How ARpedia supports early readers?

Informal and incidental literacy development through AR design principles in early readers

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ARpedia 如何有效運用 AR 虛實互動書籍
提高兒童的閱讀動機和參與度



圖/孩子們使用ARpedia閱讀

自2023年5月至2024年2月，哥倫比亞大學教授與研究人員進行了一項研究，**該研究發現使用AR虛實互動書籍可以提高兒童的閱讀動機和參與度**。



在該項研究中，使用了一系列具有AR功能的非小說類書籍。AR應用程式以多種型態將紙本書籍的內容數位化，同步動畫、影片、圖像和聲音呈現。

圖/取自ARpedia校園體驗拍攝

AR教材 VS 紙本書

AR的內容章節以前後連貫的方式建立在紙本書上，為參與和理解書籍內容的讀者提供額外的知識學習。

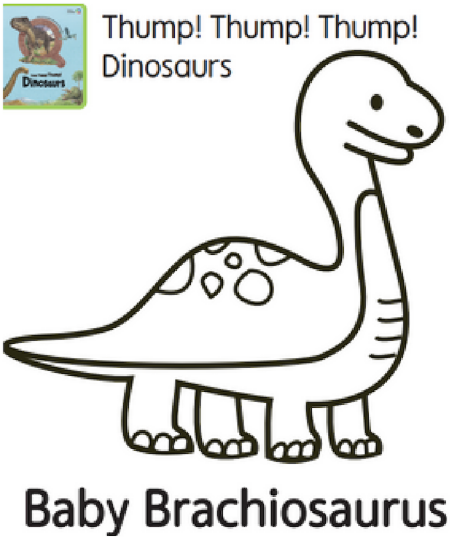
教學以故事形式帶領讀者進行互動或探索內容，讓每次互動都串聯起來。讀者可獲得各種互動機會，從遊戲式互動、協作（例如，餵養動物）、讀者所製作的素材（例如，著色、錄音、個人大頭照）到AR呈現。



圖/將著色圖卡在平板上轉換成AR動畫



圖/ARpedia互動圖卡



圖/ARpedia著色圖卡

何謂讀寫能力？

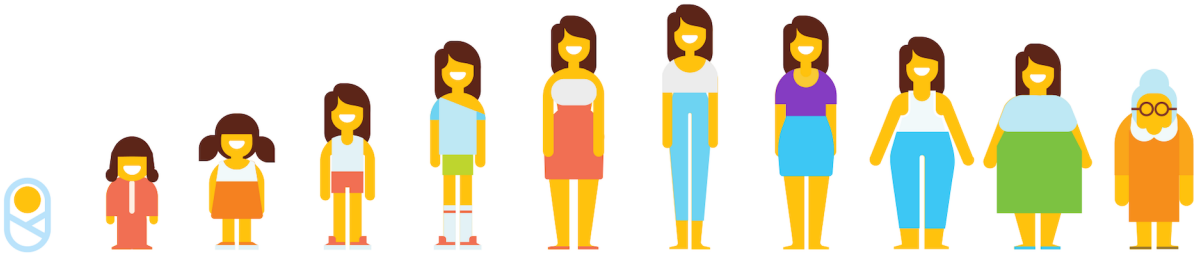
從幼兒時期開始，讀寫能力的發展貫穿一生
其中又莫過於小學時期至關重要，並且會顯著
影響高中之前的整體學業成績。

傳統的讀寫能力

在單一文化背景下以單一語言在紙上讀寫的能力。

多元的讀寫能力

透過多方面的結合，其中包括不同的語言、文化。其中不僅包含文本，還包含圖像、顏色、聲音和影片等各種多媒體格式。例如：媒體素養、科技素養





圖/讀寫能力示意圖



圖/讀寫能力示意圖

此研究中，讀寫行為分為讀者參與和分析多元內容的能力與動機。讀寫的技能包括流暢性、文字詞彙、語意理解，是超越傳統的閱讀和寫作，涵蓋多種模式的型態和互動，而讀寫能力的行為標準也包含閱讀動機和參與度。

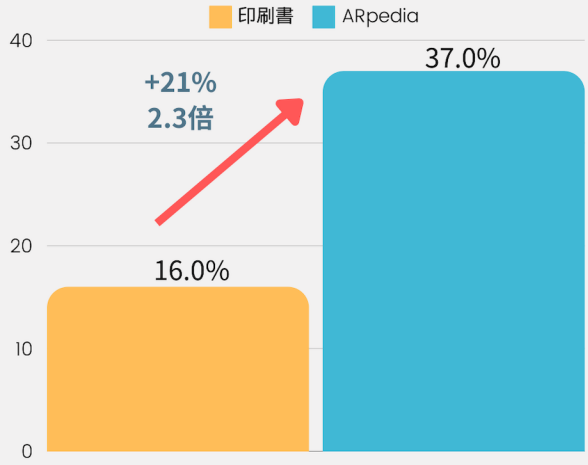
透過 AR 體驗提高學習效率

1. ARpedia - 使用注意力引導的設計範例：



圖/ARpedia中使用互動圖卡與AR互動

▶使用AR動畫引導使用者的注意力。
▶透過平板與恐龍互動圖卡作視覺呈現。



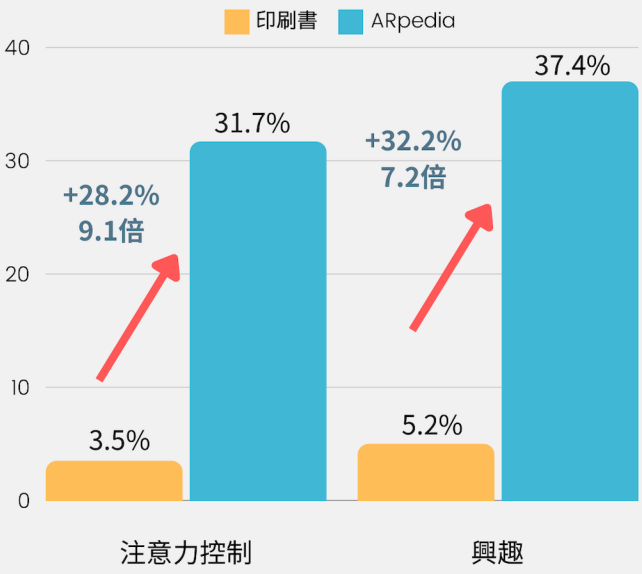
▶將注意力引導設計融入ARpedia
- 觀察到兒童閱讀紙本書的注意力時間提升21%，即 2.3 倍。

2. ARpedia - 使用適合年齡的互動設計範例：



圖/ARpedia中使用互動設計圖卡展示

▶運用著色圖卡與書籍掃描。
▶透過AR互動的過程與目標年齡的認知與技能，兩者結合來實現適合的互動。



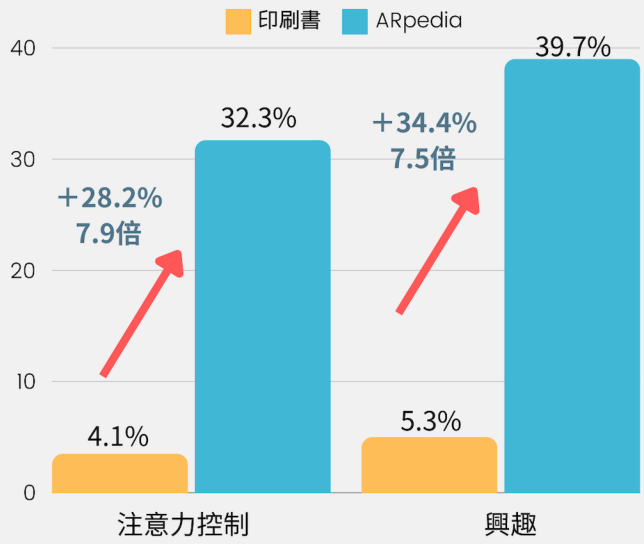
▶適合年齡層的互動設計被整合到ARpedia
- 孩子注意力增加了28.2%，9.1倍。
- 興趣行為增加了32.2%，7.2倍。

透過 AR 體驗提高學習效率

3. ARpedia 中使用的敘事學習設計範例：



圖/ARpedia中使用故事情節融入書本內容

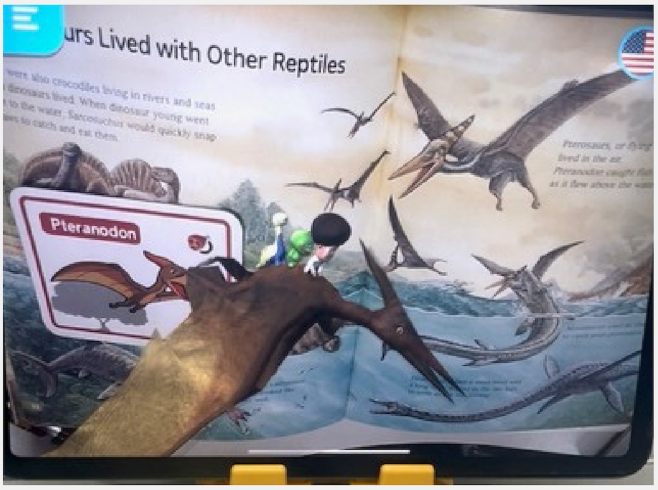


▶ 將實際例子結合到不同故事情節中，當情境學習設計融入ARpedia後，利用書中角色在世界各地冒險，將教育內容與創意敘述連結起來。

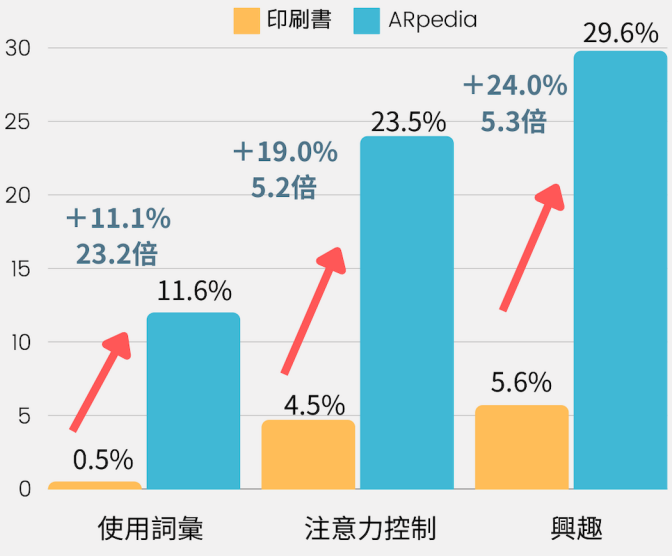
▶ 當情境學習設計融入ARpedia

- 注意力控制觀察增加28.2%，等於7.9倍。
- 興趣行為增加34.4%，等於 7.5倍。

4. ARpedia中使用的虛擬與現實融合設計範例：



圖/ARpedia中使用AR虛擬實境呈現



▶ 使用AR翼龍進行敘述，同時加入有關真實恐龍相關飛行能力的舉例，呈現了虛擬與現實的平衡， 將生物學中的訊息與恐龍冒險的幻想融為一體。

▶ 當ARpedia虛實互動時

- 詞彙參與度增加11.1%，23.2 倍。
- 注意力控制增加19%，5.2 倍。
- 興趣行為增加24%，5.3 倍。

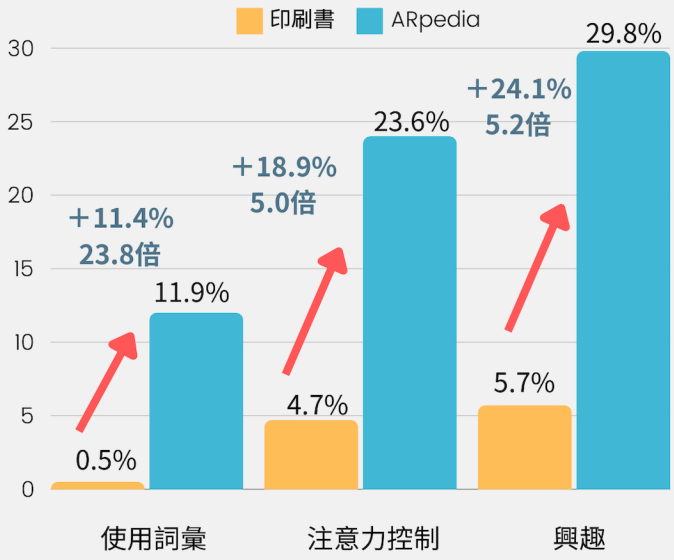
透過 AR 體驗提高學習效率

5. ARpedia中利用角色模擬人物反應的範例：



圖/ARpedia中使用AR虛擬實境呈現

▶ 恐龍以模擬人類溝通的方式討論它們的特徵，並同時傳達準確的科學訊息。



▶ 當ARpedia利用角色模擬人物反應時

- 詞彙參與度增加11.4%，23.8 倍。
- 注意力控制增加18.9%，5.0 倍。
- 興趣行為增加24.1%，5.2 倍。

研究結果



圖/孩子們在使用ARpedia

研究結果顯示：ARpedia的AR虛實互動系列書籍可以有效提升兒童的閱讀動機和參與度。關於兒童對 AR 虛實互動書籍的參與度和動機，研究人員詢問兒童是否願意閱讀 AR 書籍或繼續閱讀純印刷書籍，大多數兒童希望閱讀AR虛實互動的書籍，而不是純印刷書籍。

紙本書

缺點

- 集中注意力時間短
- 容易感到無聊
- 書籍內容乏味

優點

- 促使大腦思考
- 會用到觸覺感官
- 方便閱讀

電子書

優點

- 多感官共同運作
- 集中注意力時間長
- 部分內容具象

缺點

- 一直注視螢幕
- 容易3C成癮
- 長時間閱讀影響視力

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