

# Integrated Active Learning Utilizing the Stories of Tomorrow at Elementary School in Japan

Akihiko Tomita<sup>1</sup>, Fumihito Kubo<sup>2</sup>, Masashi Maeda<sup>3</sup>  
and Rosa Doran<sup>4</sup>

<sup>1</sup>Graduate School of Teacher Education, Course Specializing in Professional Development in Education, Wakayama University, Wakayama City 640-8510, Japan  
email: [atomita@wakayama-u.ac.jp](mailto:atomita@wakayama-u.ac.jp)

<sup>2</sup>Attached Elementary School, Faculty of Education, Wakayama University,  
1-4-1 Fukiage, Wakayama City 640-8137, Japan  
email: [kubo1214@wakayama-u.ac.jp](mailto:kubo1214@wakayama-u.ac.jp)

<sup>3</sup>Attached Elementary School, Faculty of Education, Mie University,  
359 Kan-nonji-cho, Tsu City 514-0062, Japan  
email: [mmaeda@fuzoku.edu.mie-u.ac.jp](mailto:mmaeda@fuzoku.edu.mie-u.ac.jp)

<sup>4</sup>NUCLIO – Interactive Astronomy Nucleus,  
Largo dos Topázios, 48, 3rd Front, 2785-817 São Domingos de Rana, Portugal  
email: [rosa.doran@nuclio.org](mailto:rosa.doran@nuclio.org)

**Abstract.** In 2018, two schools from Japan participated in Stories of Tomorrow, a computer-based STEAM educational practice for primary school students. We were able to learn from the students' feedback that through problem-solving, a spirit of collaboration, a spirit of overcoming failure, and a deep understanding of scientific research and technology development have been nurtured. We also confirmed the importance of translation and coordination to cross over the language barrier.

**Keywords.** Problem-solving learning, international collaboration, Stories of Tomorrow

---

## 1. Introduction

The Stories of Tomorrow is a problem-solving project based on the hypothetical challenge of traveling and migrating to Mars. This is a good example of STEAM education. The project began in 2017 as an experiment in Europe with funding from the European Commission (<http://www.storiesoftomorrow.eu/>). Several schools from each of the five European countries, Portugal, France, Germany, Greece, and Finland have participated in the project, and in 2018, two elementary schools attached to Faculty of Education of Wakayama University and Faculty of Education of Mie University were invited to participate. In the two schools in Japan, the two teachers, the authors, Kubo at Wakayama and Maeda at Mie, implemented the project in their classrooms. Tomita served as the contact person in Japan. Doran coordinated the international network of the Stories of Tomorrow and was in frequent contact with Tomita.

## 2. Practice at Mie

The students practiced making a simulated Martian environment made from cardboard, placing a piece of metal on it, and creating a simulated Mars rover made from

Lego bricks to search for the piece of metal. In considering the creation of a “class that ignites students’ minds,” Maeda has felt that themes that aim at the boundary between “I know” and “I don’t know yet” was quite effective for students to pursue tasks proactively and freely. We got feedbacks, such as “The research activity was full of failures, disagreements, and quarrels during the activity, but we got the light on at last.” Some of the students returned feedbacks with a proactive mind in discovering new ideas and admiring the device development, such as “We have made a rover that lights up when it finds a metal object, but it can only find it, not take it back to Earth, so I want to make something that can take it back to Earth.” There are feedbacks full of challenging spirit and a deep understanding of scientific research and technological development, such as “I was amazed that researchers continue to study Mars, despite repeated failures and revising the programs.”

### 3. Practice at Wakayama

The class was divided into seven groups to create the e-picture book. Kubo asked the students to think about the structure of the book in relation to the Japanese language classes’ storytelling. After that, each group came up with a draft, and then they worked proactively and collaboratively to revise the draft. We got feedbacks, such as “Though the task was difficult for me, I felt a sense of accomplishment when it was completed.” It was the appropriate difficulty of the task that led to such collaborative feedback from the students. This is similar to the strategy of aiming for the boundary between “I know” and “I don’t know yet” in the Maeda class.

### 4. Crossing over the language barrier

In Japan, the language is all Japanese in the classroom. To implement an international project such as the Stories of Tomorrow, translating the contents into Japanese is definitely crucial. All contents of the Stories of Tomorrow were translated into Japanese carefully in advance by many volunteers. The web-based platform for the e-book creation adopted all languages of participating countries including Japanese, which was prepared through the great effort by technical staff of the project. The summer school was held as an exchange and training session. It was a quite valuable opportunity for the participating Japanese teachers to interact directly with teachers from many other countries. With the careful and well-considered preparation above, Japanese teachers could incorporate the project into their classes through the curriculum design.

### 5. Conclusions

- (a) We confirmed that the key to success in problem-solving learning is an appropriately difficult task that lies on the border between “I know” and “I don’t know yet.”
- (b) We confirmed that through problem-solving, we can see from the feedbacks that a spirit of collaboration, a challenging spirit, and a deep understanding of scientific research and technological development are fostered.
- (c) We confirmed the importance of translation and coordination to cross over the language barrier in implementing an international project.

A detailed explanation of the activity was published in Tomita *et al.* (2021).

### Reference

- Tomita, A., Kubo, F., Maeda, M. & Doran, R. 2021, *Bulletin of Course Specializing in Professional Development in Education, Wakayama University*, 5, in press