

# Chapter 16

## Gifted Flipped Learning for Math Classroom With Video Materials

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### ABSTRACT

*The chapter describes the flipped classroom practice with video contents in elementary school arithmetic. Japanese students have acquired relatively high scores in international well-known competency-achievement tests like PISA and TIMISS, and then, it is believed that the educational system in Japan gets in good success to put the basic competency onto the students. However, the teachers in Japan feel that the students should acquire more ability to apply the basic competency to the real problems smoothly and actively. The authors performed flipped classroom at an elementary school using consulting preparatory teaching videos for partial flipped teaching, transferring “understanding subjects,” “recalling already learned items,” and “self-solving” to home learning, and closely connecting learning (preparation) at home and in the classroom to upgrade the students’ abilities that can solve more complex and advanced problems smoothly.*

### INTRODUCTION

Flipping the classroom is a “pedagogy-first” approach to teaching. In this approach in-class time is “re-purposed” for inquiry, application, and assessment in order to better meet the needs of individual learners. Students gain control of the learning process through studying course material outside of class, using readings, pre-recorded video lectures, or research assignments. During class time, instructors facilitate the learning process by helping students work through course material individually and in groups. Also known as “inverting” a classroom, this approach seeks to preserve the value of lecture (expertise and

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custom delivery), while freeing up precious in-person class time for active learning strategies. The main goal in flipping a class is to cultivate deeper, richer learning experiences for students when the instructor is present to coach and guide them. Emphasis is on higher-order thinking skills and application to complex problems. (University of Washington, n/a) There are numerous ways to flip your class. In fact, “every teacher who has chosen to flip does so differently,” says Bergmann and Sams (2012).

In this chapter, the specific classroom practice to which the authors shall refer is elementary school arithmetic. Japanese classrooms have been developed based on homogenous group learning, which, in recent years, has come to be generally implemented in public elementary schools. Three major course programs are conducted according to learning level. One index for determining learning level comprises scores from work tests administered at the end of each learning unit.

Since the Japanese students have acquired relatively high-scores in international well-known competency-achievement tests like PISA and TIMSS, it is usually believed that the educational system in Japan gets in good success to put the basic competency onto the students. However, the teachers in Japan feel that the students should acquire more ability to apply the basic competency to the real problems smoothly and actively. Therefore, the present authors used the following educational methods, specifically: consulting preparatory teaching videos for partial flipped teaching; transferring “understanding subjects,” “recalling already learned items,” and “self-solving” to home learning; and closely connecting learning (preparation) at home and in the classroom, to upgrade the students’ ability that can solve more complex and advanced problems smoothly.

## **BACKGROUND**

School education in Japan is conducted based on the curriculum guidelines of the School Education Act to realize the purpose of education stipulated in the Education Basic Act. These curriculum guidelines are revised approximately every 10 years, in response to the reports of the Central Council for Education, which is composed of experts and based on changing times, children’s circumstances, and social needs.

Furthermore, the school education referred to in this chapter is paired with home education and indicates education in which children are inculcated with the abilities needed to enter society. The main provider of the former is the government, while the main provider of the latter is the family. Additionally, in the former, textbooks and other materials are used for systematic instruction, while, in the latter, parents pass on the necessities of life through day-to-day living. Parents must sometimes entrust part of their educational duties to a private educational institution.

As one of these revisions, the Central Council for Education (2008) stated that a constant result can be seen in the “acquisition” of basic knowledge and skills, but the issue is whether children/students will have the ability to “utilize” them (Figure 1). Here, “acquisition” means to learn “fundamental and basic knowledge and skills,” while “utilization” means to use these “knowledge and skills in various situations in real life.” This issue is based on the fact that the National Institute for Educational Policy Research (2005) conducted a survey on curriculum implementation status and a comparative analysis for the years 2001 and 2003. In addition, the Ministry of Education, Culture, Sports, Science and Technology and the National Institute for Educational Policy Research (2008) conducted an analysis of the results of the National Survey on Academic Ability and Learning Status and published similar results. Therefore, the government instructed each school to resolve this issue from 2011 based on the 2008 revised Curriculum Guidelines. The Central Council for Education (2008) has cited “thinking ability, judgment, and ability

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