki (2011) developed an educational program that utilizes ICT to improve students’ collaborative skills. This paper aims to assess this educational program and to expand the discussion on the challenges of future education.

COLLABORATIVE LEARNING LITERATURE REVIEW

In order to cultivate 21st-century skills, it is necessary to foster thinking skills and problem-solving skills through collaborative, learned-centered activities. Based on Vygotsky’s “activity theory,” Engeström (1987) pointed out that learning is promoted through collaborative activities and learning tools. Moreover, Collins, Brown, and Newman (1989) advocated “cognitive apprenticeship,” which utilizes a learning form based on traditional, handed-down skills. Finally, Lave and Wenger (1991) proposed the legitimate peripheral participation theory, pointing out the usefulness of participation within a learning community. Based on a review of literature and educational policy, this study has developed a collaborative skills training programs utilizing ICT for elementary school students.

On the other hand, research on programming learning has aimed at cultivating children’s creativity and expressiveness from the standpoint of constructivism as a learner-centered form of learning. Resnick (2007) developed an applications programming block called Scratch for learners to obtain their own schema and to acquire

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