國立交通大學

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碩 士 論 文

設計教育型適地性遊戲模型
以發展學習者對長年野生糧食作物全方位思考

Design of an Educational Location-based Game Prototype
Evolving Learners' Whole System Thinking Toward
Wild Perennial Crops

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摘　要

適地性遊戲發源於街頭遊戲文化，多以娛樂為目的，缺乏於偏鄉、離線環境進行及以教學為目標的遊戲設計。本研究設計一款利用 GPS 手機進行適地性遊戲之遊戲模型，讓玩家於離線環境下進行「長年野生糧食作物」打卡遊戲，同時也參與對抗地球暖化及生物多樣性保育行動。

研究者與「興地球」組織合作，以行動研究法協同設計與施作「興地球學院培訓課程」。以新竹縣尖石鄉泰雅族梅嘎瀑部落為遊戲設計與教學點。透過訪談耆老，找出部落傳統智慧與長年野生糧食作物之關聯性，進而設計教學課程與實作遊戲，並招募二十五位大專與企業志工擔任學習者。研究者透過參與觀察法，記錄並分析蒐集資料，最後進行研究問題之探討。

研究主要發現為「興地球學院培訓課程」以野化長年野生糧食作物、科技、飲食文化、教育四大主題建立學習者對長年野生糧食作物全方位思考。以遊戲融入教學為策略，並取材泰雅族傳統智慧，發展出七個實作遊戲，提高學習者之學習興趣與動機。以「開放街道地圖」作為遊戲地圖資料來源，建立以長年野生糧食作物為中心、泰雅觀點之地圖，最後讓學習者透過支持離線開放街道地圖之手機程式與全球定位系統功能，於偏鄉區域進行適地性遊戲之實驗。

研究結論分成三大部分：

1. 此系列課程融入遊戲對學習者之影響：(1)學習者可透過遊戲累積學習經驗，並據以具備信心分享他人；(2)學習者主動結合個人知識與專業於遊戲中提高玩興，並將遊戲中之學習應用於真實世界，產生反思與行動；(3)遊戲中，角色扮演與反轉角色扮演技巧融入、真實事件為基礎之故事背景，以及現實世界為遊戲場景，促進學習者對服務對象產生同理心；(4)小組協同合作與小組競爭，促進高成就學員分享知識予低成就學員，低成就學員則提高溝通與表達能力。
2. 適地性遊戲之發展潛力：(1)可發展跨領域學習，如數學與地理；(2)遊戲設計者除結合巧合元素外，意料外事件亦可帶給學習者擬真的遊戲經驗，使學習者與特定地點產生意義；(3)遊戲評量可結合量化與質化評量指標，以及綜合不同專業教師之評量觀點，並發展虛擬勳章系統作為獎勵，以更全面性地呈現學習者之表現。
3. 提出遊戲模型在界面設計、遊戲角色設定與獎勵系統之改進意見，並探討結合部落傳統智慧以及利用開放地圖計劃平台之適地性遊戲須考量開放部落傳統智慧之倫理問題，應積極邀請部落參與遊戲設計，部落並應具有決定資料開放層面之權力。

關鍵字: 適地性遊戲、手機、全球定位系統、體驗學習、長年野生糧食作物、全方位思考、開放街道地圖、原住民族傳統智慧、泰雅族

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Degree Program of E-Learning College of Science National Chiao Tung University

ABSTRACT

Location-based Game (LBG), which evolves from street game culture, was mainly designed for entertainment and implemented in rural areas and offline environment while LBG of pedagogic tradition was less developed. My research aims to design an educational LBG prototype to encourage players to do check-ins for Wild Perennial Crops (WPCs) in the offline environment while players could fight against climate change and participate in biodiversity conservation during gaming.

I have collaborated with Rewilding Earth (RE) to design and deploy Rewilding Earth Academy (REA) which is a teaching program with action research method. The field station for game design and teaching program is an Atayal Tribe, Mekarang. Program designers found the generic knowledge between indigenous knowledge and WPCs through local senior interviews and field learning from which to design teaching and gaming materials. RE recruited 25 learners from university and enterprise. During the program, I used participatory observation method to make records and collect data and further analyzed them in order to answer my research questions.

According to my research findings, REA used 4 approaches, WPCs, technology, food culture and education to build up learners' "Whole System Thinking" toward WPCs and developed 7 game episodes to engage and motivate learners and everyone of them obtains knowledge and wisdom from Atayal. OpenStreetMap (OSM) was adopted to develop a WPC centered and Atayal perspective map and the game prototype had been tested by players using GPS smart phones that support offline OSM to do check-ins for WPCs and explore around rural areas.

From data analysis and field observations, I drew my research conclusions into 3 points:

1. Impact of the integration of gaming in a series of teaching programs on the learners: 1) the learners gained learning experiences from playing and gained confidence for sharing, 2) the learners contributed personal knowledge during gaming and practiced knowledge learned from games to engage public issues in the real world, 3) the learners' empathy to targeted service group was fostered by role playing and virtual stories based on real events and scenes, 4) the learners' competence was improved through group collaboration and group competition.
2. Findings in LBG design: 1) it has potentials to foster multidisciplinary learning, such as Mathematics and Geography, 2) unplanned events enhance authentic playing experience, 3) evaluation that combines quantitative and qualitative dimensions, evaluators from different expertise and a virtual badge reward system could show learners' performance in a holistic way.
3. Make suggestions to the WPC game prototype and discuss LBG that involves indigenous knowledge and uses OSM as a participatory mapping platform should consider the ethical issues that indigenous people engagement in the game design is crucial and they should the authority to decide the scale and level of open data.

Keywords: Location-based Gaming, Mobile, GPS, Experiential learning, Wild Perennial Crops, Whole System Thinking, OpenStreetMap, Indigenous knowledge, Atayal

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E S A
1896

Table of Contents

Index of Tables


E S A
1896

Illustration Index


E S A
1896