TECHNICAL NOTE

Toward Achievement of the UN Ocean Decade: Does "CANAL STUDY" in Central Tokyo Bay Area Enhance Ocean Literacy?

AUTHOR

Sasaki Tsuyoshi
Tokyo University of Marine Science and Technology

ABSTRACT

"CANAL STUDY" at a junior high school in Minato Ward in the Central Tokyo Bay Area has been involved with the Tokyo University of Marine Science and Technology Aquatic Marine Environmental Education efforts to promote Aquatic Marine Environmental Literacy (AMEL). AMEL is the ability to understand the interaction between humans and the aquatic environment, and to utilize the knowledge in decision making. AMEL is almost synonymous with Ocean Literacy, but regional characteristics such as traditional knowledge and conventional knowledge have been added. In this article, the research results of CANAL STUDY will be introduced and the significance of CANAL STUDY will be discussed from the viewpoint of self-determination theory and relational values, suggesting the direction of UNESCO Ocean literacy education planned for the UN Decade of Ocean Science for Sustainable Development. The CANAL STUDY, based on the learning cycle theory, has fostered AMEL, scientific inquiry skill development, attachment to the community, a sense of competence, and motivation for each learner to take the initiative for solving problems, such as improving the water quality of Tokyo Bay. Currently, Ocean Literacy Education is being tackled all over the world, but CANAL STUDY is an effective example that shows concrete methods and directions for the effective promotion of Ocean literacy education. In addition, it was shown that enhancing Ocean literacy fosters relational values.

Keywords: aquatic marine environmental education (AMEE), learning cycle theory, self-determination theory, relational values, social ecological systems

Introduction

In 2019, the Intergovernmental Panel on Climate Change (IPCC) compiled the IPCC Special Report on Oceans and Cryosphere in a Changing Climate.[1] The warming of recent decades has led to a significant reduction in the mass of ice sheets and glaciers, and sea level will rise up to 5.4 m by 2300. If this trend continues, many people will be forced to migrate as large cities around the world are distributed in coastal areas. To avoid such a situation, the United Nations has designated the period from 2021 to 2030 as the UN Decade of Ocean Science for Sustainable Development (UN Ocean Decade), calling for a concerted effort by multi-stakeholders, including not only researchers but also the general public, companies, and government agencies.

At the same time, the UNESCO IOC (UNESCO Intergovernmental Oceanographic Commission) announced, in order to achieve the goal of "The United Nations Decade of Ocean Science," that developing "Ocean Literacy," the ability to understand and utilize the interaction between the ocean and humankind, must be developed worldwide. In promoting Ocean Literacy education, I would like to emphasize that people in all positions must regard global environmental problems as their own affair and increase their motivation to take actions to solve these problems. We must develop the capacity of leaders and allocate human resources as soon as possible to develop and put into practice an ocean environment literacy education program for that purpose.

At Konan Junior High School in Minato Ward in the Central Tokyo Bay Area, "CANAL STUDY" has been implemented to promote Aquatic Marine Environmental Literacy (AMEL) by Tokyo University of Marine Science and Technology (TUMSAT). AMEL is the ability to understand the interaction between humans and the aquatic environment to utilize the knowledge, which is almost synonymous with Ocean Literacy, but to which regional characteristics such as traditional knowledge and conventional knowledge have been added. In this paper, I will introduce Aquatic Marine

[1] Hiroyuki E.: Reading "IPCC Special Report on Oceans and Cryosphere in Changing Climates". https://www.cger.nies.go.jp/cgernews/202001/349001.html

Environmental Education (AMEE), the structure of CANAL STUDY, including the contents and the results, and discuss the significance of CANAL STUDY from the viewpoint of self-determination theory (SDT) and relational values (RVs). Finally, the direction of UNESCO Ocean Literacy Education will be suggested.

AMEE

In 2007, the TUMSAT's "AMEE Promotion Program" was adopted as an Effective Practice by the Ministry of Education, Culture, Sports, Science and Technology. The program was designed to develop "AMEE Promotion Leaders" with the qualities and abilities to promote AMEL (Sasaki, 2011a). AMEE Promotion Leaders develop, implement, and evaluate experiential AMEE programs that respond to learners' learning processes based on the learning cycle theory described below, and contribute to the promotion of AMEL.

Status of Aquatic Marine Environment in Shibaura Konan District, Minato Ward, Tokyo

Minato Ward, Tokyo, located in the southeastern part of Tokyo is the 12th largest of the 23 wards of Tokyo, with an area of 20.37 km^2. As of 2015, the total population of Minato Ward is estimated to be approximately 240,000.[2] The eastern part of Minato Ward is located in the central part of the west coast cliff line of Tokyo Bay on the Musashino Plateau. The rain that falls there, including the nutrients on the plateau, eventually flows to the coastal area of the ward. The Shibaura Konan area in the same district is a waterfront area facing Tokyo Bay with 10 canals. According to the "Minato Ward Basic Plan/Shibaura Konan District Edition Plan," it is clearly stated that the aim is to create a comfortable and attractive space around the waterside, and "Promotion of utilization of canals and seaside." As an example, "CANAL STUDY" is introduced).[3] Many people use the canal as a place of relaxation, but the water quality of the canal is generally organically polluted. In addition, the dissolved oxygen levels are low in the water at the bottom of the canal and generation of foul odors has become a problem (Ando et al., 2010).

Contents of CANAL STUDY

CANAL STUDY has been held at Konan Junior High School adjacent to TUMSAT since 2010. Takahama Canal, the subject of CANAL STUDY, is designated as a canal renaissance promotion area by the Tokyo Metropolitan Government Bureau of Port and Harbor, and terraces are built along both banks to bring people closer to the water (Ando et al., 2010). A canal renaissance is an initiative by local residents, stores, and businesses to promote community development that makes use of water areas (Sugawara et al., 2014). Japan is an island nation, and although the ocean and rivers are a familiar environment, there are not enough educational opportunities for people on the aquatic and marine environment. The same is true of the Shibaura-Konan area, which is surrounded by canals. Based on research findings (Sasaki, 2011b; Sobel, 2004) that learning activities utilizing the familiar environment not only help students understand their own local environment, but also increase their scientific awareness, canals were selected as the study subject.

CANAL STUDY is conducted in groups of six, and each group is assigned a university student facilitator who is responsible for drawing out the participants' awareness, discovery, wisdom, and other abilities (Mori, 2007). Facilitators are students who aspire to become AMEE promotion leaders or teachers, and they assist and support learning. Each lesson is based on the "learning cycle theory" (Sasaki, 2011a). Through the program, middle school students can learn the process of scientific inquiry by using the cross-model worksheet (Figure 1), which corresponds to the process of scientific inquiry, while making hypotheses, investigating canals, and summarizing their findings.

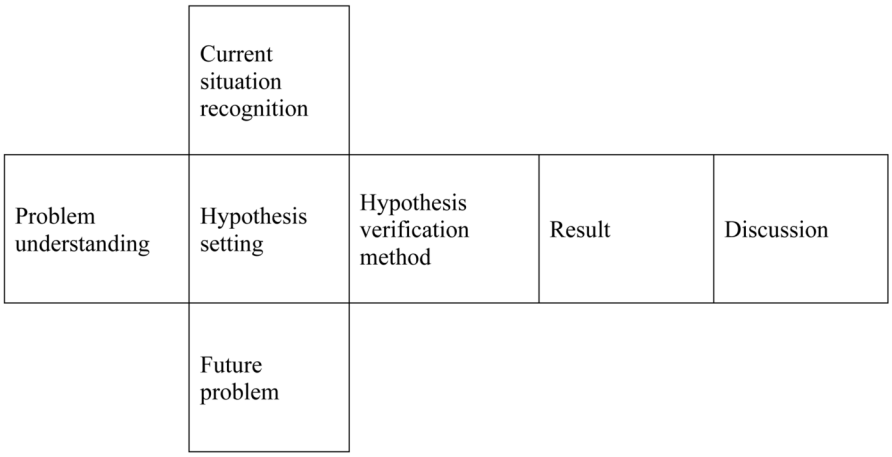
The Cross Model Worksheet is based on the "Knowledge Construction Cross Model" developed by Makino (2010) and reorganized for use in CANAL STUDY. By filling in the worksheet frame in the order of "Recognition of current situation," "Problem identification," "Hypothesis setting," "Hypothesis testing method," "Results," "Discussion," and "Future tasks," learners can visualize the process

[2]Minato Ward, Tokyo: "Overview of Minato Ward". https://www.city.minato.tokyo.jp/kuse/gaiyo/index.html

[3]Minato Ward Shibaura Konan District General Branch (2018). "Minato Ward Basic Plan Shibaura Konan District Version Plan", Minato Ward Shibaura Konan District General Branch Collaboration Promotion Division https://www.city.minato.tokyo.jp/kouchou/kuse/kocho/kuseiken/documents/201111-kyouiku-zenbun02-05.pdf

FIGURE 1

The cross model worksheet frame to visualize the scientific inquiry process.



of scientific inquiry. Scientific inquiry skills consist of the following three elements: Thinking skill, Judgment skill, and Expression skill (Saito et al., 2019).

- Thinking skill: The ability to recognize the current situation, grasp the problem, and formulate a hypothesis.
- Judgment skill: The ability to face "hypothesis setting" and "results," determine whether or not the hypothesis is correct, consider the reasons, and think about future issues.
- Expression skill: The ability to present the "results" obtained through hypothesis testing in figures and tables.

University students facilitate junior high school students to acquire the above scientific inquiry skills by completing and developing the cross-model.

The "Learning Cycle Theory" was devised based on Piaget's theory (Fuller, 2003). Initially, the Learning Cycle consisted of three stages: Exploration → Invention → Discovery, was incorporated into Science Curriculum Improvement Study in the early 1960s as "Inquiry Based Learning." Currently, there are five stages: <Invitation> → <Exploration> → <Concept Invention > → <Application > → < Reflection>).[4] AMEE Programs using this theory have confirmed that children's awareness of the aquatic environment is raised, junior high school students' understanding of the aquatic environment is deepened, and scientific thinking ability is fostered (Sasaki & Arai, 2014; Sasaki & Kanzaki, 2013).

Achievements of CANAL STUDY

In the CANAL STUDY, we have analyzed the scientific inquiry ability of junior high school students, their perception of and relationship to canals, and the university student facilitation of the materials. The research results are introduced below.

Scientific Inquiry Process and Focus of Inquiry

Sasaki and Kanzaki (2013) analyzed each activity in the CANAL STUDY program using the "learning cycle theory," stepped through the students' interests in the canal. We confirmed the improvement of understanding of the aquatic environment and the expression of scientific thinking. Waki et al. (2015) developed a program using the "learning cycle theory" and involved outdoor group activities with the aim of clarifying the thinking process of students at the Exploration stage. As a result, it was confirmed that the activities of the students at the time of Exploration were subdivided from the first to sixth stages of Exploration. The situation in which the object of such vague Exploration gradually becomes clear is called the focus of the inquiry object.

Role of University Student Facilitators in the Scientific Inquiry Process

Facilitators are currently needed in corporate training and participatory workshops to strengthen problem solving and organizational skills (Science Council of Japan Environmental Studies Committee, 2008). In environmental education, in addition to teaching environmental knowledge, emphasis is placed on experience, dialogue, and collaboration, with the aim of enabling learners to experience, feel, understand, think, and act on their own.

In addition, based on the "Law Concerning the Promotion of Environmental Conservation Efforts through Environmental Education, etc." that came into effect in 2012, the "Basic Policy on Environmental Conservation Activities, Promotion of Motivation for Environmental Conservation, and Promotion of Environmental Education and Cooperative Action" states that the elements required for environmental education

[4]Lawrence Hall of Science, University of California at Berkeley. Communicating Science: A Science Teaching Methods Course. http://www.lawrencehallofscience.org/comsci/

are "awareness-raising through interactive communication." It also mentions the need for human resource development, stating that it is essential to have "a person (facilitator) who plays the role of skillfully drawing out and promoting the spontaneous actions of participants at the activity site."[5]

Sasaki and Kanzaki (2014) focused on university student facilitators supporting CANAL STUDY and confirmed the existence of various supports by university student facilitators in the background regarding the development of scientific thinking skills of junior high school students. The university students, based on their observations of the junior high school students at the beginning of CANAL STUDY, assisted the students to use formulaic sentences such as, "Why is it ~?" or "If...it might be...," and often encouraged students to be aware of these sentence structures. Through this kind of support, in the latter half of the activity, the students were observed to express their own questions and hypotheses, and it was confirmed that they were able to observe, question, and formulate hypotheses on their own.

Waki et al. (2016) contrasted U-FCR (university student facilitation) in CANAL STUDY with PBL-UCR (medical student facilitation in Problem Based Learning) in the room to identify the characteristics of questions that assist participants' learning, increase intrinsic motivation, and promote action (Table 1).

[5]Ministry of the Environment: "Basic policy on environmental conservation activities, promotion of motivation for environmental conservation, environmental education and promotion of collaborative efforts". https://edu.env.go.jp/files/basic-policy_20120626.pdf

TABLE 1

Questions common to PBL-FCR and U-FCR.

PBL-FCR	U-FCR Practice Status
Asking open and metacognitive questions	Getting to know students' experiences
	Asking questions about the canal
Seeking explanations	Asking for observations
	Asking about reasons or rationales for observations
	Asking about the meaning of data/numbers
Revoicing	Rephrasing student's opinion
	Restating the student's opinion to the members of the group so that they can interact with the group
Summarize the story	Explain the meaning of the data, tying it to the students' experiences
Making and evaluating hypotheses	Affirming the student's questions
Correlations between symptoms and hypotheses	Asking questions to guide students
	Asking questions to help students to reach conclusions

Furthermore, it was revealed that the university student facilitators in CANAL STUDY, while implementing general facilitation, have their own "view of facilitation" based on their own unique conceptions that differ from one individual to another. Therefore, we proposed that learning program designers need to be aware of the diversity of facilitators and mutually confirm the diversity of facilitation by disclosing each facilitator's "view of facilitation" to each other in advance in a pre-meeting before implementing environmental education. In addition to the general facilitation, five facilitation types specific to environmental education were found to exist (Table 2).

The following five characteristics were identified: (1) "Maintaining students' interest," (2) "Emphasis on experiences using the five senses," (3) "Scenarios for interacting with nature," (4) "Safety guidance during hands-on activities," and (5) "Measures during outdoor activities. In particular, items (2) through (5) can be said to be characteristics of facilitation of outdoor environmental education activities.

Characteristics of Consciousness and Cognitive Transformation From the Viewpoint of SDT

Kaneko and Sasaki (2015) analyzed the transformation process of water quality improvement consciousness in CANAL STUDY about awareness of the local environment "Before Study" and "Post Study 1" and environmental improvement "Post Study 2," using SCAT (Steps, Cording and Theorization) analysis, from the viewpoint of SDT focused on free writing of 90 students. SDT cites three conditions that cause intrinsic motivation (independent behavior) in humans (Deci & Ryan, 1985).

- "Connectedness": Feelings of wanting to take good care of people, sense of belonging to the community, sense of sharing, etc.

TABLE 2

Distinctive questions of U-FCR.

Distinctive facilitations	U-FCR's Practice Status
(1) Maintain student interest	Asking trigger question
	Keeping students with the impression that learning on the canal is fun
(2) Emphasis on experiences using the five senses	Seeking experiences using the senses
	Using of natural situations for emotional arousal
	Showing them an example and ask them to imitate it F6
(3) Scenarios for interacting with nature	Using the habits of nature and living creatures
(4)Safety guidance during hands-on activities	Keeping attention to safety management
(5) Measures to be taken during outdoor activities	Asking questions to bring interest to the class instead of playing because outside increases students' active power

- "Competence": Efficacy, self-confidence, etc.
- "Autonomy": Acting with interest and universal values.

SCAT is a method of analysis based on story lines and theoretical descriptions obtained by weaving together themes and constructs after segmenting linguistic data such as observation and interview records and coding each linguistic data into four steps: (1) words in the data that need attention, (2) words outside the data to paraphrase them, (3) words to explain them, and (4) themes and constructs that emerge from them (Otani, 2008).

Table 3 shows the perception of the canal "Before Study." S7 and S33 describe the creatures of the canal, and S18 and S42 describe the well-being brought about by the canal. On the other hand, as in S28, there are some descriptions that are limited to the abiotic explanation of the canal, and these can be seen that each student has various perceptions.

TABLE 3

Questionnaire descriptions of "Before Study" at first grade.

Student	"The canal is a ____ place"	⟨4⟩Constructive Concepts
S7	The canal is a place where there are many seagulls / A canal is a place where there are many birds etc.	The canal is a place where living things live
S18	A place to change one's mind	A place to change one's mind.
S28	Where there is water	A place where there is water
S33	Where you can see fish, birds, etc. /foggy / familiar/ walking course around the canal / where you can see it raining or not from your house / interesting!	A place where creatures can be seen / walking courses / interesting places
S42	A place to calm down	A place to calm down

Next, regarding the recognition of the students in "Post Study 1," there was evidence that they felt affirmative about the environment of the canal after discovering that "there are living things in the canal," like S4, S8, and S12. There are also statements such as S26 and S32 that show a deeper understanding of the canal environment (Table 4).

In addition, based on the description of the students in Table 4, SCAT analysis was performed. Table 5 shows the results (1 class) of the four constructs created using this method classified by concept. From the classification of the students' responses, "discovery of the variety of living things" and "improvement of awareness of the quality" accounted for about 50% of the total. These were the shifts from the existing perception of places where there the canals contained no living things and the negative connotation of dark water as dirty, to positive perceptions and were descriptions that positively captured the environment of the canal. The next most common answer category was "deepening understanding of canals," which mentioned the causes of canal pollution and understanding of water quality.

Table 6 shows that students want a positive improvement in the canal environment. As for the content of the improvement, the word "clean" was used as seen in S24, S37, S47, etc., and there were many requests for water quality improvement to clean the canal. They also mentioned that they wanted to improve "the way the canal interacts with people," such as S10, S24, and S26.

To summarize the above, in Post Study 1 (Table 4), the students became positive about the canal environment, and in Post Study 2, the students wanted a positive improvement in the

TABLE 4

Questionnaire descriptions of "After Study 1" at first grade.

Student	"What impression has changed?"	⟨4⟩Constructive Concepts
S4	At first, I thought it was too dirty for living things to live in, but it was not so dirty that it was uninhabitable. However, it needs to be cleaned up.	The canal is a habitat for living things and a place that should be cleaned up.
S8	I thought there were no living things, but there were many living things.	The canal is habitat for living things.
S12	When I entered the school, I had an image of it being "dirty," but now I think it is an environment where various creatures can live.	The canal is habitat for living things.
S26	I thought the water quality of the canal would not change, but I'm glad I learned a lot about water quality.	The canal is a surprisingly clean place.
S32	It smells because of sludge.	The canal is smelly place because of sludge.

canal environment (Table 6). In other words, the CANAL STUDY reduced the sense of distance from the canal and created a feeling of "relatedness" such as "wanting to take good care of" the canal, "sense of belonging" to the canal, and "sense of sharing" with others about these feelings. These lead to a sense of "competence" and desire to improve their canals and to have others recognize their canals.

As shown in Table 6, the following statements regarding awareness of improvement were found: "I want to make the canal so that foreigners will tell their mother countries about it," "I want to make the canal beautiful so that local people will like it," "I want to make the canal clean so that everyone will like it," "I want to make the canal clean so that people will feel confident about it," "I want the canal to be a beautiful place to live. I want to make it something to be proud of." These statements characterized not only the relationship between themselves and the canal, but also a broad social and temporal perspective, envisioning the ideal image of the canal, and referred to the relationship between the people around them and the canal.

In this way, students who had individual awareness of the canal experienced contact with the local climate through CANAL STUDY and increased their connection to positive perception of the local environment, which led to regional preference of local environment that developed into regional attachment. Regional preference is the feeling of being happy to live in this region, and regional attachment is the love of the region in which one lives (Suzuki & Fujii, 2006; Sano, 2005). In other words, CANAL STUDY leads to increased sense of belonging, a desire for competence, and "autonomy" to proactively work to improve local issues. It has been suggested that CANAL STUDY leads to intrinsically motivational activities.

TABLE 5

Classification of "Post Study 1" questionnaire descriptions at Class A of first grade.

Breakdown of Component Concepts	*N* (%)
Discovery of biodiversity	23 (48.9%)
Increased awareness (image) of the color and pollution of water	10 (21.2%)
Better understanding of canals	9 (19.1%)
Recognition as a place of learning	1 (2%)
Recognition as a place that should be protected	1 (2%)
Recognition as important	1 (2%)
Expression of interest in the canal	1 (2%)
Unknown classification	1 (2%)

Significance of CANAL STUDY From the Perspective of RVs

Students participating in CANAL STUDY have become more conscious of trying to improve water quality after increasing their attachment to the community and positively understanding the natural environment of the canal. These students were initially uninterested in the canal, which is in their hometown, until they engaged in a scientific inquiry process with the support of a facilitator. This change in perception of the environment of familiar canals has great significance in building a sustainable aquatic environment. The concept of RVs is said to enhance

TABLE 6

Questionnaire descriptions of "Post Study 2" at second grade.

Student	"What specifically about the canal would you like to change?"	⟨4⟩Constructive Concepts
S10	A canal that people from other countries can tell their mother countries about.	Canal handed down abroad
S24	I want the canal to be beautiful and to be thought of as nice by local people.	Clean canal/Canal that local people think is nice
S26	We want to make the canal a place where more people gather.	Canal that brings people together
S37	I want to make the canal clean and make everyone love it.	Clean canal/well-liked canal
S47	The current canal is dirty, so we want to make it clean and odorless.	Clean canal/No smelly canal

the sustainability of the social ecological systems (Arias-Arévalo et al., 2017). In this section, the significance of the CANAL STUDY will be considered from the viewpoint of RVs.

Definition of RVs

Chan et al. (2016) described RVs in philosophical terms; they are: preferences, principles, and virtues associated with relationships, both interpersonal and as articulated by policies and social norms. They include "eudaimonic" values, or values associated with a good life. They assume that RVs apply to the relationship between humans and nature, and are described as follows:

RVs (Primarily Individual)

1. The place is important to me, to who I am as a person (Individual identity)
2. My care for this land fulfills me, helps me lead a good life (Stewardship eudaimonic)
3. Keeping the land healthy is the right thing to do (Stewardship principle/virtue)

RVs (Involving the Human Collective)

4. Place is important to my people, to whom we are as a people (Cultural identity)
5. Being in nature provides a vehicle for me to connect with people (Social cohesion)
6. Caring for ecosystems is crucial to caring for my fellow humans, present and future (Social responsibility)
7. Caring for all lifeforms and physical forms is a moral necessity (Moral responsibility to nonhumans)

What is noteworthy in the description of RVs is that it does not refer to intrinsic value (nature itself; i.e., nature has value, independent of people) and instrumental value (what exists in nature and gives humans a sense of fulfillment; i.e., being in/seeing nature brings people pleasure or satisfaction) as conflicting values, but rather it connects nature and humans in both directions, and positions RVs as a factor for coexistence with the natural environment (Pascual et al., 2017). The RVs are being applied and studied not only in policy proposals but also in various fields such as sustainable ecosystem management (Arias-Arévalo et al., 2017; Mould et al., 2019), conservation of nature reserves (Vos et al., 2018), evaluation of ecosystem services (Himes & Muraca, 2018), assessment of the environment (Grubert, 2018), and environmental education (Britto dos Santos & Gould, 2018; Uehara et al., 2018). These studies have shown that RVs motivate people to protect nature, solve problems of conflicting environmental policy positions, solve problems that cannot be dealt with by conventional ecosystem service valuation, and play an essential role in the sustainable management of social and ecological systems.

Significance of CANAL STUDY From the Perspective of RVs

Next, regarding the section, Characteristics of Consciousness and Cognitive Transformation From the Viewpoint of SDT, most of the descriptions before learning about the canal focused on the surface of the canal, but in "Post Study 1," descriptions indicating a deeper understanding of the canal environment were found. Furthermore, in "Post Study 2," many of their descriptions showed that students wanted positive improvements in the environment of the canal, especially in "how people interact with the canal."

Thus, as the canal study progressed, the students came to view the issues of the canal in a positive light and showed a desire to solve them. This willingness to clean up the canal feels to them as though it is the right thing for them to do, and it increases their own satisfaction as well as their "RVs (primarily individual)": "2. Stewardship eudaimonic," "3. Stewardship principle/virtue," and "RVs (involving the human

collective)": "4. Cultural identity" and "5. Social cohesion."

It is necessary to conduct a detailed analysis in the future, but by the CANAL STUDY that has been carried out so far, the participating students' RVs (both of primarily individual and involving the human collective) were confirmed, and CANAL STUDY is an effective means of improving RVs.

Collaboration With UNESCO Ocean Literacy Education

In July 2017, the International Ocean Conference was held at the United Nations Headquarters. In response to this, on December 5, 2017, the United Nations announced that it would launch the United Nations Decade of Ocean Science with the aim of achieving Sustainable Development Goal 14, protecting the abundance of the sea. On the same day, the ocean literacy international conference was held at the UNESCO office in Venice, sponsored by UNESCO IOC. At the conference, the need was confirmed for the UN Decade of Ocean Science to include "ocean literacy education," a collaborative activity to promote global ocean education.[6] On this day, it announced that it would develop a "tool kit for ocean literacy" and aim to spread and implement it all over the world. This guidebook includes the TUMSAT "AMEE Promoting Program," which has been introduced as a precedent case.[6]

The CANAL STUDY that has been conducted so far has fostered personal identities such as attachment to the community and a sense of competence utilizing the cross model worksheet (Figure 1) based on the learning cycle theory. By continuously implementing the CANAL STUDY program, each learner is motivated to take the initiative in solving problems (improving the water quality of Tokyo Bay), which leads to the acquisition of AMEL. Currently, Ocean Literacy Education is being tackled all over the world, but CANAL STUDY is a concrete example of effective methods and directions that lead to positive societal and academic outcomes. In addition, it was concretely shown that the fostering of Ocean Literacy fosters RVs (Uehara et al., 2018).

In October 2021, the AMEE activities undertaken by the TUMSAT were certified and adopted as a formal project of UN Ocean Decade.[7] Following the adoption, local junior high school students renewed their determination to study the canal. In addition, local residents in the Konan area have begun to consider launching the "Ocean Town (UMI-MACHI) Community School" to support these activities at elementary and junior high schools in collaboration with local governments, private companies, and universities, and have developed a system to work on the entire region. We hope that this "Ocean Town (UMI-MACHI) Community School" concept will become a movement worldwide to build a network where local children and citizens will solve regional and global issues to contribute developing Ocean Literacy Education to achieve the goal of UN Ocean Decade.

[6]IOC UNESCO: https://oceanconference.un.org/commitments/?id=15187

[7]Action Project of Tokyo University of Marine Science and Technology Planning Approved and Adopted by UN Ocean Decade, https://www.kaiyodai.ac.jp/topics/img/3697a729a1b08854bd28862b8b755b04.pdf (Accessed December 3, 2021).

Conclusion

The importance of environmental education is increasing worldwide, increasing opportunities for contact with nature and experientially understanding the connection between nature and humans. Environmental education is effective not only in developing human resources for solving problems in the global environment but also in promoting the spiritual and healthy development of children in the modern age of urbanization (Chawla, 2015; Christian et al., 2015; McCormick, 2017; Xiong et al., 2017). From this point of view, the CANAL STUDY efforts in the city center are of great significance. We will continue to work on CANAL STUDY with the aim of realizing the wishes of children.

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Author:

Tsuyoshi Sasaki
Laboratory of Aquatic Marine Environmental Education,
Department of Marine Policy and Culture,
okyo University of Marine Science and Technology
Email: t-sasaki@kaiyodai.ac.jp

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