



Photos: Shutterstock

# Geep

GLOBAL 全球  
ENVIRONMENTAL 環境  
EDUCATION 教育  
PARTNERSHIP 夥伴

*Sharing ideas to create a more just and sustainable future through the power of environmental education*

## CASE STUDY

# Popularizing an environmental education project: A case study of the eco-picture diary in Yokohama City, Japan

### CONTRIBUTORS

Hiroshi Ito and Alan Reid

Geep is a partnership of the U.S. Environmental Protection Agency, the Environmental Protection Administration of Taiwan, and the North American Association for Environmental Education.



## Popularizing an environmental education project: A case study of the eco-picture diary in Yokohama City, Japan



### Overview

The Eco-Picture Diary Environmental Education Project (EDEEP) was developed and introduced by Recycle Design, a Yokohama-based civil society organization, to inform students, their family members, and other citizens about particular socio-environmental issues and strategies in Yokohama City, Japan. EDEEP was a contributing factor to the success of the city's Garbage-30% (G-30) program, which helped reduce garbage waste production by 43% in 2010.

This case study shows (1) how Yokohama citizens perceived EDEEP's effect on the G-30 garbage reduction program; (2) how project stakeholders perceived EDEEP as an instructional tool using place-based approaches to environmental education, ecopedagogy,<sup>1</sup> reflective learning,<sup>2</sup> and backcasting;<sup>3</sup> and (3) how the project became popular via the diffusion of innovation theory and the theory of planned behavior (Hiroshi and Reid, 2020).

<sup>1</sup> Ecopedagogy's primary goal is to create a "planetary consciousness" through revolutionary teaching and learning. The movement aims to create educational programs that explore the intersection of social, political, economic and environmental systems. *Wikipedia*, s.v. "Ecopedagogy," last modified April 2, 2021, [https://en.wikipedia.org/wiki/Ecopedagogy#cite\\_note:-9-5](https://en.wikipedia.org/wiki/Ecopedagogy#cite_note:-9-5).

<sup>2</sup> Reflective learning is a form of education in which the student reflects upon their learning experiences to clarify and create meaning in terms of self, change conceptual perspectives, and allows them to understand experiences differently and take action accordingly. *Wikipedia*, s.v. "Reflective learning," last modified December 20, 2020, [https://en.wikipedia.org/wiki/Reflective\\_learning](https://en.wikipedia.org/wiki/Reflective_learning).

<sup>3</sup> Backcasting is a planning method that starts with defining a desirable future and then working backwards to identify policies, programs, and/or individual actions that will connect that specified future to the present. The fundamental question of backcasting asks, "If we want to attain a certain goal, what actions must be taken to get there?" *Wikipedia*, s.v. "Backcasting," last modified March 20, 2021, <https://en.wikipedia.org/wiki/Backcasting>.



Photo: Shutterstock

Yamashita Park, Yokohama, Japan

## Background

Yokohama City, one of the largest cities in Japan with a population of 3.75 million, has confronted solid waste management challenges since the early 2000s when its garbage dumpsites were filled. To address this issue, the municipal authorities initiated the G-30 program in 2003 with the goal of reducing overall solid waste by 30% in 2010 to 1.13 million tons, by sorting waste into recycle, reduce, and reuse (3Rs) categories. The city reported that it managed to reduce garbage waste production by 43% during this period. EDEEP was recognized as a significant factor in the success of the program and subsequent eco-initiatives (Yokohama City 2020). This case study examines EDEEP and the process of how it became popular to address socio-environmental issues, through partnerships between informal and formal education providers.

## Approach

### A. EEDEEP Design

EDEEP informs students, their family members, and other citizens about particular socio-environmental issues as well as strategies that can address these issues, such as promoting the 3Rs, reducing greenhouse gas (GHG) emissions, and working towards one or more of the UN's Sustainable Development Goals (SDGs). Classroom teachers instruct their students to create eco-picture diaries of writings and drawings expressing how they want their city to be in the future and what they can do to realize this ideal future. This includes discussions with family members about socio-environmental issues as well as elaborating on and expressing strategies to address these issues (Recycle Design 2019). Application forms to participate in the project are distributed in all elementary schools in Yokohama at the end of June. If teachers agree to participate in the project, their students are asked to prepare the diaries as homework during the summer break. Approximately 20,000 students, primarily in the fourth grade, participate annually in the program.



Examples of completed student eco-picture diaries





Photo: Shutterstock

The completed eco-picture diaries are evaluated by stakeholders selected during the annual citizen selection meeting. Employees from many Yokohama-based companies also participate in evaluating the content of eco-picture diaries and in the award ceremonies for the project. Evaluated diaries are returned to schools at the beginning of September. The most highly rated diaries are exhibited at various venues, such as events hosted by the Japan International Cooperation Agency (JICA), the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Associated School Conferences, as well as at eco-related meetings, which provides other members of the public an opportunity to consider the students' diaries (Recycle Design 2019).

EDEEP was designed using distinct educational approaches, including place-based education, eco-pedagogy, reflective learning, and backcasting.

- **Eco-picture diaries as a place-based approach:** Eco-picture diaries feature place-based education, as they help nurture the students' sense of place. The project emphasizes inclusion of the community in the resolution of socio-environmental issues (Efird 2015). This is important because people are more concerned about environmental issues in areas where they reside compared to other places.
- **Eco-picture diaries as an eco-pedagogical approach:** An explicit aim of eco-picture diaries is social transformation (Recycle Design 2019), also a goal of eco-pedagogy which is focused on the reflective assessment of social structures to identify, challenge, and transform them (Morrow 1994). Eco-picture diaries help learners analyze the underlying gap between current situations and desirable futures. This approach can address socio-environmental issues through critical reflection and action (Misiaszek 2016).
- **Eco-picture diaries as a reflective approach:** Eco-picture diaries are also positioned as a type of reflective journaling. For instance, the eco-picture diaries include images as well as text. The interaction of using both writing and drawing helps learners activate multiple cognitive abilities that are important for effective reflective learning (Mayer and Sims 1994) and differentiates the eco-picture diary from basic journal writing.
- **Eco-picture diaries as a backcasting approach:** EDEEP was designed to exemplify a form of backcasting to help envision, plan, and realize a desirable sustainable society. Backcasting is an approach that generates an image of "a desirable future, and then works backwards from that future to the present" (Vergragt and Quist 2011, 747) to conceptualize steps to get to that future.



## B. EDEEP Implementation

Recycle Design initially developed EDEEP in 2000 in response to a focus group with Yokohama city personnel that identified shrinking landfill space as a major issue confronting the city. Fewer than 1,000 students participated annually in the program's early years due in part to competition from many other individuals and organizations that introduced similar projects in the community. But Recycle Design persisted with implementation, adapting EDEEP's implementation process to accommodate changing socio-environmental issue priorities, educational requirements, city policies, participation in national and international projects, and recognition by national and international programs and organizations. As one elementary principal stakeholder said, "Persistence is the key to success. If a project continues for several years consecutively, it makes us think if we should do it again the following year." Recycle Design's flexible and adaptable implementation process resulted in growing participation and popularity over nearly two decades, with an annual participation of more than 25,000 students by 2015.

As mentioned earlier, Recycle Design initially established EDEEP in 2000 in response to a Yokohama City personnel focus group discussion that identified solid waste as an important socio-environmental issue. The following key events over the subsequent two decades were important drivers for the changes Recycle Design made to EDEEP's programming and design:

1. **2000:** The Ministry of Education, Sports, Science, and Technology (MEXT) introduced Integrated Studies (IS) into the school curriculum to help students become more aware of environmental problems and to help them identify potential solutions. IS was mandatory for all primary and secondary schools requiring several hours of environmental and other education instruction each week.
2. **2003:** Yokohama City established the G-30 program to reduce garbage waste production by promoting the 3Rs. A member of the Board of Education reported that all teachers were required to teach the 3Rs as part of the IS program. While many teachers did not have related expertise, the Recycle Design team already had more than three years of experience in the field. At this point, an increasing number of teachers decided to collaborate with Recycle Design and adopt the eco-picture diary as part of their standard instruction.
3. **2008:** Yokohama City was designated an Eco-Model City by the government of Japan as part of a national effort to become a carbon neutral society. This led Recycle Design to add GHG emissions reduction to EDEEP's 3Rs' theme.
4. **2010:** Yokohama City was the only Japanese city recognized as an Eco2 City<sup>4</sup> by the World Bank for successful GHG emissions reduction programming. While this recognition did not result in any changes to EDEEP's programming, it did result in greater visibility and popularity of the program locally, nationally, and internationally.
5. **2011:** Yokohama City was designed as an Eco-Future City, an initiative established by the Japanese government in response to the Great East Japan Earthquake, which catalyzed national interest and discussions related to environmental and energy-related issues. While Yokohama City was not directly impacted by the earthquake, it was selected to participate in the program because of its experience addressing socio-environmental issues. This recognition led to the adoption of EDEEP by cities in Japan and internationally.
6. **2015:** The United Nations General Assembly agreed upon the Sustainable Development Goals (SDG). Based on the SDGs, Recycle Design broadened the themes of EDEEP to include multiple socio-environmental issues in addition to the 3Rs and GHG emission reduction. This led to increased interest among the Yokohama City corporate community, as participation in the project counted toward their corporate social responsibility requirements (CSR).<sup>5</sup>

<sup>4</sup> Eco2 Cities are defined as cities that create economic opportunities for their citizens in an inclusive, sustainable, and resource-efficient way, while also protecting and nurturing the local ecology and global public goods, such as the environment, for future generations. (The World Bank)

<sup>5</sup> Corporate social responsibility (CSR) is a type of international private business self-regulation that aims to contribute to societal goals of a philanthropic, activist, or charitable nature by engaging in or supporting ethically oriented practices. While once it was possible to describe CSR as an internal organizational policy or a corporate ethic strategy, that time has passed as various international laws have been developed and various organizations have used their authority to push it beyond individual or even industry-wide initiatives. *Wikipedia*, s.v. last modified April 3, 2021, [https://en.wikipedia.org/wiki/Corporate\\_social\\_responsibility](https://en.wikipedia.org/wiki/Corporate_social_responsibility).



2015 saw more than 23,000 students from 281 schools participate in the project, nearly one in six students in Yokohama City's primary schools. A member of the board of education reported that even teachers who were not very motivated to engage in environmental education started using EDEEP, and it became a kind of social norm. Thanks to an adaptive and innovative implementation process and recognized impacts and outcomes, EDEEP became a very popular education program used throughout Japan and internationally to effectively educate and engage students and communities in identifying and addressing socio-environmental issues.



Photo: Shutterstock

Sankeien Garden, Yokohama, Japan

## Evaluation Plan

Project evaluation included:

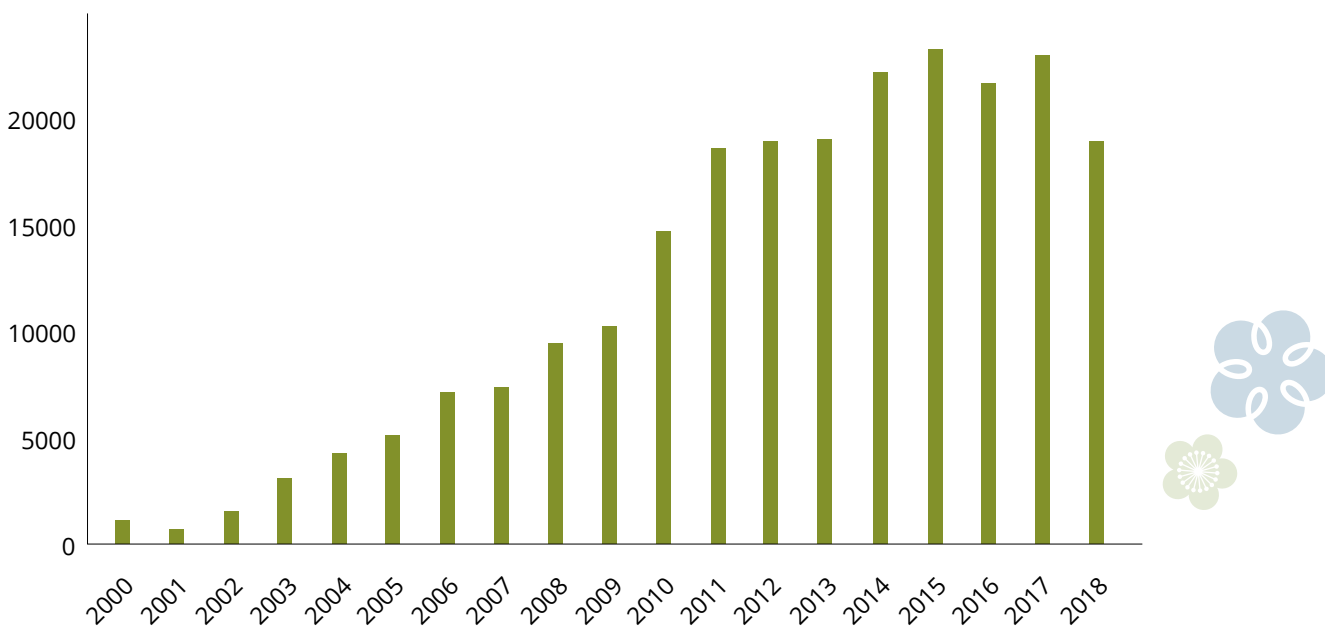
1. Tracking the number of student participants each year and reviewing public records to determine the number of citizens that saw exhibitions of the eco-picture diaries
2. Conducting surveys with 1,159 Yokohama citizens through a professional research agency. The survey questionnaire was designed to examine citizen awareness of EDEEP and perceptions on whether the project had a positive impact on garbage reduction.
3. Conducting stakeholder interviews with three city personnel, three staff members from Recycle Design, two elementary school teachers, an elementary school principal, a member of the Board of Education, and a president from a private company. Stakeholders were identified and selected using snowball sampling beginning with city personnel and were asked to share their opinion about eco-picture diaries as an instructional tool as well as how and why the eco-picture diary project became popular.

## Outcomes/Results

### A. Number of Student Participants:

Over 250,000 elementary school students participated in the project between 2000 and 2018 (Figure 1). Assuming that at least one family member worked with each student, it can be estimated that over 250,000 additional family members were involved in the project. Furthermore, cumulatively, through the aforementioned exhibitions, public records show that the diaries would have been seen by approximately 110,000 visitors by the end of 2018. Therefore, it can be estimated over 610,000 or 16% of Yokohama citizens would have been directly or indirectly involved in the project.

Figure 1. Number of students who participated in the eco-picture diary project.



### B. Community Perceptions of EDEEP's Effect on Garbage Reduction

Among Yokohama citizens responding to the survey, 13.2% reported knowing about the eco-picture diary (Table 1). Among those with knowledge of the eco-picture diary project, 55.6% claimed that the diary contributed to the city's garbage reduction while only 3.9% reported that it had not.

Table 1. Participant awareness and perceptions of EDEEP's effect on garbage reduction

Awareness of the eco-picture diary	n	%
Yes	153	13.2
No	1006	86.8
Total	1159	100.0
Perception of the diaries' impact on garbage reduction		
Strongly agree	13	8.5
Agree	72	47.1
Neither agree nor disagree	62	40.5
Disagree	4	2.6
Strongly disagree	2	1.3
<i>Total</i>	<i>153</i>	<i>100.0</i>





### C. How EDEEP links to theories including the diffusion of innovation theory and the theory of planned behavior

Although Recycle Design staff did not use diffusion of innovation theory or the theory of planned behavior per se in the design or implementation phases of EDEEP, researchers recognized how the project demonstrated the key constructs of those theories when developing the evaluation and examining results and outcomes. The following section provides some additional background on the theories and highlights how EDEEP demonstrates key constructs.

#### 1. Diffusion of Innovation Theory

Innovation implies a new idea or behavior (e.g. adoption of the EDEEP) where it is important to note that if an idea seems new to an individual, it is considered an innovation regardless of how long the idea has actually been in use (Rogers 2003). According to Rogers' (2003) diffusion of innovation theory, innovations with relative advantages, compatibility, trialability, and observability tend to be adopted more rapidly than other innovations.

**Diffusion of Innovation Theory Key Constructs**

- Relative advantage:* An innovation's perceived benefit as compared to existing tools or procedures
- Compatibility:* An innovation's perceived consistency with existing values
- Trialability:* An innovation's ease regarding experimentation
- Observability:* An innovation's impact visibility

EDEEP offers some relative advantages as an instructional tool for teachers who struggled with teaching the 3Rs, GHG emissions, and the SDGs due to ease of use and teachers' lack of awareness of other tools or procedures. Teachers easily understand and adopt EDEEP due to its compatibility with existing values of the education system. EDEEP is also flexible to use and not mandated by the government, allowing teachers to try it out at their convenience and decide whether to use it. This affirms the concept of trialability. The output of the diary is also evident through the number of submissions that are exhibited throughout the city. This leads to observability.

Diffusion theory also describes communication channels as a means of delivering messages among individuals. Word of mouth has been an effective communication tool to promote the eco-picture diary project. Time is an important dimension in the innovation-decision process through awareness/knowledge, persuasion, decision, and confirmation/continuation. In the context of the eco-picture diary, teachers first became aware of the need to teach 3Rs, GHG, and the SDGs. In each instance, they sought relevant educational material from Recycle Design. Diffusion occurs within a social system whose structure provides a context for regularity and stability to human behavior within that system. In Yokohama, social norms can be seen to affect the rate of adoption of new innovations as they influence the behavior of individuals.





## 2. Theory of Planned Behavior

Diffusion theory shares similarities with the theory of planned behavior (TPB), which assumes that attitude, perceived behavioral control, and subjective norms create the intention toward adopting a given behavior. In the case of the eco-picture diary, teachers and other stakeholders can acquire a positive attitude toward teaching socio-environmental issues, develop and share subjective norms, and exercise perceived behavioral control. Teachers developed a positive attitude toward the diary in part because of the aforementioned relative advantage: the diary fulfilled their teaching needs. The ease of use and flexibility (complexity and compatibility) also provided teachers with control. Teachers using the eco-picture diary built confidence in others that they could use it, too, and this supported the creation of a social norm.

### Theory of Planned Behavior Key Constructs

**Attitude:** a settled way of thinking or feeling about someone or something. Attitudes are comprised of personal values, beliefs, and concerns as well as awareness and knowledge.

**Perceived Behavioral Control:** is a combination of an individual's perceived ability to execute control (self-efficacy), and how much control an individual thinks he or she has (locus of control).

**Subjective Norms:** is personal behavior based on what those who are important to one do (descriptive norms), and what should be done (social norms).



Photos: Shutterstock

## Lessons Learned

By further applying constructs in diffusion theory and the TPB, the eco-picture diary can be promoted even further. The following lessons learned may be considered important to promote the eco-picture diary or similar projects.

- Focus the content of the eco-picture diaries on relevant and important socio-environmental issues. Initially, EDEEP focused on solid waste, but it evolved to include greenhouse gas emissions reduction, sustainable development goals, corporate responsibility, and other issues.
- Use effective educational approaches. EDEEP's instructional materials are based on effective educational approaches such as backcasting, reflective thinking, and eco-pedagogical and place-based strategies.
- Consider the key constructs from Diffusion Theory and Theory of Planned Behavior. EDEEP is compatible with the everyday challenges and opportunities educators manage in their classrooms, and the values of the current educational system (such as the requirement to teach EE). The program is also simple to use and can easily be tested in the classroom setting with minimal preparation or risk, both of which offer important relative advantages to teachers over competing EE programs. As a result, teachers develop a positive attitude, obtain control, and share a norm pertaining to the diary.



## Resources/References

- Efird, R. 2015. "Learning Places and 'Little Volunteers': An Assessment of Place- and Community-Based Education in China." *Environmental Education Research* 21 (8): 1143–1154.
- Hiroshi, I. and A. Reid. 2020. "Promoting an Environmental Education Project: The Eco-Picture Diary Project in Yokohama City, Japan." *Environmental Education Research*, 26 (11): 1656-1675, DOI: 10.1080/13504622.2020.1828289
- Mayer, R. E. and V. K. Sims. 1994. "For Whom Is a Picture Worth a Thousand Words? Extensions of a Dual-Coding Theory of Multimedia Learning." *Journal of Educational Psychology* 86 (3), 389–401.
- Misiaszek, G. W. 2016. "Ecopedagogy As an Element of Citizenship Education: The Dialectic of Global/Local Spheres of Citizenship and Critical Environmental Pedagogies." *International Review of Education* 62: 587–607.
- Morrow, R.A. 1994. *Critical Theory and Methodology*. Thousand Oaks, CA: SAGE Publications Inc.
- Recycle Design. 2019. *Kankyou enikki* (Eco-picture diaries). Yokohama: Recycle Design.
- Rogers, E. M. 2003. *Diffusion of Innovations*. (5th ed). New York: Free Press.
- Vergragt, P. J. and J. Quist. 2011. "Backcasting for Sustainability: Introduction to the Special Issue." *Technological Forecasting & Social Change* 78 747–755.
- Yokohama City. (2020). *Jigyousya to renkeishita kodomotachi no kankyouishiki no ikusei – Kankyou enikki* (Fostering Children's Environmental Awareness Through Cooperation with Businesses). <https://www.city.yokohama.lg.jp/kurashi/machizukuri-kankyo/ondanka/futurecity/promotion/kankyoenikki.html>

## Contact

### Hiroshi Ito

Professor, Graduate School of Management, NUCB Business School,  
Nagoya University of Commerce and Business  
Address: 1-3-1 Nishiki Naka-ku, Nagoya 460-0003 JAPAN  
Tel: +81 52 203 8111  
[hito@nucba.ac.jp](mailto:hito@nucba.ac.jp)

### Alan Reid

Professor of Education, Montosh University  
[alan.reid@monash.edu](mailto:alan.reid@monash.edu)

