Chapter 10
Software for Creating Self–Made Content With Multimedia–Enabled Dot Codes and Gifted School Activities for Students With Disabilities

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ABSTRACT

Gifted school activities for students with various disabilities were presented with self-made original content created with newly-developed software—Sound Linker, File Linker, GM Authoring Tool, and Gridmark Content Viewer software—that can handle multimedia-enabled dot codes, originally developed by Gridmark, Inc. Each dot codes can link up to four multimedia mediums—such as a movie—in addition to up to four voices/sounds. Touching dot codes with a speaking-pen enables audio files to be replayed,

and touching dot codes with a dot-code reader enables multimedia to be replayed on iOS and Windows OS devices. Software and Post-it® sticker icon overlaid with dot codes and a speaking-pen and dot-code reader are distributed for free to school teachers. All the teachers can now create their own self-made original content and can conduct related school activities without buying any costly software and tools. Basic information on (1) creating original teaching materials using the developed software and (2) its use in schools for students with various difficulties is presented in this chapter.

INTRODUCTION

There are many reasons why students may struggle in the classroom. As educators and parents look for ways to help children, they often find that there are undiscovered learning disabilities that interfere with learning. These disabilities know no cultural or geographical boundaries. The identification of students with special needs may vary, but the overwhelming need for understanding of best educational practices does not change.

In Japan, there are 1,141 separate schools for special needs education; and 143,379 students are enrolled and nearly 84,600 teachers work there. Of these schools, 556 schools serve 93,214 students identified with intellectual disabilities; 121 schools serve 3,339 students identified with physical disabilities; 86 schools serve 4,612 students with hearing impairments; 62 schools serve 1,949 students with visual impairments; 57 schools serve 2,275 students who have health impairments; and 259 schools enroll 37,990 students who have with multiple disabilities (Statistics Japan, 2018).

Although officially, it has been pointed out by the Ministry of Education, Culture, Sports, Science and Technology—Japan (2016) that about 6.5% of all the students at general public-schools have learning difficulties, some of the teachers believe that this is an underestimation. Such teachers sometimes have difficulties in teaching and managing their classes. In most of the general schools, there are special needs education classes; likewise, there are classes for students with language and speech disorders, hearing, speech impediments, articulation disorders (including stuttering), etc.

Each student with a disability has different hopes, needs, and desires; and a unique learning history. Each year, the teachers at special needs schools feel deeply that a wonderful teaching aid and specific materials suitable for one student in the previous class does not fit a new student at all. Each student with a disability may need individualized, self-made teaching aids and materials. Thus, it is reasonable to conclude that easier-to-handle and cheaper software and tools might be an indispensable means for schoolteachers to create their own content for each student in their classes.

One of the authors (S. I.), from Otsuma Women's University, Japan, has been involved in organizing a worldwide collaborative research group to develop original, self-made teaching materials using advanced ICT tools—and, in partnership with the Japanese company Gridmark, Inc., has conducted gifted and talented school activities at both special-needs and general-education schools. Original teaching materials with dot codes and e-books with media overlays (International Digital Publishing Forum, 2011) were created by the authors, who then conducted activities in schools for students with various difficulties. Particularly, the dot code activities developed for use by children with intellectual disabilities, autism, and selective mutism showed that original teaching materials and tools, along with the associated school activities, were very useful both in enriching the students' understanding of words and phrases and in improving their speaking ability (Ikuta, Endo, Nemoto, Kaiami, & Ezoe, 2013; Ikuta & Kasai, 2014; Ikuta et al., 2015; Ikuta et al., 2017; Ikuta, 2018; Ikuta et al., 2019a; Ikuta et al., 2019b; Ishitobi et al., 2019).

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