Title: Validating a Tool to Measure Ecological and Environmental Awareness in Singaporean Preschool Children

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Summary

Teaching environmental sustainability in early childhood is crucial for fostering a generation that is conscious of and committed to sustainable practices. Early childhood is a formative period where foundational attitudes and behaviors are established, making it an ideal time to introduce concepts of environmental stewardship. By integrating sustainability into early education, children can develop a deep-seated respect for nature, learn responsible behaviors, and acquire skills that contribute to sustainable development. This approach not only benefits the environment but also supports children's cognitive, emotional, and social development.

Relevance to Singapore's Nurturing Early Learners Framework

Children are naturally curious and eager to explore the world around them. The Discovery of the World learning area in Singapore's Nurturing Early Learners (NEL) Framework builds on this innate curiosity, helping young children make sense of their surroundings while laying the foundation for future learning. A key aspect of this framework is fostering a sense of responsibility, care, and respect for the environment, aligning directly with the need to develop early sustainability awareness.

By understanding how human action, such as water conservation, impacts the environment, children begin to develop a sense of social responsibility and start reconsidering their everyday habits. The NEL framework emphasizes that alongside knowledge and skills, children must cultivate positive attitudes towards sustainability. Early exposure to sustainability concepts helps young learners recognize their role in protecting the natural, social, and built environments, preparing them to navigate the challenges of a rapidly changing world.

The Study

Our study aligns with these objectives by providing a structured, validated tool to assess sustainability awareness in K1 and K2 children. By systematically measuring children's ecological and environmental awareness, this tool supports the NEL framework's goal of nurturing future generations who are environmentally conscious and actively contribute to Singapore's sustainable development efforts.

This study aimed to develop and validate a tool for assessing sustainability awareness in K1 and K2 children. The tool was initially designed with three key constructs: Ecological Awareness (EcF), which examines children's understanding of sustainability practices in daily life; Environmental Awareness (EnA), which assesses their knowledge of broader environmental issues such as pollution and conservation; and Attitudes Towards Nature (ATN), which measured children's preferences and emotional connection to natural environments. To enhance engagement and reduce paper waste, the tool was digitized into an interactive PowerPoint with VBA and administered to 249 preschoolers in Singapore. Children's responses were captured digitally, and a 2 fold cross validation Confirmatory Factor Analysis (CFA) in RStudio was used to examine the tool's construct validity and reliability.

Findings

During the validation process, the Attitudes Towards Nature (ATN) subscale was removed due to low reliability and weak factor loadings, resulting in a refined model with two constructs: Ecological Awareness (EcF) and Environmental Awareness (EnA). The final model retained 11 items, removing five that negatively impacted reliability and model fit. Confirmatory Factor Analysis (CFA) confirmed that EcF and EnA are related but distinct constructs, with a moderate correlation ($r = 0.66$). Reliability indices were acceptable, with Cronbach's Alpha at 0.76 for EcF and 0.70 for EnA. The model also demonstrated good fit indices (CFI = 0.93, TLI = 0.91, RMSEA = 0.06, SRMR = 0.065), supporting its validity. These findings confirm that the tool provides a robust and reliable measure of young children's sustainability awareness, making it suitable for use within Singapore's early childhood education context.

Key Findings

- The initial tool included three constructs (Ecological Awareness, Environmental Awareness, and Attitudes Towards Nature). After validation, Attitudes Towards Nature (ATN) was removed due to low reliability and weak factor loadings.

- Moderate correlation ($r = 0.66$) supports treating Ecological Awareness (EcF) and Environmental Awareness (EnA) as separate constructs.

- The refined tool provides a robust and reliable measure of sustainability awareness among young children.

Significance of Findings

This study is significant as it fills a critical gap by providing a culturally relevant, validated assessment tool for sustainability education in Singapore. The tool supports curriculum development by enabling educators to track children's sustainability awareness and tailor teaching strategies accordingly. It also promotes evidence-based education by offering a structured way to measure sustainability learning outcomes in early childhood. Additionally, its digital format reduces paper waste while maintaining engagement and accuracy. The factor analysis confirmed two distinct yet interconnected constructs in Ecological Awareness and Environmental Awareness. By validating a structured, culturally relevant tool for assessing sustainability awareness in young children, this study provides a foundation for enhancing sustainability education in Singapore.

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