國立政治大學圖書資訊與檔案學研究所

碩士論文

Master Thesis

National Chengchi of University

Graduate Institute of Library, Information and Archival

Studies

元宇宙數位策展於歷史學習成效之影響研究—以二戰在香

港台灣平民百姓被拘留之歷史為例

The Effects of Metaverse Digital Curation on History

Learning Effectiveness: A Case Study of the History of

Taiwan Civilians Cooped in Hong Kong in World War II

指導教授：陳志銘、藍適齊 博士

Adviser: Chih-Ming Chen & Shi-Chi Lan

研究生：翁榮秀

Author: Jung-Hsiu Weng

中華民國一一二年七月

July, 2023

摘要

　　元宇宙是一個融合實體和數位虛擬環境之虛實整合生態系統，具有類似人類實體生活世界之一切可能活動，為下一個世代的網際網路系統。本研究採用的「元宇宙數位策展平台」可以創建具有情境脈絡敘事的數位策展，且具有線上互動機制，可以營造共同觀展之合作學習模式，本研究將其應用於輔助歷史教學，讓學習者以第一人稱之身歷其境方式來進行歷史學習之探究，並探討相較於採用「合作閱讀標註系統」輔以歷史學習，此一學習模式是否有助於提升學習者的歷史學習成效、學習動機、學習滿意度，以及降低外在認知負荷，提升增生認知負荷。此外，也利用行為歷程分析方法，找出元宇宙數位策展有效的觀展行為模式。

　　本研究採用準實驗研究法，以桃園市某高中一年級一個班級共 33 名學生為研究對象，並將其中 17 個學生及 16 個學生分別隨機分派為使用「元宇宙數位策展平台」及「合作閱讀標註系統」輔以進行「二戰在香港台灣平民百姓被拘留」之歷史學習的實驗組與控制組，探討這兩種學習模式在學習成效、學習動機、認知負荷，以及學習滿意度上是否具有顯著的差異。此外，也進一步探討使用這兩種不同學習模式的不同先備知識與認知風格學習者，在學習成效、學習動機、認知負荷，以及學習滿意度上是否具有顯著的差異。也以半結構式訪談了解學習者使用這兩種不同學習模式輔以歷史學習的想法、感受與建議。最後，本研究採用滯後序列分析進一步探討實驗組學習者於元宇宙數位策展平台之有效觀展行為模式。

　　研究結果發現，在學習成效上，使用「元宇宙數位策展平台」的學習者在記憶和批判思考的學習成效上顯著優於使用「合作閱讀標註系統」的學習者，並能有效地促進學習者之整體、記憶、理解和批判思考面向的學習成效。此外，對於不同先備知識與認知風格的學習者而言，使用「元宇宙數位策展平台」能有效地促進高先備知識學習者在整體和記憶面向的學習成效，以及低先備知識學習者在

整體、記憶、理解和批判思考面向的學習成效；並且有效促進文字型學習者在整體、記憶和批判思考面向的學習成效，以及圖像型學習者在整體、記憶、理解和批判思考面向的學習成效。再則，使用「元宇宙數位策展平台」的整體、不同先備知識或是認知風格學習者的學習動機，皆顯著優於採用「合作閱讀標註系統」的整體、不同先備知識或是認知風格學習者。在認知負荷方面，使用「元宇宙數位策展平台」有助於低先備知識和圖像型學習者產生增生認知負荷。另外，在學習滿意度上，相較於使用「合作閱讀標註系統」輔以歷史學習的整體、不同先備知識或是認知風格學習者，使用「元宇宙數位策展平台」的整體、不同先備知識或是認知風格學習者皆具有較佳的學習滿意度。在觀展行為模式方面，高分組學習者會更仔細一一探索策展中所放置的展覽物件，並多次來回與反覆查看以加深學習印象，以獲得更好的學習表現。

最後基於研究結果，本研究提出元宇宙數位策展輔以歷史教學之實施與改善建議。在未來研究方向上，本研究建議加強「元宇宙數位策展平台」的遊戲和互動功能，並探討其對於學習成效的影響、先備的數位使用經驗對於學習者的學習成效、學習動機、認知負荷與學習滿意度的影響，以及教師在元宇宙數位策展中扮演的角色，並針對學習者在二戰在香港平民百姓被拘留之歷史測驗卷作答的內容進行質性的探討。

整體而言，元宇宙是一個尚在發展中的新概念，目前尚未完全的發展成熟，未來還有很大的發展空間。本研究之研究結果顯示使用「元宇宙數位策展平台」輔以歷史教學，有助於提升學習者的學習表現，對於促進元宇宙結合歷史科學習的教學應用具有貢獻。

關鍵詞：元宇宙、數位策展、數位科技輔助學習、高中歷史課程、認知風格、學習成效、行為模式、滯後序列分析、二戰拘留歷史、在香港的台灣平民百姓。

Abstract

The metaverse is an integrated ecosystem that combines physical and digital virtual environments, encompassing all possible activities similar to those in the physical world. It represents the next generation of internet systems. In this study, the "Metaverse Digital Curation Platform" was utilized to create digital curation with storytelling narratives that accompanies online interactive mechanisms with peers to foster a collaborative learning mode in exploring a contextual history exhibition, enabling learners to immerse themselves in a first-person perspective to explore historical events. A comparison was made between this learning mode and the use of a "collaborative reading annotation system" as an assisted tool to history learning. The study aimed to investigate whether this learning mode enhances learners' historical learning effectiveness, learning motivation, and satisfaction, reduces extraneous cognitive load and enhances germane cognitive load in comparison with "collaborative reading annotation system." Additionally, behavioral process analysis methods were employed to identify effective exhibition viewing behavior patterns when using the metaverse digital curation platform to support history learning.

This study employed a quasi-experimental research design and selected a class of 33 students from a first-grade high school in Taoyuan City, Taiwan as the research participants. Among them, 17 students were randomly assigned to the experimental group using the "Metaverse Digital Curation Platform," while the remaining 16 students were assigned to the control group using the "Collaborative Reading Annotation System" to support history learning. The study aimed to investigate whether there were significant differences between these two learning modes in terms of learning effectiveness, learning motivation, cognitive load, and satisfaction in the

context of learning about "History of Taiwan Civilians Cooped in Hong Kong in World War II." Furthermore, the study explored whether there were significant differences in learning effectiveness, learning motivation, cognitive load, and satisfaction based on different prior knowledge and cognitive styles of learners using these two different learning modes. Additionally, this research adopts semi-structured interviews to understand learners' thoughts, experiences, and suggestions regarding the use of these two learning modes for history learning. Finally, the study utilized Lag Sequential Analysis to further explore effective exhibition viewing behavior patterns of the learners in the experimental group when using the Metaverse Digital Curation Platform to support history learning.

In terms of learning effectiveness, the research found that learners using the "Metaverse Digital Curation Platform" outperformed those using the "Collaborative Reading Annotation System" in memory and critical thinking aspects. Moreover, the "Metaverse Digital Curation Platform" effectively facilitated learners' overall learning effectiveness and learning effectiveness in their memory, understanding, and critical thinking aspects. Furthermore, for learners with different prior knowledge and cognitive styles, using the "Metaverse Digital Curation Platform" effectively enhanced the overall and memory aspects of learning effectiveness for high prior knowledge learners, as well as the overall, memory, understanding, and critical thinking aspects for low prior knowledge learners. Additionally, it promoted the overall, memory, and critical thinking aspects of learning learning effectiveness for verbal-oriented learners, as well as the overall, memory, understanding, and critical thinking aspects for visual oriented learners. Regarding learning motivation, learners using the "Metaverse Digital Curation Platform," regardless of their prior knowledge or cognitive styles, exhibited

7

significantly higher motivation levels than those using the "Collaborative Reading Annotation System." In terms of cognitive load, the use of the "Metaverse Digital Curation Platform" facilitated the generation of germane cognitive load for low prior knowledge and visual-oriented learners. For learning satisfaction, the overall, prior knowledge, and cognitive style learners using the "Metaverse Digital Curation Platform" reported higher satisfaction levels than those using the "Collaborative Reading Annotation System." In terms of exhibition viewing behavior patterns, high-scoring learners had a more thorough exploration of the digital curation, engaging in multiple revisits and repeated viewings to deepen their learning impressions, thereby achieving better learning effectiveness.

Overall, the metaverse is a developing concept that has not yet reached its full maturity, thus still leaving large room for future improvement. The results of this study shows that using the "Metaverse Digital Curation Platform" as a tool for history education contributes to enhancing learners' learning effectiveness and has the potential to facilitate the integration of the metaverse into historical learning. This research provides valuable insights into the application of the metaverse in educational contexts and its potential contribution to the field of history education.

Keywords: Metaverse, Digital Curation, Digital Technology-Assisted Learning, High School History Curriculum, Cognitive Style, Learning Effectiveness, Behavior Patterns, Lag Sequence Analysis, World War II Internment History, Taiwanese Civilians In Hong Kong.