The Development of Integrated Learning Package on Mangrove Ecosystems for Secondary School Students in Samutsongkram Province, Thailand

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Abstract: This study aimed to investigate lower secondary school students' knowledge and awareness on mangrove ecosystems, to develop an integrated learning package, and to study the effect of developed learning package on students' knowledge and awareness. The participants were thirty-two grade eight students which are randomized using purposive sampling technique. The criteria for purposive sampling are students who are study in lower secondary school level, schools are located not more than 5 kilometers from mangrove ecosystems, there is local sage on mangrove ecosystems, and the participants show their willingness to participate in this study. These participants attended the developed learning package in second semester academic year 2010. The developed learning package comprises of various activities such as games, lectures from local sage, teacher and researcher, field trips in local ecosystems, discussion with local sage, and teamwork assignments. The mixed-method research paradigm (Johnson & Onwuegbuzie, 2004) was employed for data collection and analysis. The quantitative data include questionnaires on awareness and multiple choices items for conceptual understanding. The data were collected both before and after participation in the learning package. In addition, interviews, classroom observations, and the written documents on food chain, food web, and adaptations were collected. Quantitative data of pre-test and post-test were analyzed using the paired t-test. The questionnaires were collected, coded, and analyzed. The significance at P<0.05 was used for mean separation and comparing the students' awareness before and after participating in the learning package. The transcription from the interview on perceptions on mangrove ecosystems were categorized into four levels using the scoring rubric: poor, fair, good, and excellent. The holistic scoring rubric technique was used to analyze the concept maps, food chains and food web, reports, and interviews. They were categorized into three levels of conceptual understanding: poor, fair, and good conceptual understanding.

Keywords: Learning Package, Mangrove Ecosystems, Integrated, Secondary School

Introduction

The main objectives of science educational reform are enhancing students' knowledge, developing more positive attitude toward the natural world and science, and promoting creativity skills (American Association for the Advancement of Science (AAAS), 1993; National Research Council (NRC), 1996; National Science Teachers Association, 1990). The traditional teaching was changed to more integrate and more interactive classroom (Lee & Erdogan, 2007).

Ecosystems topic was stated as an important topic of biology instruction and concept (AAAS, 1993). The relationships among ecosystems components were defined as an essential topic for secondary school curriculum standards in several countries, including Thailand.