# Use of an iconic grid instrument at a special education school in Japan for the musical engagement of children with severe and multiple disabilities: A preliminary report

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**1. Introduction**

Music technology is defined as a tool to support musical instruction, communication and performance (Hoffer, 2009), and it has been suggested that it may deliver a tremendous impact on and positively influence the way we define music and music education, when used effectively (Frankel, 2010).

Indeed, Rudolph (2004) described computer-controlled musical instruments as “the crayons for music class” (p.6). He compared the usage of the technology to young children drawing, a kind of art-making without any wrong answers (Frankel, 2010). Nevertheless, many music specialists have failed to incorporate the latest technology into their music classes (Jassmann, 2004). One possible reason could be that music teachers have been strongly concerned about and resistant to implementing music technology in their classrooms because of the pervasive belief that the use of traditional musical instruments should be preferred among children. However, as the technology progresses over time, music educators will be pushed to reconsider the application of the latest technology in their music teaching (Hoffer, 2009).

In 2012, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan set a new goal of constructing a *kyosei* society by implementing an inclusive education system in special education. The inclusive stance in education promotes learning together and building a community (Glass, Blair & Ganley, 2012) for students with a broad range of abilities, with and without disabilities. The Japanese term, *kyosei*, can be translated as a symbiotic relationship between individuals and the world around them. Kaku (1997) described *kyosei* as a “spirit of cooperation” in which both individuals and organizations work together for the common good. Three core characteristics of *kyosei* have been addressed as follows (Miyazawa, 2011):

1. "Understand Each other”
2. "Leave Nobody Out”
3. " Make Friends”

These three characteristics of *kyosei* represent an inclusive vision shared during music teaching and learning. In and through music, we understand each other and listen to different voices; we play music or sing together inclusively and make friends.

This preliminary report describes the process of developing and using the iconic grid instrument so that children with severe and multiple disabilities can successfully participate in musical engagement and mixed instrumental ensemble practice at special education schools (*Tokubetu Shien Gakkou*) in Japan. Specifically, this report describes how the iconic grid instrument was designed and used with the hope that students' musical engagement and communication could be well-facilitated. The paper also points out how further improvements could be made for its future use in special education settings.

Four members collaborated on this project. Mr. Yutaka Nakanishi (YN), a researcher who specializes in educational technology, designed the device. Ms. Shizuka Sutani (SS) and Dr. Taichi Akutsu (TA), practitioner researchers of music education, supported him and made constructive recommendations for this project. In addition, Dr. Shingo Okada (SO), a researcher with rich experience at special education schools, advised and recorded the process.

## 2. Method and Materials

### *Setting and Participants*

In this study, we used the iconic grid instrument for mixed instrumental practice at a special education school in Okayama, Japan. The participants were 21 students with severe and multiple disabilities (N=21), with the median age of 8 (range: 6–11). Previously, the research team was asked by the school to offer music activities for students and since July, 2017 has hosted music workshops at the school several times. However, the students with severe and multiple disabilities have not been able to fully participate in the music activities because of their physical challenges. Thus, the researchers needed to find an alternative measure to allow everyone to participate in the activities. In fact, the cooperation and collaboration between and among the participants in this inclusive stance have been major components of the progress in the school's music education. Lamb (2010) considers music learning to be a social phenomenon requiring interaction between and among participants and describes the emphasis on interaction as being different from the emphasis on music education in either skills or talents.

### *Preparation of the Devices*

First, YN installed Ableton Live 9 Lite digital audio workstation software in his laptop. Next, he collected and put sound effects and drum loops into the Live 9 Lite, then connected Novation's Launchpad Pro grid controller to the laptop. The grid controller is a type of MIDI controller, also known as a pad controller, matrix controller, or DJ controller. It is mainly used by DJs when they play dance music.

YN and TA together selected a well-known musical theme, Ode to Joy from Beethoven's 9th Symphony, as a song for this project. The reason for this selection was its familiarity to students and the existence of variation forms. (The term variation form refers to a basic technique for changing the music melodically, harmonically and/or contrapuntally.) Then, a three-step lesson plan was considered for the students with the following goals: 1) to explore various traditional instruments; 2) to introduce the grid controller to students; and 3) to let participants create their own variations for orchestrating with various instruments, voices and technology.

SS and TA proposed that YN separate respective musical phrases so that users could select how they arrange the music's mode, including various articulations and the timbre of the sound, and either connect the phrases or overlay them. YN made some musical phrases of the cantus melody, counter melody and bass line of Ode to Joy using Yamaha's Motif synthesizer. Each phrase was divided into four measures and input into the software. Then, YN set the phrases, sound effects and loops to the buttons on the grid controller.

When the buttons on the device were pressed, sound effects instantly were heard. Drum loops and musical phrases did not generate sound on their own, unless being synchronized with the beginning of the next measure. So, just by pressing a button, the users could participate in an instrumental ensemble in a highly synchronous fashion. Naturally, the other users needed to play acoustic instruments in sync with the rhythm the Ableton Live generated.
Figure 1 The iconic grid controller used in this project

**3. Case Presentation**

*Workshop*

YN introduced the technological device to the students (Figure 1), followed by listening activities and free exploration of the multiple musical instruments, YN demonstrated how the buttons could change the melody and/or sound, and he also instructed the proper timing for pressing the buttons so that a series of sounds would make up the melody of Ode to Joy. Then, the researchers put the device on a desk and every student tried it one after another, while the others continued exploring other regular instruments in the classroom.

After all the students had played the device, TA asked the teachers to hand every child the instrument and ask them to play along with the tune played by the device. YN chose a male student who loved the technological device as a controller for the grid instrument. They attempted to create an original variation of Ode to Joy by adding musical sound to the sound from the device.

**4. Discussion**

In this study, we incorporated the latest technology into the music classes for children with severe and multiple disabilities. As for the children's musical engagement, some appeared to be reverential when they first touched the device and successfully created sound. This type of social learning is underpinned by the ability to understand the relationship between gaze direction and a referent object (Okumura, Kanakogi, Kanda, Ishiguro & Itakura, 2013). For example, in this workshop, quite a few students looked at their teacher's faces after they pushed the buttons and when they heard the sound come out of the speaker. For students who failed to push the buttons, teachers guided their fingers gently and pressed the buttons together with them. Also, in that case, the students also appeared reverential or had changes in their facial expressions, while the students with severe disabilities failed to show their feelings.

However, two problems occurred. First, participants randomly pushed buttons that did not create sound at the same time they pushed the buttons to produce the core melodies, countermelodies or bass lines, although researchers intended them to press just the buttons to create the core melodies. To counter this issue, the researchers created an instant frame made of cardboard and put it on the instrument, as shown in Figure 2.

Second, the instrument was rather small and only one instrument was available for the 21 participants. As a result, a limited number of students were able to play the instrument. In Japanese special education schools, tablets such as the iPad are commonly used, and we could have ported the software into their iPads in advance. Nevertheless and overall, our attempts suggested a possibility that the latest technology could be successfully implemented in music classes for students with severe and multiple disabilities.

In conclusion, the use of the iconic grid instrument and traditional instruments may facilitate students' musical engagement differently by giving them an additional option for participating in musical activities. This systematic research should lead to the development of music education for all and a universal design for music education.

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**Figures:**

**Figure 1:** The iconic grid controller used in this project

**Figure 2:**

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