

國小節能減碳知識評量表之建置及現況調查研究

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摘要

本研究分析國民小學現有節能減碳相關課程內容，以專家概念圖為基礎編製半開放式問卷，蒐集學童的節能減碳概念狀況，並配合半結構式臨床晤談，探討學生的迷思概念及狀況。再依半開放式問卷及晤談結果編製封閉式問卷，經過專家審查、兩次預試及修正，編製成正式問卷進行大規模施測，採分層依比例抽樣，共發出 1,637 份問卷，低、中、高各年段各發出 540 份，低、中、高年級有效回收率分別為 89%、92% 及 97%。本研究所編製節能減碳知識評量試題分為：全球暖化的主因、全球暖化的影響、節能減碳技術及方法與國際公約及國際節能減碳作法等四部份，國小低、中、高年級試題分別有 24、32 及 35 題，平均難度分別為 0.62、0.59 及 0.58，平均鑑別度為 0.43、0.36 及 0.35。由大規模施測的結果分析發現：在各節能減碳知識面向中，以「全球暖化的影響」面向各年段學童的平均表現最好，其次為「節能減碳技術及方法」面向；表現最差為「導致全球暖化的主因」面向；在各子面向中以「對於環保標章的了解」子面向學童的表現最差。

關鍵詞：國小學童、概念、節能減碳、標準化評量

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The Investigation of Current Situation and Development of Knowledge Assessment Form on Energy Conservation and Carbon Emission Reduction for Elementary School Students

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Abstract

This study explores the situation of elementary school students' misconceptions about Energy Conservation and Carbon Emission Reduction by analyzing related textbook contents existing within the country. Such situation is studied with a combination of conducting a semi-open questionnaire survey based on expert concept map and semi-structured clinical interviews. Closed questionnaire survey was carried out in accordance with the results from the semi-open questionnaire survey as well as the interviews. The questionnaires were compiled into formal questionnaires after experts' examination, twice pilot-tests and revisions, and were distributed for a large-scale test, based on the relative proportion adopted from the stratified quota sampling method. A total of 1,637 questionnaires were issued to all low, middle and high graders with 540 for each. The effective return rate was respectively 89, 92 and 97%. The form of Energy Conservation and Carbon Emission Reduction knowledge was compiled into four standardized topics for assessment: the main cause and impact of global warming, the technologies and methods of Energy Conservation and Carbon Emission Reduction, the international conventions and the international practices of Energy Conservation and Carbon Emission Reduction. There were 24, 32 and 35 questions in the assessment forms for low-, middle- and high-graders, respectively; the average difficulties were 0.618, 0.589 and 0.579; the average indices of discrimination were 0.433, 0.361 and 0.348, respectively. From the results of large-scale test, the conclusions can be drawn that in all

aspects of Energy Conservation and Carbon Emission Reduction, the average performance of school children for “global warming effects” aspect was the optimal, followed by the “technologies and methods for Energy Conservation and Carbon Emission Reduction;” the “main cause and impact of global warming” aspect appeared to be the worst. In all sub- aspects, the performance of school children on “understanding of Eco-Label” was the worst.

Keywords: elementary school, concept, Energy Conservation and Carbon Emission Reduction, standardized assessment