
Bridging The Water Literacy Gap: A Digital Approach To Promoting Sustainable Water Behaviour Among Malaysian Secondary Students

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Abstract

Water literacy is widely recognised as a multidimensional construct comprising knowledge, attitudes, and behaviour. However, behavioural change remains the most difficult dimension to develop, particularly in school-based environmental education. This study examined whether a digital learning approach could strengthen sustainable water-related behaviour among Malaysian secondary school students. A quantitative quasi-experimental design with a non-equivalent pretest-posttest control group was employed. The study involved 63 Form One students from two secondary schools in Miri, Sarawak, comprising 31 students in the digital learning group and 32 students in the conventional group. The intervention group used the interactive digital module through Minecraft Education Edition, while the control group received conventional teacher-centred instruction. Water-related behaviour was measured using a 15-item questionnaire, and the data were analysed using descriptive statistics, independent-samples t-tests, and Cohen's *d*. The findings showed no significant difference between the groups at pre-test, but the digital group achieved a significantly higher post-test mean score than the conventional group, $t(61) = 4.596, p < .001$, with a large effect size ($d = 1.158$). These findings indicate that digitally mediated, action-oriented learning can more effectively promote sustainable water-related behaviour and help bridge the behavioural gap in water literacy among Malaysian secondary school students.

Keywords: *Digital Learning; Environmental Education; Sustainable Water Behaviour; Water Literacy*
