PRACTICAL REPORT ON ENERGY AND ENVIRONMENTAL EDUCATION USING THE CONTENTS OF THE "STEAM LIBRARY"

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INTRODUCTION

In Japan, the new Course of Study for 2022 replaced "Period of Integrated Study" with "Period for Inquiry-Based Cross-Disciplinary Study" in the high school curriculum (Ministry of Education, Culture, Sports, Science and Technology, 2018). This was in recognition of the need for inquiry-based learning. Since 2018, the Ministry of Economy, Trade and Industry (METI) has been promoting the "Classroom of the Future" project to demonstrate teaching and learning methods using EdTech. As part of this project in 2021, the “STEAM Library”, a set of contents for inquiry-based learning, was opened.

The authors were involved in developing content for the "STEAM Library," which was also made available to the public (Ministry of Economy, Trade and Industry, 2022). It was further updated in 2022 to organize and add documents and videos. This content is not only beneficial for inquiry-based learning. It can also be used to teach about energy and the environment in a "Basic Physics" class, giving students a more recent and realistic picture of what is happening. In the study we are presenting, we planned and implemented an energy and environmental education class using this content and confirmed its educational effects.

METHODS

The authors conducted ten periods of energy and environmental education classes using the content within a "Basic Physics" in 2021. They completed a questionnaire survey to determine the effectiveness of the classes. It consisted of a survey on beliefs, engagement, and motivation about the energy environment based on PISA 2015 questionnaire and open-ended statements about the energy consumed and electricity generation (OECD, 2016).

In this class, students watched various videos and performed demonstrations and experiments on power generation. Finally, students were asked to design a “5-minute video in which you were a bureaucrat and proposed the optimal energy mix" with a peer to evaluate the activity of the videos they created.

RESULT

The survey on beliefs and motivations was poor, with only two of the 18 items improving significantly: "enjoyment of gaining new knowledge about energy and the environment" and "interest in renewable energy." In the open-ended description, the amount of free writing increased by 34%, perhaps because opinions were more in-depth and specific. In addition, many students wrote views about nuclear power.

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