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從桌上行為流向生活習慣：水資源議題桌遊之設計與成效

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摘要

本研究旨在提供情境模擬桌遊的設計思維，並開發模擬日常用水環境的桌遊，以培養大眾對用水議題的知識、態度與生活習慣。情境模擬桌遊的設計思維乃是透過分析議題的特性，將其轉換成遊戲中的情境與系統，然後將議題中的因素與關係轉化成遊戲機制與卡牌。基於此設計思維，本研究發展了一套模擬用水情境的桌上遊戲「瘋水輪流轉」，並在遊戲中加入鷹架的設計以協助參與者關注影響個人水足跡與健康的重要因素。根據 53 位國中生的前、後測及訪談結果資料顯示，參與者在遊戲過程中能體認水資源與生活習慣的重要性，包含：天氣對臺灣可用水的影響、生活習慣與個人水足跡的關聯、省水措施等知識。學生透過桌遊教學能產生覺知與理解各種因素對水資源以及健康的影響，且願意選擇省水的生活習慣。本研究提供情境模擬桌遊在環境議題教學的潛力與成效，並說明設計環境教育桌遊的思維與步驟。

關鍵字： 水資源、生活用水習慣、設計模式、議題情境桌上遊戲

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生活水足跡的因素與計算、省水設施與省水方法等知識，也能覺察生活中的水資源及相關因素，傾向較省水的生活習慣。

本研究亦將桌上遊戲加入「鷹架」能提示學生關注影響用水環境與個人水足跡的重要因素。從訪談中也發現鷹架設計讓學生可自主關注與安排自身的習慣，從而促發對生活習慣的覺知與改變意圖。最後，根據此次研究的結果顯示，利用情境模擬桌遊作為環境議題的教育工具是具有潛力的，可供使用環境桌遊教學的教育人員與相關研究人員參考，使其能了解其桌遊設計思維與考慮面向。

未來在遊戲情境模擬的效用上，可基於日常個人行為與時空環境的設定，朝不同模組與難度的設計，使遊戲的適用性更廣。而學生表現的評估，本研究在習慣行為的面向僅採學生自我評估，為了佐證生活習慣的改變，也應從日常行為進行觀察，或於未來再次進行習慣評估。上述遊戲調整和評估方式可為後續研究的主題。

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捌、附錄

日常水資源覺知與意向評量

		非常同意	同意	普通	不同意	非常不同意
1	我平常會去運用五官觀察體驗、探究有關水資源的事物。	□	□	□	□	□
2	我平常會去覺知水資源與個人身心健康的關係。	□	□	□	□	□
3	我平常會去察覺生活周遭水資源環境的變遷。	□	□	□	□	□
4	我平常會去覺知自己的生活方式對水資源的影響。	□	□	□	□	□
5	我平常會去覺知人類生活品質乃繫於水資源的永續利用和維持生態平衡。	□	□	□	□	□
6	我平常會去認識生活周遭的水資源環境，與人造環境、常見的動物、植物、微生物彼此之間的互動關係。	□	□	□	□	□
7	我平常會去認識生活周遭的水資源問題形成的原因，並探究可能的改善方法。	□	□	□	□	□
8	我平常會去認識全球性的水資源議題及其對人類社會的影響，並瞭解相關的解決對策。	□	□	□	□	□
9	我平常會去瞭解水資源與經濟發展間的關係。	□	□	□	□	□
10	我平常會去認識國內的水資源法規與政策、國際水資源公約、環保組織，以及公民的環境行動。	□	□	□	□	□
11	我具有好奇心，去體認人類在水資源議題中的角色，以及水資源與人的相互關係。	□	□	□	□	□
12	我培養自己對水資源議題的熱愛與對戶外活動的興趣，	□	□	□	□	□
13	我個人具備有對水資源環境的責任感。	□	□	□	□	□
14	我會關切人類行為對水資源環境的衝擊，進而建立水資源環境友善的生活與消費觀念。	□	□	□	□	□
15	我有養成積極探究國內外水資源議題的態度。	□	□	□	□	□
16	我會關懷未來世代的生存與永續發展。	□	□	□	□	□
17	我會依循環保簡樸與健康的理念於日常生活與消費行為。	□	□	□	□	□

日常生活習慣自評

食	**我是(單選)：** □肉食主義者　□素食主義者(奶蛋素)　□素食主義者(全素)
	對我而言： **平均每天我習慣吃的肉類(牛羊豬雞)比例約為**：_____ % **平均每天我習慣吃的蔬果類(蔬菜、水果)的比例約為**：_____% **平均每天我習慣吃的穀類(飯、麵)的比例約為**：_____% (三題合計應為 100%)
浴	**平均每天淋浴的次數：**_____次。平均**每次淋浴的時間：**　_____分鐘
設備	**家中洗衣機種類為(單選)：** □一般洗衣機　□省水型之漩渦/攪拌式洗衣機　□省水型之滾筒洗衣機 □不知道，而且也覺得知道或不知道都還好 □不知道，但會想回去問家人
	家中的水龍頭是？(單選)： □一般型水龍頭　□一般型水龍頭，但有加裝低流量節水墊片　□省水型水龍頭 □不知道，而且也覺得知道或不知道都還好　□不知道，但會想回去問家人
	家中的蓮蓬頭是(單選)： □一般型蓮蓬頭　□省水型蓮蓬頭 □不知道，而且也覺得知道或不知道都還好 □不知道，但會想回去問家人
	家中的馬桶是(單選)： □傳統馬桶　□傳統馬桶加裝兩段式沖水器　□一段式省水馬桶　□兩段式省水馬桶 □不知道，而且也覺得知道或不知道都還好　□不知道，但會想回去問家人
用電	**家裡的電器：** **冷氣：**夏天平均每天開_____小時，冬天平均每天開_____小時 **電視：**平均每天開_____小時 **電燈：**平均每天開_____小時 **電腦：**平均每天開_____小時 **熱水器：**平均每天開_____小時

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Learning Transfer to Daily Habit: The Design and Effectiveness of Water Resources Board Game

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Abstract

This study aims to provide the design thinking of an issue-situation-based board game, which could simulate the situations of daily water uses. The idea is to transform the situations into the game system by analyzing the characteristics of the issue and constructing the game mechanics in relation to the issue. Based on the design idea, this study has developed a board game, named “Crazy Water”. Moreover, the design of a “scaffolding” has been established in this board game with the hope that students would pay attention to the key components affecting the personal water footprint and health. 53 students from one junior high school in central Taiwan participated in this study. The performance of the students were evaluated by the pretest, posttest, and post-interview. Results showed that students could realize the importance of water resources and change his or her water use behavior. First, they understood the weather as the main factor influencing water consumption in Taiwan. Second, they could calculate the water footprints and find out the strategy for water saving. Third, they were conscious of the factors influencing the water resources as well as personal health and adjusted behaviors of using water. This study shows the potential of issue-situation-based board game for the instruction of environmental issues and demonstrates the thinking and steps while

designing the board game.

Keywords: water resources, water usage habits, issue-situation-based board game, design model