



A Case Study of Integrating Non-formal Learning for Developing Teaching **Resources for Sustainability During a Science Teacher Education Course**

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Introduction

This case study was based on the course as a part of ERASMUS+ program, under the project of Promoting Education Relevant in Science for Sustainability (PRESS), participated by 34 student teachers at Science Education Department of Universitas Negeri Malang, Indonesia during September-December 2024 2024/2025 the at Semester. The course entitle Development the of Teaching (4.5 Resources ECTS) aims to equip the students with knowledge, skill, pedagogical and model in creating teaching resources for sustainability. consists of The course lectures, non-formal field trips, project work to design teaching resources, presentation, as well as peer and expert review. The field trip was conducted by the students to at least one of the following sites: Bajulmati Sea Turtle Conservation (BSTC), Javan (JLC), Langur Center Wonosari Tea Garden, and Zoological Museum. The then worked in students eight design to groups teaching for resources sustainability based on the context from the sites they Each two groups visited. designed teaching the based on one resources particular site.

Research Questions

RQ 1: What kind of relevant pedagogical models did the student teachers design for sustainability teaching at school science curriculum after their field trips in the course?

RQ 2: What are the student teachers view on designing sustainability-based teaching resources in the course?

Methods

RQ 1 was answered based on the content analysis of the student teachers' learning artefact.

RQ 2 was according to the result of the small survey analysis participated by 34 student teachers after the course

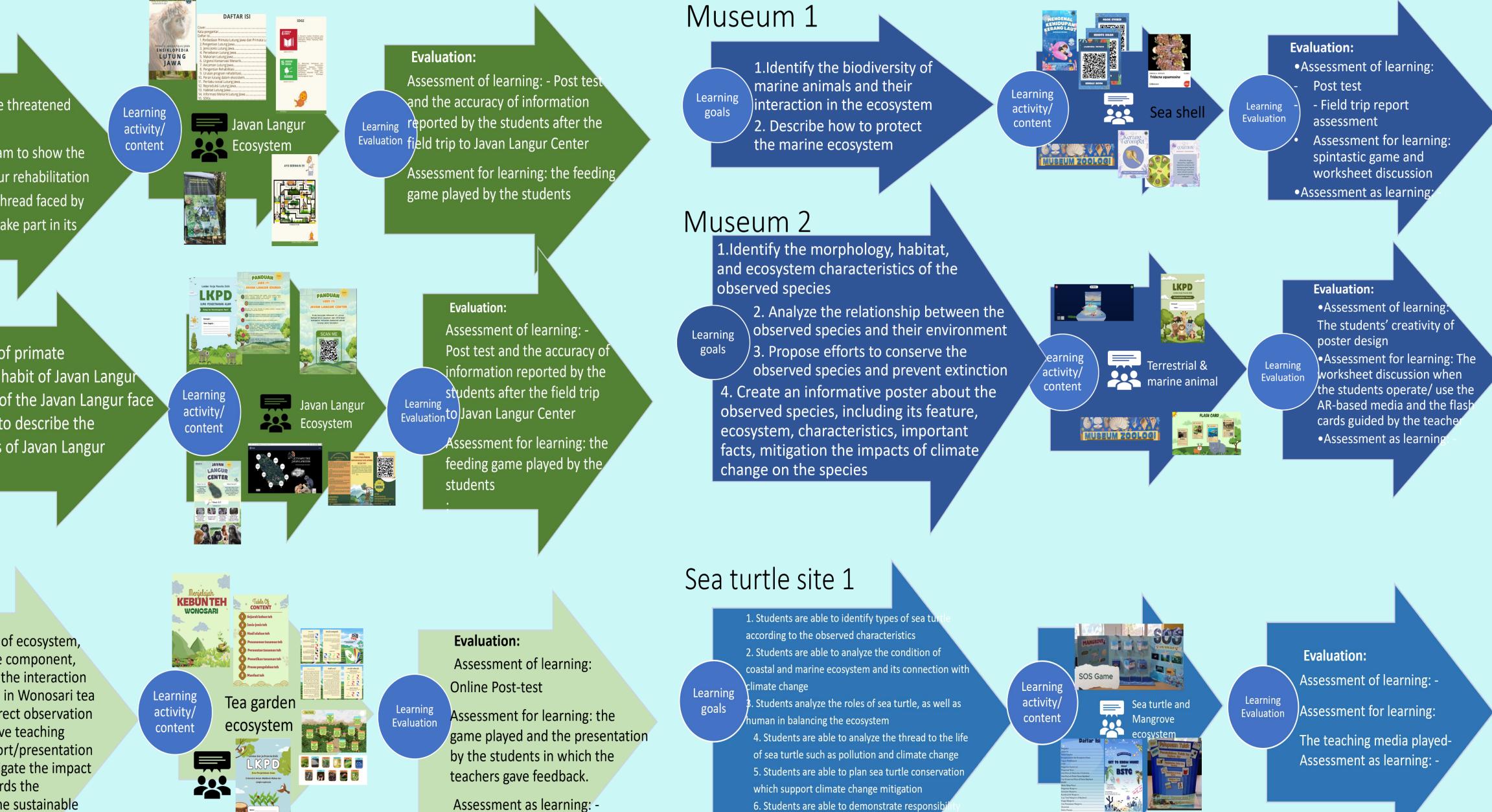
1. The Designed Pedagogical Models

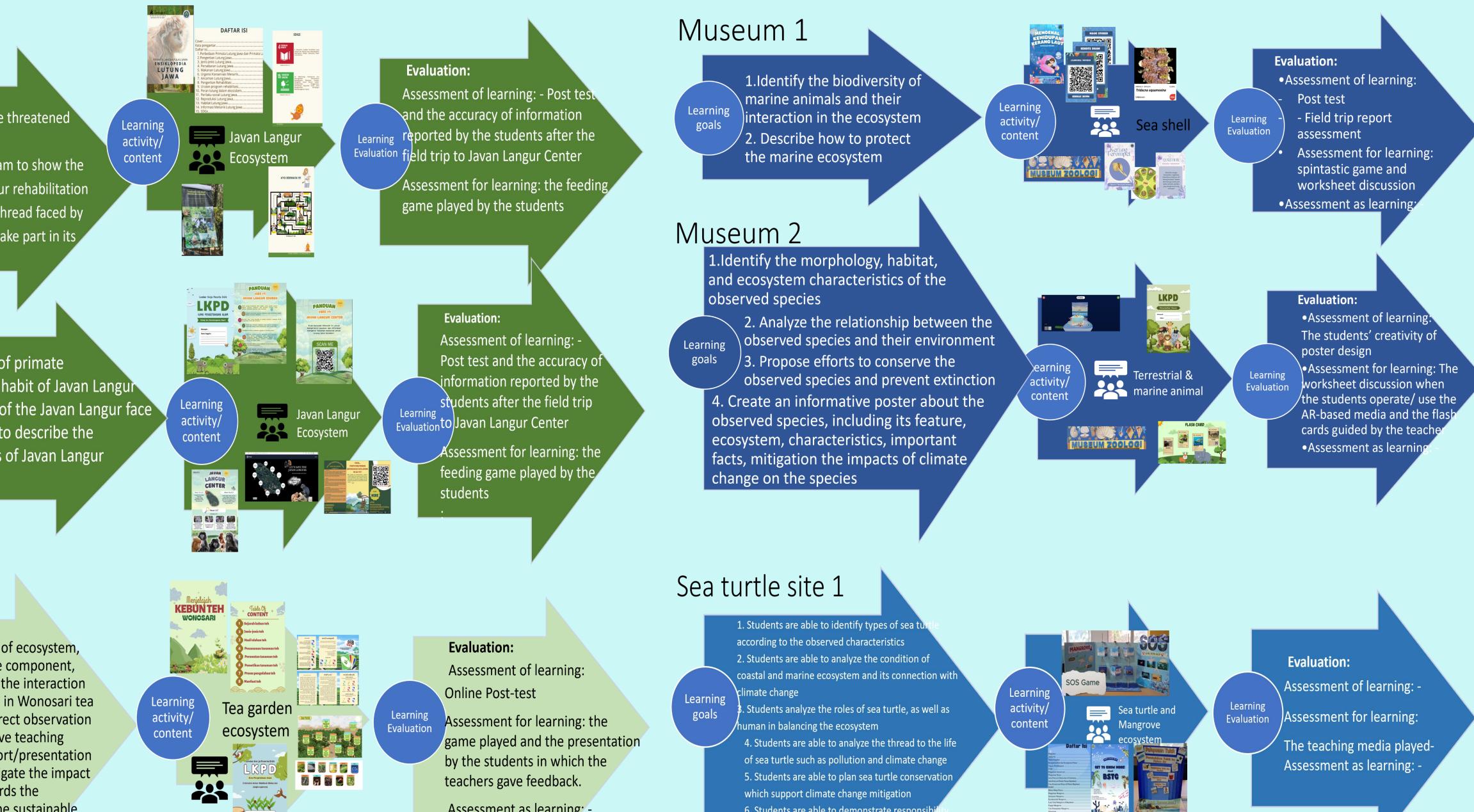
JLC 1



Result & Discussion



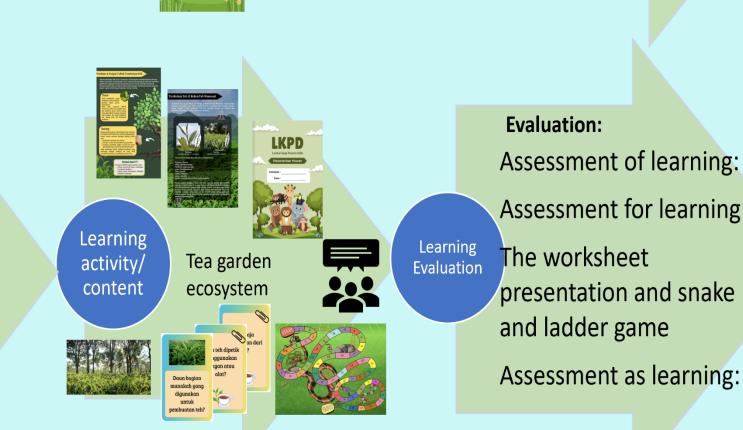




1. Analyze the cause of the threatened Jayan Langur Students create diagram to show the Learning process of Javan Langur rehabilitation goals 2. Create a report on the thread faced by Javan Langur and how to take part in its conservation JLC 2 1. Differentiate types of primate 2. Identify the dietary habit of Javan Langur Analyze the thread of the Javan Langur face Learning 4. Students are able to describe the goals conservation process of Javan Langur conservation

Tea garden 1

Classify the component of ecosystem, interaction between the component, and the factor affecting the interaction among the components in Wonosari tea goals garden ecosystem by direct observation or through the interactive teaching resources. Create a report/presentation on how to prevent/ mitigate the impact of global warming towards the ecosystem to support the sustainable ecosystem. Tea garden 2 1. Differentiate between living things and nonliving things based on their characteristics 2. Classify organism in the tea garden ecosystem based on their characteristics/ taxonomy Learning goals 3. Analyze the interactions between the organism in the tea farm and the important role of each organism in the farm to maintain the ecosystem balance



Evaluation: Assessment of learning: Assessment for learning: The worksheet presentation and snake and ladder game



and real action to support sea turtle con

Evaluation: Assessment of learning Assessment for learning: worksheet, presentation, Learning Evaluation pop up book and puzzle

Assessment as learni

activity

2. Student Teachers View

As a future teacher the course has raised my awareness of (global) sustainability issues and given me knowledge that will help me teach them.

between human activities and sustainability issues.

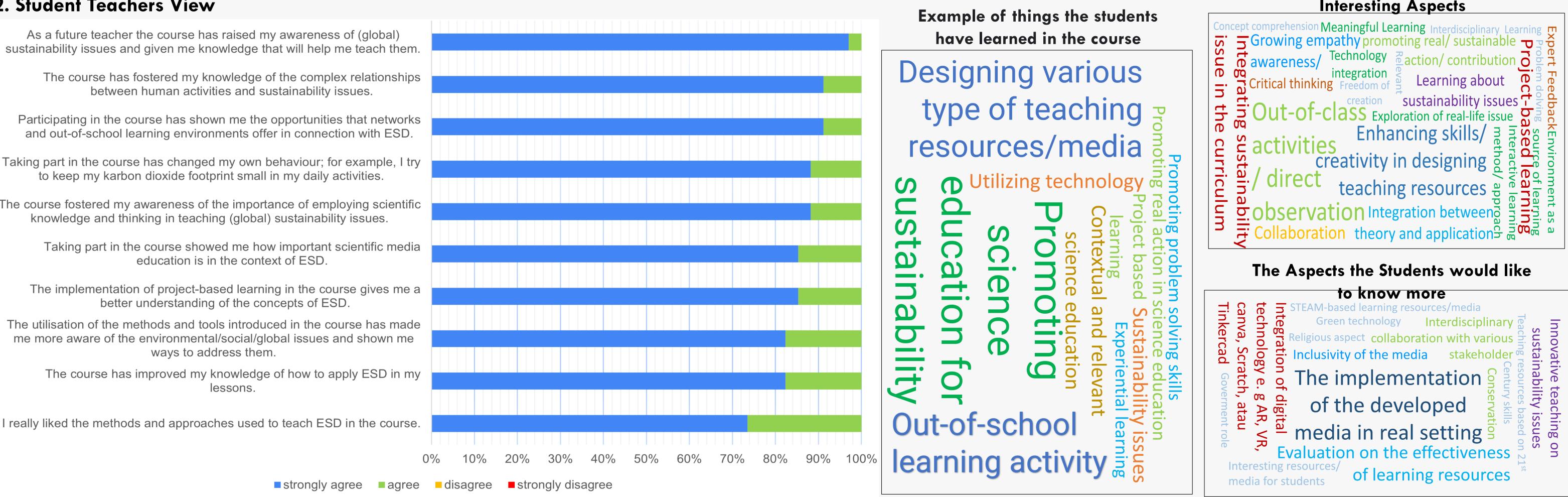
and out-of-school learning environments offer in connection with ESD.

Taking part in the course has changed my own behaviour; for example, I try to keep my karbon dioxide footprint small in my daily activities.

The course fostered my awareness of the importance of employing scientific knowledge and thinking in teaching (global) sustainability issues.

education is in the context of ESD.

better understanding of the concepts of ESD.



Interesting Aspects

Sea turtle and

Mangrove

ecosystem

Learnir

activity/

content



Conclusion

1. Among the eight group, all of them designed the teaching resources about ecosystem which aimed to promote not only the understanding about the component of ecosystem and its interaction, but also sustainability. The groups design the activity in which the students can experience direct observation at particular sites (zoological museum, tea park, Javan Langur Center, and Bajulmati Sea Turtle Conservation), or if it is not possible, then the students are provided with external resources (worksheet, article, video, quiz, AR) linked with QR code. In addition to that, students are engaged to play game such as uno, snake & ladder, as well as puzzle. The evaluation ranges from assessment of learning to assessment for learning. Assessment as learning is limited and highly suggested to be used as a part of the evaluation process.

2. Most of the student teachers gave encouraging feedback on the course that all students agree and strongly agree to each item, as well as according to the positive response from the open-ended questions. Almost all students acknowledged that as a future teacher the course has raised the student teachers' awareness of (global) sustainability issues and given them knowledge that will help them teach the sustainability issues. This indicates that those non-formal learning environments are relevant for their learning in designing secondary school sciece teaching resources for sustainability. However, only three forth of students strongly agree that they really liked the methods and approaches used to teach ESD in the course. Providing more rooms for improvement.







