

RECOGNIZING ECOSYSTEM SERVICES THROUGH EDUCATION FOR SUSTAINABLE DEVELOPMENT THAT UTILIZES THE SEA IN THE REGION

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The relationship between people and the sea is weakening every year. We have conducted education for sustainable development (ESD) of the sea, aimed at deepening their understanding of the relationship between humans and the sea. We get method and we think that it can be a model to be implemented in other areas. The content of the lessons introduced on this occasion, we think that children were able to learn broadly about the ecosystem services of the sea, and became interested in the sea from many angles. we conducted more lessons, the willingness to take action by themselves has been nurtured.

Key words: ESD, ecosystem services

I. PURPOSE

The relationship between people and the sea is weakening every year. As an example, such a typical sea-related leisure activity as sea bathing was last listed in the top 20 leisure activities of the White Paper on Leisure in 1999, when it came in at number 18. In addition, there has been a decreasing trend for such previously frequent school events as seaside schools [1]

The decrease in opportunities for people to be in contact with the sea reduces the opportunities to understand the ecosystem services of the sea. To reach the desired environment of coastal waters, the first step is for people in the area to understand the relationship between humans and the sea. Then, it is to implement possible activities to create the desired coastal waters. To realize such a coastal zone management integrated with the region, with children as the subjects of this study, we have conducted education for sustainable development (ESD) of the sea, aimed at deepening their understanding of the relationship between humans and the sea.

II. CONTENT

This research was conducted in Wakayama City, Wakayama Prefecture, Japan. Wakayama Prefecture, with the coastline accounting for 66% of its border, and forests accounting for 77% of its land, is a region that is richly blessed with the sea and forest. Moreover, in Wakaura where we conducted the research, there is a tidalflat over an area of 35 ha, and it has been famous as a scenic spot since ancient times. However, when asking a question, “Do you know the word ‘tidalflat?’” to 42 third year students at Wakaura Elementary School, located about 800 m from this Wakanoura tidalflat, about 80% of students did not even know the word “tidalflat.” Even though the sea can be seen from their school’s window, this suggests that their interest in the sea is declining.

1) Facilitation of the understanding about the ecosystem services of the sea

In general, within ecosystem services, there are four categories — “provisioning services,” “regulating services,” “cultural services,” and “supporting services.” In this research, students learned about supporting services by observing creatures in the tidalflat for the first lesson; cultural services by staying at a campsite along the coastline for the second lesson; provisioning services through a fisheries study tour at a fishing port for the third lesson; provisioning services through a cooking class with seafood caught in the region for the fourth lesson; and regulating services through disaster prevention learning about disasters such as tsunamis at a disaster prevention learning center for the fifth lesson. For the sixth lesson, the children summarized the content of previous lessons and shared the information with local residents (Table 1).

In Japan, when it comes to environmental education of the sea, observation of creatures around the rocky shore and tidalflat is often done, and the nature of the ecosystem services of the sea is not conveyed in a multifaceted manner. Through the content of the lessons introduced on this occasion, we think that children were able to learn broadly about the ecosystem services of the sea, and became interested in the sea from many angles. In addition, as the activity on this occasion was done in the coastal areas as well as at facilities located within a circle of 6 km from the central part of Wakayama City, it took advantage of local resources related to the sea, and we think that it can be a model to be implemented in other areas. As for future challenges, we are thinking that it is necessary to quantify the effects of these lessons.

Table 1. Lesson content

Lesson number	Theme	Activities	Place	Related ecosystem services
First	• Creatures • Environment	Observation of creatures in the tidalflat, experiments on the marine environment	Wakanoura tidalflat	Supporting services
Second	• Recreation	Observation of rocky shore creatures, beach combing, camping experience	Wakayama City Youth House	Cultural services
Third	• Fishing industry • Food	Fisheries study tour at a fishing port	Wakaura Fishing Port	Provisioning services
Fourth	• Food education	Cooking workshop with seafood caught in the region	Wakayama City Central Community Center	Provisioning services
Fifth	• Disaster prevention	Learning about tsunamis	Wakayama City Disaster Prevention Learning Center	Regulating services
Sixth	• Sharing of information	Sharing of summary of previous lessons with local residents	Wakayama University	—



Photo 1. Lesson in sessions

1) Activities for the desired coastal water environment

At the Wakanoura tidalflat (first lesson) introduced in 1), a decrease in the clam population has become a problem. Due to the decrease in the clam population, people have been unable to do the annual clamming since seven years ago. Under such conditions, while considering several causes, we can list the clam-eating ray as factors. We then introduced the “Clam Princess project,” that uses bamboo as one of its measures. The “Clam Princess” refers to an old Japanese story, “The Tale of Princess Kaguya.” When she was a baby, Princess Kaguya grew up in a bamboo. The “Clam Princess project” intends to use this bamboo to protect clams from their predators. In this research, by introducing this “Clam Princess project,” we attempted to recover the clam population, and at the same time, investigated using a questionnaire, how children’s awareness of the sea has changed through their involvement in this project. The same questionnaire was also used on three occasions. The content of the lessons conducted and the questionnaire are shown in Table 2 and Table 3.

Table 2. Project content

Lesson number	Lesson date	Activities
First	July 14 th	After a workshop about the sea including experiments, etc., we actually went to a tidalflat and observed the creatures. After returning to school, we reflected on the activities.
Second	October 2 nd	We had circle time as a core activity, played a game to think about the causes of sea pollution, and did an experiment to clean clams.
Third	November 12 th	After explaining Clam Princess, we did bamboo work for Clam Princess outdoors.

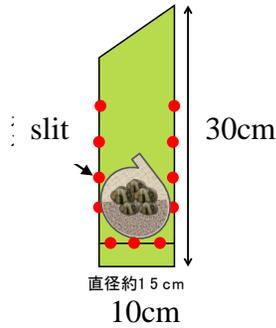


Fig 1. Clam Princess Project

Photo 2. Lesson in sessions

Table 3. Questionnaire used

< Questionnaire >

Please let us know how today went

• Was it fun?	Extremely	5 - 4 - 3 - 2 - 1	Not at all
• Did you learn?	A lot	5 - 4 - 3 - 2 - 1	Not at all
• Are you more interested in nature and creatures?	Extremely	5 - 4 - 3 - 2 - 1	Not at all
• Are you more interested in tidalflat?	Extremely	5 - 4 - 3 - 2 - 1	Not at all
• Do you want to protect tidalflat in future?	Absolutely	5 - 4 - 3 - 2 - 1	Not at all
• Do you want to visit the tidalflat again?	Absolutely	5 - 4 - 3 - 2 - 1	Not at all
• Do you want to clean the sea?	Absolutely	5 - 4 - 3 - 2 - 1	Not at all
• Do you want to participate in an activity to clean the sea if there is one?	Absolutely	5 - 4 - 3 - 2 - 1	Not at all

The results of the questionnaire are shown in the Fig.1. From the graph, although favourable responses (5-4) for most of the questions can be seen, for the last question, “Do you want to participate in an activity to clean the sea if there is one?” the proportion of those who chose 5-4 is lower compared to other questions. While the other questions asked about their experience and thoughts, the last question asked whether they will actually put it into practice, and from this, it can be assumed that although they want to clean the sea, they are hesitant about taking action themselves. However, as we conducted more lessons, the proportion of 5-4 responses to the last question increased, implying that the willingness to take action by themselves has been nurtured.

These results reveal that this project has a learning effect for students in the school located near the Wakanoura tidalflat. However, we have not reached the point of understanding the factors that have influenced the children. In the future, by resolving these issues, as we continue to improve the awareness of people, including children, of the sea in the region, we hope to continue the activities to achieve the desired coastal water environment.

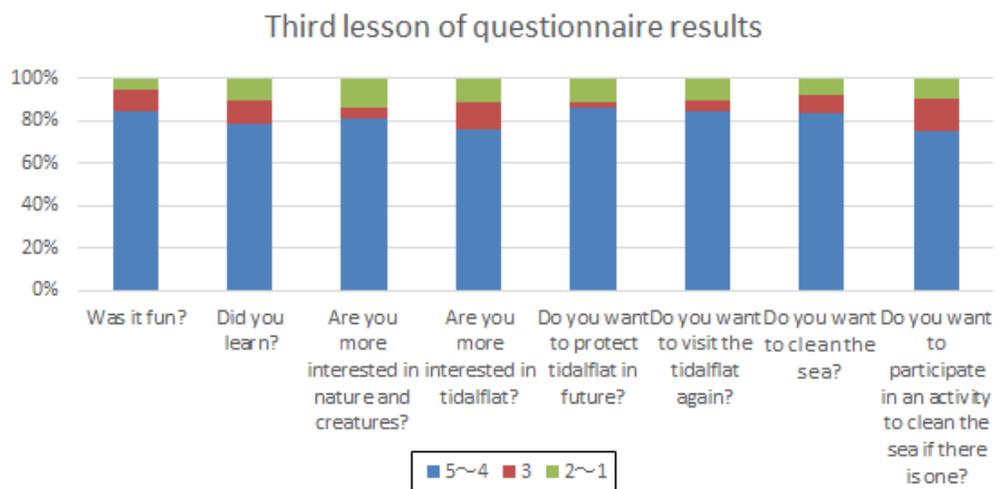
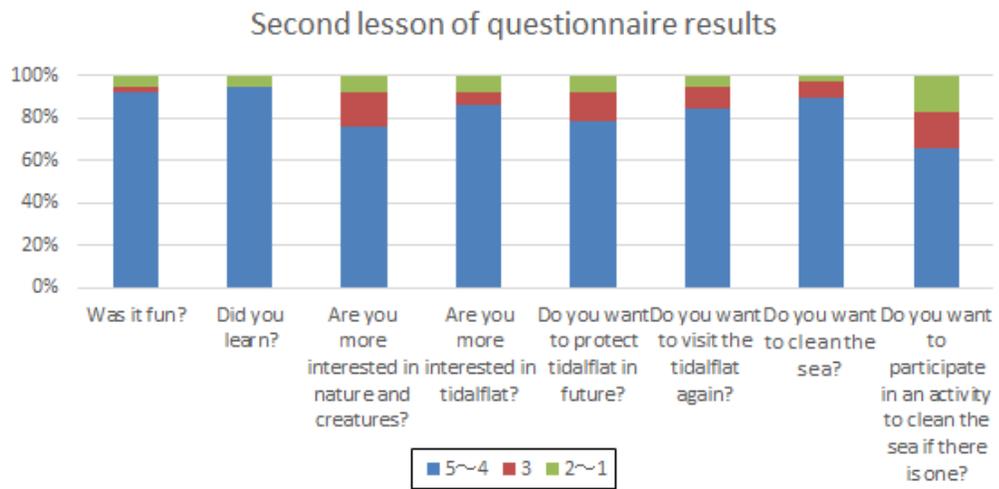
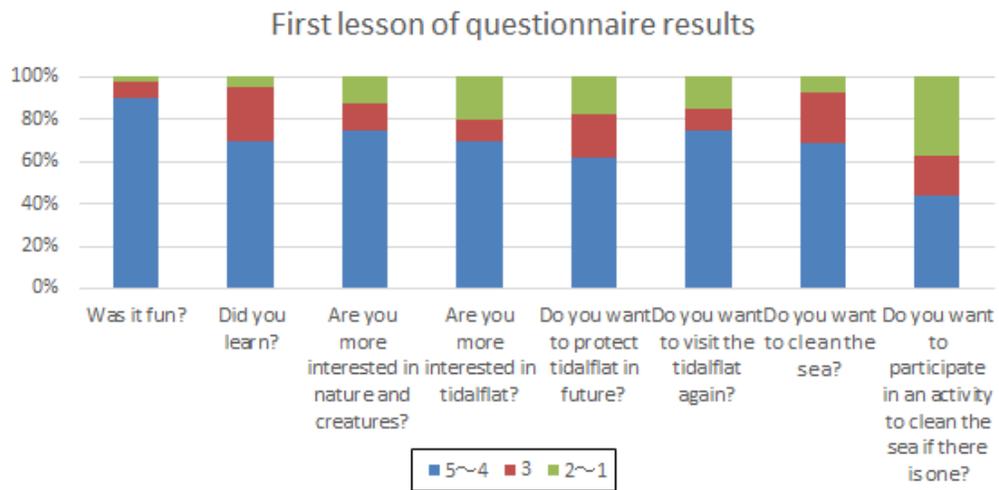


Fig. 1. Questionnaire results

III. REFERENCES

- [1] Y. Tadashi, and M. Hirokazu, "A study of the practice safe Seaside Campus in elementary school," *Osaka Kyoiku University Bulletin*, 2005.