

生成式**AI**在教育應用的研究設計與論文寫作策略-以學校及職場培訓為例



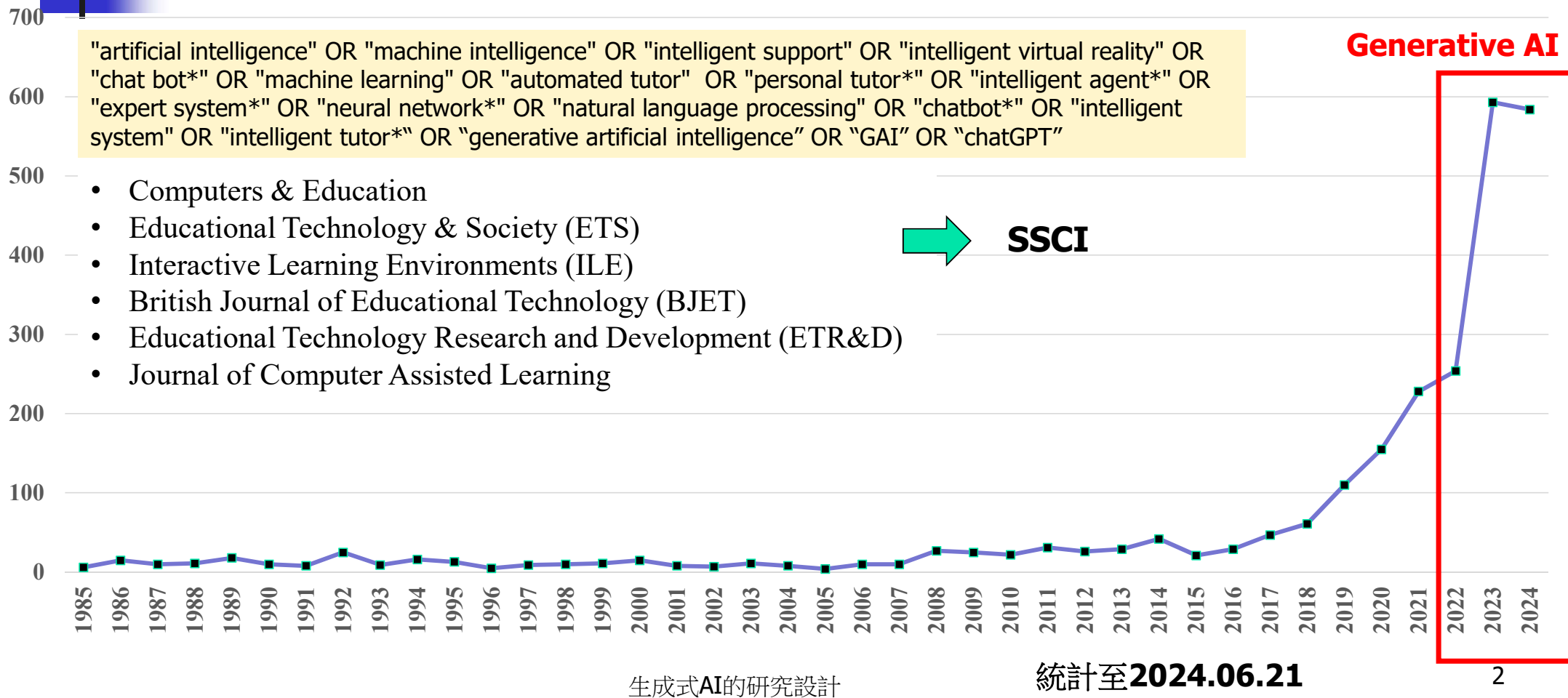
臺中教育大學 教育資訊與測驗統計研究所

臺灣科技大學 數位學習與教育所

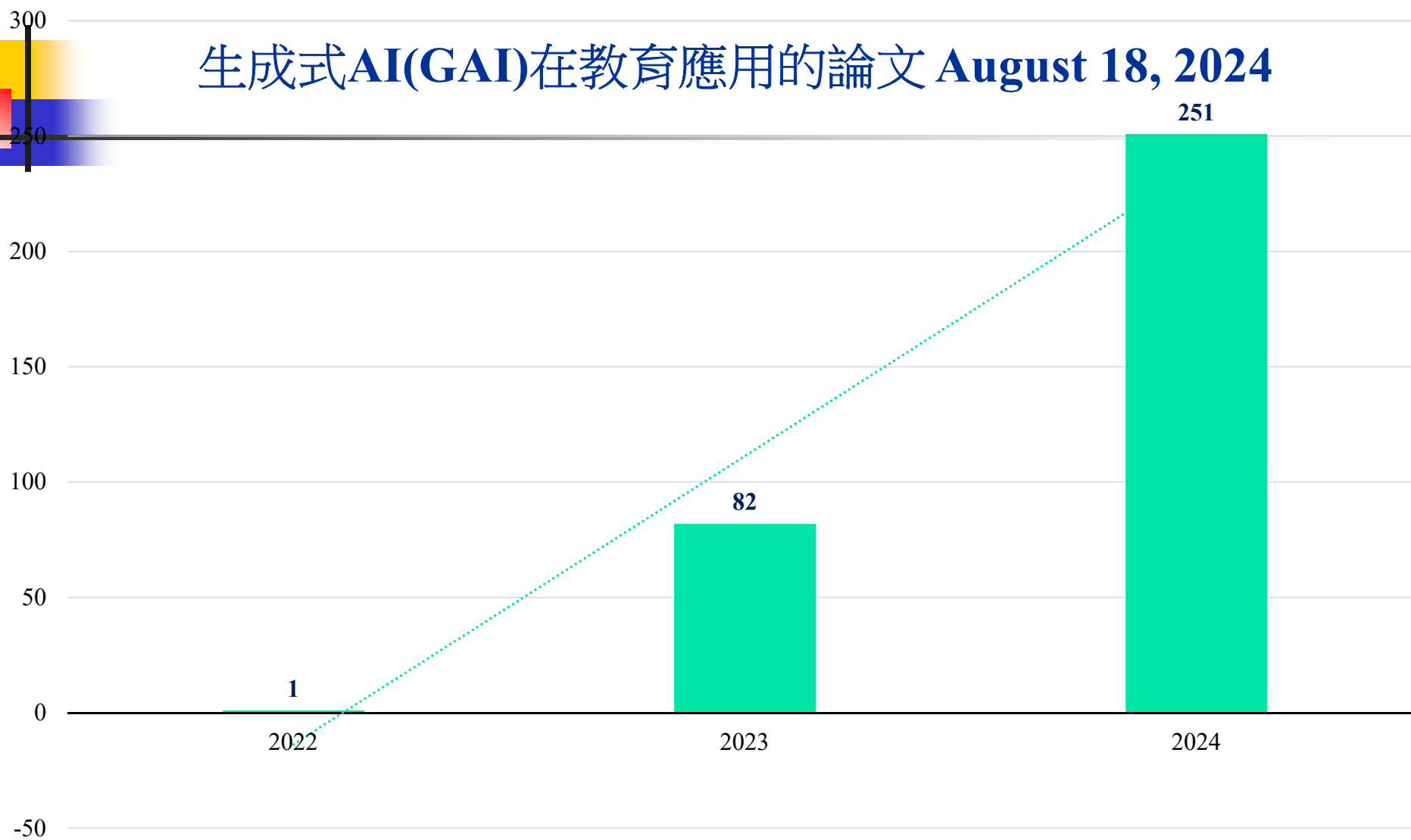
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AIED in six well-recognized SSCI journals of educational technology (June 20, 2024)



生成式AI(GAI)在教育應用的論文 August 18, 2024





在SSCI journals發表的論文類型

- Review papers: 太多
- Investigation of learners' or instructors' perceptions or acceptance of AI in educational settings: 太多
- Position papers: 不要隨便寫
- Experimental studies: 比例不高，具有相對潛力

跨出第一步：瞭解生成式AI的特性

- ➡ 生成式AI(Generative AI)是一項快速發展中的人工智慧技術
 - ➡ 藉由提供大量數據給機器學習模型，從中提取高層次的抽象特徵
 - ➡ 根據特徵生成如文案、圖片、音訊等作品
- ➡ 生成式 AI 適合運用於创造性的工作
 - ➡ 讓電腦能夠模仿人類的創造力，產生出新的、原創的、有意義的內容。
- ➡ 生成式 AI的優勢
 - ➡ 大幅提升學習和工作效率
 - ➡ 提供更高品質的教學研究內容
 - ➡ 為生活帶來便利
- ➡ 生成式AI的限制
 - ➡ 使用者依然必須針對正確性作嚴謹的把關確認





生成式AI的應用與工具

→ 文本生成

- 根據給定的輸入生成新的文字內容，如文章、對話或故事等。例如：ChatGPT

→ 圖像生成

- 創建逼真的圖像，可應用於人臉合成、風景生成等。例如：MidJourney

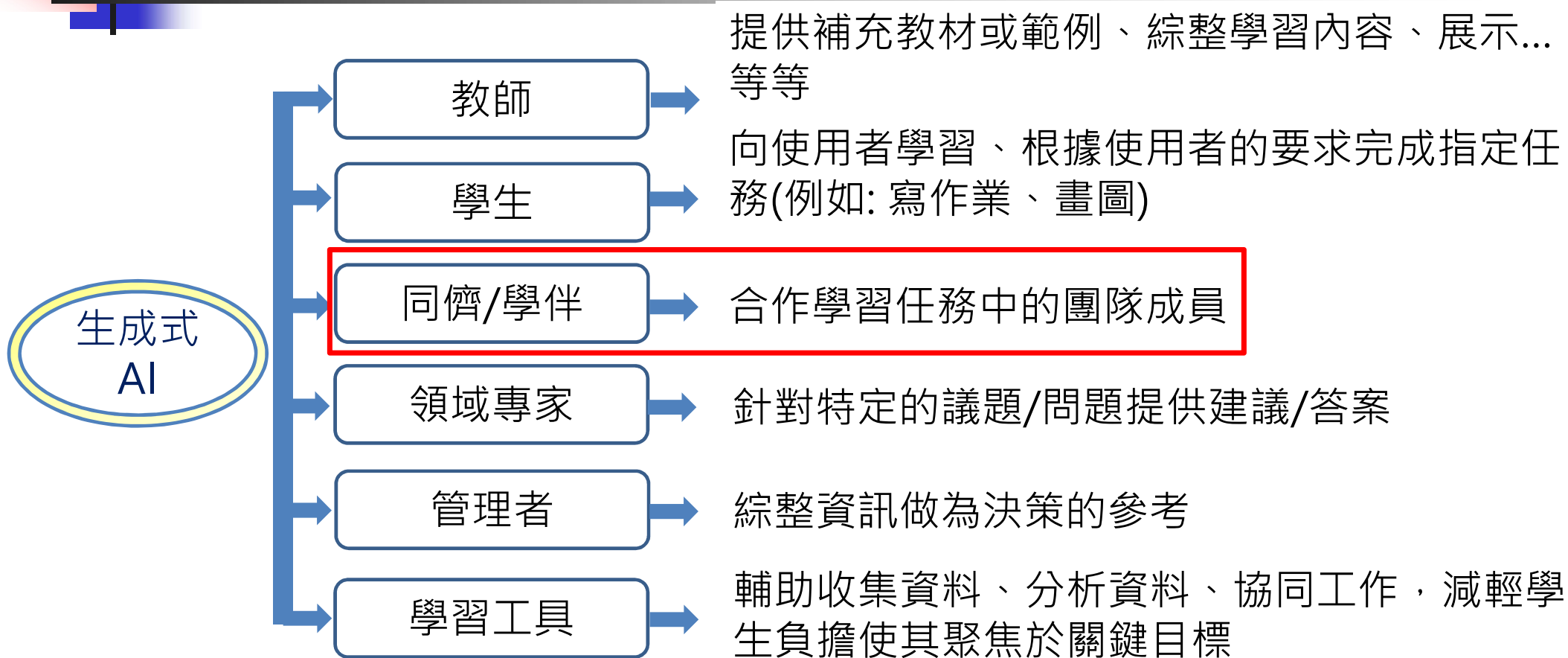
→ 影片生成

- 創建、編輯或合成視頻和影片，包括特效、合成以及場景生成。例如：剪映、DID、Synthesia

→ 音樂生成

- 創建新的音樂作品，產生旋律、和聲甚至整個樂曲。例如：Tuneflow

生成式AI在教育扮演的角色





何謂 ChatGPT?

- ChatGPT 是由OpenAI 開發的聊天機器人
 - 使用Large Language Models (LLMs)的 **Generative Pre-trained Transformer** (GPT) 系列技術.
- LLMs 是一種處理大量資料的deep-learning-based AI model.
- ChatGPT 不只是一個搜尋引擎 (ChatGPT vs Google)
 - 它可以協助解決問題，或是完成指定的任務
 - 只要用戶能夠提出正確的指令或要求 (requests or prompts)



ChatGPT vs Search Engine

	Search Engine	ChatGPT
輸入	關鍵詞(Keyword)	提示語(Prompt)
方法	搜尋	生成
輸出	包含關鍵詞的網頁	根據提示語生成的資料
優化	<u>搜尋技巧</u>	<u>提示語工程</u> (Prompt Engineering)
特點	1. 要會下關鍵詞 2. 自行過濾、整理內容 3. 正確性較高	1. 可用自然語言表達意圖 2. 自動過濾、整理內容 3. 可能生成虛構的資訊

ChatGPT vs Search Engine

Search Engine: 花蓮 親子民宿 推薦



花蓮 親子民宿 推薦



地圖

圖片

購物

影片

新聞

書籍

航班

財經

搜尋結果 · 中山路 711 號花蓮棧親子民宿 溜滑梯民宿 · 選擇地區

花蓮福康飯店

- 花蓮親子飯店#1 花蓮福康飯店
- 花蓮親子住宿#2 花蓮理想大地渡假飯店
- 花蓮親子飯店推薦#3 瑞穗天合國際觀光酒店
- 花蓮親子飯店推薦#4 蝴蝶谷溫泉度假村
- 花蓮親子住宿推薦#5 太魯閣山月村
- 花蓮飯店推薦#6 綠舍民宿

2023年12月9日



United Daily News

<https://woman.udn.com> > udn 女子漾 > 美食旅遊

【花蓮親子飯店攻略】探索六間親子友善飯店，打造家庭共樂時光

🔍 花蓮 親子民宿 推薦

🔍 花蓮親子民宿溜滑梯

🔍 花蓮溜滑梯民宿推薦

🔍 花蓮親子民宿villa

🔍 花蓮親子民宿包棟

🔍 花蓮親子飯店第一名

🔍 花蓮親子民宿電動車

🔍 花蓮親子飯店ptt

🔍 花蓮親子民宿ptt

🔍 花蓮親子飯店推薦

🔍 花蓮海景親子民宿

ChatGPT vs Search Engine

ChatGPT：請推薦花蓮適合親子住宿的民宿 (自然語言描述)



您

請推薦花蓮適合親子住宿的民宿



ChatGPT

在花蓮，有幾家適合親子住宿的民宿推薦給您：

1. Hanada Grass Get 241 Bed and Breakfast：一個以《綠野仙蹤》為主題的民宿，提供免費早餐和接送服務，適合有小孩的家庭。
2. Levee Side House：這家民宿擁有自己的兒童冒險遊樂場，位於美崙河畔，提供免費早餐，並有自家餐廳。
3. Sha Hai B&B：這家民宿有個室外游泳池和室內滑梯，並提供免費的火車站接送服務。
4. Teddy and Friends Homestay：這裡有以卡通角色為主題的房間，每天提供美味早餐和當地水果，對於帶小孩的家庭來說非常方便。

這些民宿都非常注重為家庭提供舒適和便利的環境，使家長和孩子們都能享受愉快的假期 [👉]。



生成式AI的研究設計



“Programming Prompts”的概念

- 使用 generative AI 都是要透過一組 “prompts” 或 “instructions” 來引導它為你完成工作
- “prompt” 通常是一些使用自然語言的句子或描述
- 描述的內容越清楚，越能夠獲得想要的結果

GJ

請幫忙校稿以下的學術論文內容。



當然，我很樂意幫助您校稿學術論文。請將您的論文內容複製並粘貼在下方，我將盡力提供幫助。



GJ

1.介紹 Introduction

英語為國際語言之一。對英語非母語的學習者而言,他們需要投入更多的時間學習英語。外語學習可以根據聽、讀、寫、說四種語言技能進行。在這些技能中,大多數英語作為外語 (EFL) 學習者都認為提高口語能力是一項艱鉅的任務 (Gan, 2013)。然而,但是對於英語非母語的國家來說,如何練習英語口說成為一大挑戰。

傳統的教學方式通常是經由教師引導、或是由學生互相練習,再由教師給予回饋。但是,在學生程度不同的狀況下,如何針對學生個人口說內容的正確性,給予更精準回饋與建議,成為重要的教學目標。

人工智慧的發展可助解決問題。例如:人工智慧的語音辨識系統能夠分析人類口說的內容及發音,並即時地給予回饋與建議。研究顯示:學習者可能會對公開演講或以外語回答問題感到焦慮 (Doddington et al., 2017)。因此減少學習焦慮被認為

↻ Regenerate response

⏏ Continue generating

生成式AI的研究設計



校稿如下：



1. Introduction

English is one of the international languages. For non-native English learners, they need to invest more time in learning English. Foreign language learning can be categorized into four language skills: listening, reading, writing, and speaking. Among these skills, most English as a foreign language (EFL) learners consider improving their speaking ability as a challenging task (Gan, 2013). However, practicing spoken English becomes a major challenge for non-native English-speaking countries.

Traditional teaching methods usually involve teacher-guided instruction or student-to-student practice, followed by feedback from the teacher. However, in situations where students have different proficiency levels, providing more accurate feedback and suggestions on the correctness of individual students' spoken content becomes an important teaching goal.

The development of artificial intelligence (AI) can help address this issue. For example, AI speech recognition systems can provide real-time feedback on pronunciation and grammar. However, the development of AI systems requires a lot of data and resources, and the results of AI systems need to be verified and corrected by humans and



Regenerate response



Continue generating



1. 介紹



英語是其中一種國際語言。對於非英語為母語的學習者而言，他們需要花更多時間學習英語。外語學習可分為聽、讀、寫、說四種語言技能。在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項艱鉅的任務（Gan，2013）。然而，對於非英語為母語的國家來說，如何練習英語口說成為一大挑戰。

傳統的教學方式通常是由教師引導，或者學生之間進行互相練習，再由教師提供回饋。然而，在學生程度不同的情況下，如何針對學生個人口說內容的正確性，給予更精準的回饋與建議，成為重要的教學目標。

人工智慧的發展可以幫助解決這個問題。例如，人工智慧的語音辨識系統能夠分析人類口說的內容和發音，並即時地給予回饋與建議。研究顯示學習者可能會對公開演講或以外語回答問題感到焦慮（Bodnar et al.，2017），因此減少學習焦慮被認為是提高學生英語口語能力的關鍵因素（Liu & Jacks，2019）。對話的學習模式，個人與機器人互動的自我效能和學習動機研究（Robinson et al.，2020）。

🔄 Regenerate response

⏩ Continue generating

生成式AI的研究設計

GJ

請提供一個修改對照表；只需要列出修改的內容。



當然，這是一個修改對照表，顯示了我們在原始文本中進行的修改。



原始文本：英語是其中一種國際語言。

修改後：英語是一種國際語言。

原始文本：對於非英語為母語的學習者而言，他們需要花更多時間學習英語。

修改後：對於非英語為母語的學習者而言，他們需要花費更多時間學習英語。

原始文本：外語學習可分為聽、讀、寫、說四種語言技能。

修改後：外語學習可分為聽、讀、寫、和說四種語言技能。

原始文本：在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項艱鉅的任務（Gan，2013）。

修改後：在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項艱難的任務（Gan，2013）。



請使用表格來呈現這些修改對照。



當然，這裡是修改對照表，以表格形式呈現了我們對原始文本所進行的修改：



原始文本	修改後文本
英語是其中一種國際語言。	英語是一種國際語言。
對於非英語為母語的學習者而言，他們需要花更多時間學習英語。	對於非英語為母語的學習者而言，他們需要花費更多時間學習英語。
外語學習可分為聽、讀、寫、說四種語言技能。	外語學習可分為聽、讀、寫、和說四種語言技能。
在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項艱鉅的任務（Gan，2013）。	在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項艱難的任務（Gan，2013）。
然而，對於非英語為母語的國家來說，如何練習英語口說成為一大挑戰。	然而，對於非英語為母語的國家來說，如何練習英語口說成為一個大挑戰。
傳統的教學方式通常是由教師引導，或者學生之間進行互相練習，再由教師提供回饋。	傳統的教學方式通常是由教師引導，或者學生由教師提供回饋。

↻ Regenerate response

» Continue generating

生成式AI的研究設計

回到上一個結果，請加入一個說明欄位，說明做了什麼修改的動作。



非常抱歉，這裡是修改對照表，包括修改前後的用詞以及說明修改的動作：



原始文本	修改後文本	說明
英語是其中一種國際語言。	英語是一種國際語言。	修改了用詞。
對於非英語為母語的學習者而言，他們需要花更多時間學習英語。	對於非英語為母語的學習者而言，他們需要花費更多時間學習英語。	修改了用詞。
外語學習可分為聽、讀、寫、說四種語言技能。	外語學習可分為聽、讀、寫、和說四種語言技能。	修改了用詞。
在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項艱鉅的任務（Gan，2013）。	在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項艱難的任務（Gan，2013）。	修改了用詞。
然而，對於非英語為母語的國家來說，如何練習英語口說成為一大挑戰。	然而，對於非英語為母語的國家來說，如何練習英語口說成為一個大挑戰。	修改了用詞。
傳統的教學方式通常是中教師引導，或學生之間進行互相練習，再	傳統的教學方式通常由中教師引導，或由教師	修改了用詞。

↺ Regenerate response

▶▶ Continue generating



只需要呈現修改前後的詞或字；同時，說明欄要更詳細，例如刪除了什麼字、增加了什麼字，或是用什麼字取代了什麼字。



非常抱歉之前的回答不符合您的需求。這裡是修改對照表，僅呈現修改前後的詞或字，並提供更詳細的說明：



原始文本	修改後文本	說明
英語是其中一種國際語言。	英語是一國際語言。	刪除「種」字。
對於非英語為母語的學習者而言，他們需要花更多時間學習英語。	對於非英語為母語的學習者而言，他們需要 投入 更多時間學習英語。	增加「投入」字。
外語學習可分為聽、讀、寫、說四種語言技能。	外語學習可分為聽、讀、寫、 說 四種語言技能。	增加「說」字。
在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項艱鉅的任務（Gan，2013）。	在這些技能中，大部分的英語作為外語（EFL）學習者認為提升口語能力是一項 艱巨 的任務（Gan，2013）。	將「艱鉅」改為「艱巨」。
然而，對於非英語為母語的國家來說，如何練習英語口說成為	然而，對於非英語為母語的國家來說， 練習	增加「一個」字。

Regenerate response Continue generating

SA 什麼是"生成式AI模型"?



生成式AI模型是一種人工智能模型，它使用深度學習技術來生成具有一定結構和內容的新資料。這種模型能夠從訓練數據中學習潛在的模式和規律，並用這些知識來創建新的、與訓練數據相似的內容。

生成式AI模型的其中一種廣泛應用是語言生成，如對話系統或自動文本生成。這些模型可以通過分析大量的文本資料，學習語言的結構和語義，並生成新的文本，如回答問題、寫作、翻譯等。

生成式AI模型的核心是遞歸神經網絡（RNN）或變種，如長短期記憶（LSTM）或閘控循環單元（GRU）。這些模型具有記憶單元，可以捕捉上下文的依賴關係和長期依賴。它們可以生成連續的序列資料，如文本、音頻和影片等。

生成式AI模型具有創造性，能夠生成獨特且具有多樣性的內容。然而，這些模型也可能產生不正確或不合理的資料，因為它們僅僅是通過模式匹配和統計學習來生成內容，而無法理解內容的真正含義。

儘管生成式AI模型在許多領域有廣泛應用，但其潛在風險包括假新聞、語言模仿和個人信息的濫用。因此，在使用這些模型時，需要謹慎並進行適當的監督和調控。

SA 請你把我當成5歲小朋友,並用簡單的話跟我說明什麼是"生成式AI模型"?

SA 請你把我當成國中的學生,並用簡單的話跟我說明什麼是"生成式AI模型"?

SA 請你把我當成高中的學生,並用簡單的話跟我說明什麼是"生成式AI模型"?

SA 請你把我當成大學的學生,並用簡單的話跟我說明什麼是"生成式AI模型"?



嗨！好的，現在我會用更貼近大學生活的方式來解釋生成式AI模型給你。



生成式AI模型就像是一個非常智慧的電腦程式，它可以透過學習龐大的資料集，並利用這些資料來產生全新的內容。這個模型可以學習資料中的模式、特徵和相關性，然後根據這些學習來創造出全新的東西。

想像一下，你給這個AI模型一段英文文章，它可以透過閱讀和分析這段文章，學習到其中的語法、詞彙和句子結構。然後，當你給它一個句子或一個主題，它可以利用自己的理解和創造力，生成出一個和原本文章風格相似的新句子或新段落。這樣的AI模型可以幫助你在寫作、翻譯和創作上更加出色。

生成式AI模型在許多領域都有廣泛的應用。例如，在科學研究中，它可以協助分析和解讀龐大的數據集，從中發現新的規律和結果；在藝術創作方面，它可以生成音樂、繪畫和影片，豐富藝術創作的可能性；甚至在自然語言處理和對話系統中，它可以模擬人類對話，提供智能的回應和建議。

請將上面的內容整理成表格,欄位包含"不同角色","什麼是"生成式AI模型"

SA

請將上面的內容整,整理成表格,欄位包含"不同角色","什麼是"生成式AI模型"



以下是將上述內容整理成表格的格式：



不同角色	生成式AI模型是什麼？
5歲小朋友	生成式AI模型就像是一個聰明的電腦朋友，可以幫你創造各種有趣的事物，像是故事和圖畫。他還可以回答問題，提供新奇的知識。
國中的學生	生成式AI模型是一個超級智能的電腦助手，可以幫助你完成各種任務和創造內容。他能回答問題、提供資訊、做計算，讓學習和創作更加方便和有趣。
高中的學生	生成式AI模型是一個強大的程式，通過學習資料和模式生成新的內容，如文章、故事、音樂、圖像。它是智能的創作助手，拓寬思維，提供新的創意和觀點。
大學的學生	生成式AI模型是一種強大的人工智能技術，通過學習資料和模式生成新的內容。它是智能的合作者，提供專業知識和創意支持，幫助研究和創新。

修正到我們滿意為止

- 我覺得你引言寫的不夠好,可以在這裡使用活潑的寫法,並多加解釋,請重寫
- 專業術語的部份可以多加解釋
- 文筆再更生動,有趣一點
- 不要寫到這個字「我」
-

- Rephrase (重寫)
- Lengthen (延伸)
- Shorten (精簡)
- Explain (解釋)
- Pull out keywords (摘錄關鍵字)

繼續根據回應追問

這樣可以繼續深入討論，也可以發現更多的相關知識和信息。

針對ChatGPT的回答，進一步延伸/探討、提出挑戰、詢問理由、要求解釋、提供實例，也可以對回答進行修正或進行更廣泛的聯以更深入的討論問題，提高聊天的質量，也可以根據需要調整和完善ChatGPT的回答。

從簡單的問題開始

清晰的讓ChatGPT理解你的需求。

具體描述你的Prompt的背景和環境，以及你希望解決的具體問題，儘量從簡單的問題開始

進一步釐清問題

包含進一步詳細厘清/闡述你的問題，包括問題的各個方面和你期望的解決方案。

一定要查證資訊



以下是作文的評分標準, 幫我整理成表格

級分 評分規準

六級分 六級分的文章是優秀的，這種文章明顯具有下列特徵：

立意取材 能依據題目或寫作任務，適切地統整、運用材料，並能進一步闡述說明以凸顯主旨。

結構組織 文章結構完整，脈絡分明，內容前後連貫。

遣詞造句 能精確使用語詞，並有效運用各種句型使文句流暢。

錯別字、格式與標點符號 幾乎沒有錯別字，及格式、標點符號運用上的錯誤。

五級分 五級分的文章在一般水準之上，這種文章明顯具有下列特徵：

立意取材 能依據題目或寫作任務，適當地統整、運用材料，並能闡述說明主旨。

結構組織 文章結構完整，但偶有轉折不流暢之處。

遣詞造句 能正確使用語詞，並運用各種句型使文句通順。

錯別字、格式與標點符號 少有錯別字，及格式、標點符號運用上的錯誤，但並不影響文意的表達。



以下是您要求的評分標準表格：

級分	立意取材	結構組織	遣詞造句	錯別字、格式與標點符號
六級分	能依據題目或寫作任務，適切地統整、運用材料，並能進一步闡述說明以凸顯主旨。	文章結構完整，脈絡分明，內容前後連貫。	能精確使用語詞，並有效運用各種句型使文句流暢。	幾乎沒有錯別字，及格式、標點符號運用上的錯誤。
五級分	能依據題目或寫作任務，適當地統整、運用材料，並能闡述說明主旨。	文章結構完整，但偶有轉折不流暢之處。	能正確使用語詞，並運用各種句型使文句通順。	少有錯別字，及格式、標點符號運用上的錯誤，但並不影響文意的表達。
四級分	能依據題目或寫作任務，統整、運用材料，尚能闡述說明主旨。	文章結構大致完整，但偶有不連貫、轉折不清之處。	能正確使用語詞，文意表達尚稱清楚，但有時會出現冗詞贅句；句型較無變化。	有一些錯別字，及格式、標點符號運用上的錯誤，但不至於造成理解上太大的困難。
三級分	嘗試依據題目或寫作任務，統整、運用材料，但不甚適當，或發展不夠充分。	文章結構鬆散；或前後不連貫。	用字遣詞不太恰當，或出現錯誤；或冗詞贅句過多。	有一些錯別字，及格式、標點符號運用上的錯誤，以致造成理解上的困難。

生成式AI的研究設計



Anonymous

謝謝你。

請分析學生的文章，給予 " 級分 " 的等級評價（零級分～六級分）。並請依據 " 立意取材 "、" 結構組織 "、" 遣詞造句 " 和 " 錯別字、格式、標點 " 這四個面向給予評價，以及要說明原因。

" 主題；好市多三度驗出致癌物 消基會:賠償金不得低於2萬元
食藥署7日公布好市多販售的「油漬摩佐羅拉乾酪」，驗出含有一級致癌物「環氧乙烷」。消基會今天發出新聞稿指出，好市多除回收致癌乾酪，更應提出合理賠償外，且應迅速建立大型品管檢驗室，為銷售食品嚴格把關。消基會也再度重申，將與消費者站在一起，在好市多公司未能對消費者提出合理賠償的情況下，再度為消費者提起團體訴訟。消基會指出，本次好市多乾酪被驗出含有致癌物質，較之前冷凍藍莓、草莓事件，對於消費者身體健康安全的危害更甚，消基會認為好市多公司對已食入該食品之消費者，應負損害的賠償金額，加上懲罰性賠償金不得低於新台幣2萬元。食藥署7日公布好市多販售的「油漬摩佐羅拉乾酪」，驗出含有一級致癌物「環氧乙烷」，致癌乾酪目前有757.2公斤流入市面。好市多目前已下架問題產品，並啟動自願性召回，通知1300名會員辦理退貨。高雄市衛生局將依食安法開罰6萬以上、2億元以下罰鍰。好市多9日表示，凡於2023年5月24日至7月1日購買此商品「Formaggio 油漬摩佐羅拉乾酪（油漬乾酪）」的會員，可憑購買記錄和會員卡辦理退貨作業；若會員尚留有商品也可一併帶至賣場辦理，統計共有1300名會員購買這項受影響商品。針對好市多公司短期內連續發生3起召回事件（冷凍藍莓、草莓，以及這次的油漬乾酪），消基會認為，好市多公司



ChatGPT

此篇文章的分析和評價如下：

立意取材：4.5級分

文章挑選了現代社會極具熱度與影響力的主題：食品安全與大型連鎖超市的品質把關。全篇立意清晰，闡述好市多因為連續的食品安全問題應該對消費者負起更多的責任，並且提供了豐富的細節，讓人對事件有深入的理解。但是，對好市多的反應與對策較少著墨，比較欠缺全面性。

結構組織：5級分

全文結構清晰，首先提出問題（好市多銷售的食品中含有致癌物質），然後分析原因（好市多的品管問題），再引出消基會的反應和要求，最後指出可能的法律追訴與消費者的權益保護。文章鋪陳流暢，讀者可以輕鬆理解主題和論述。

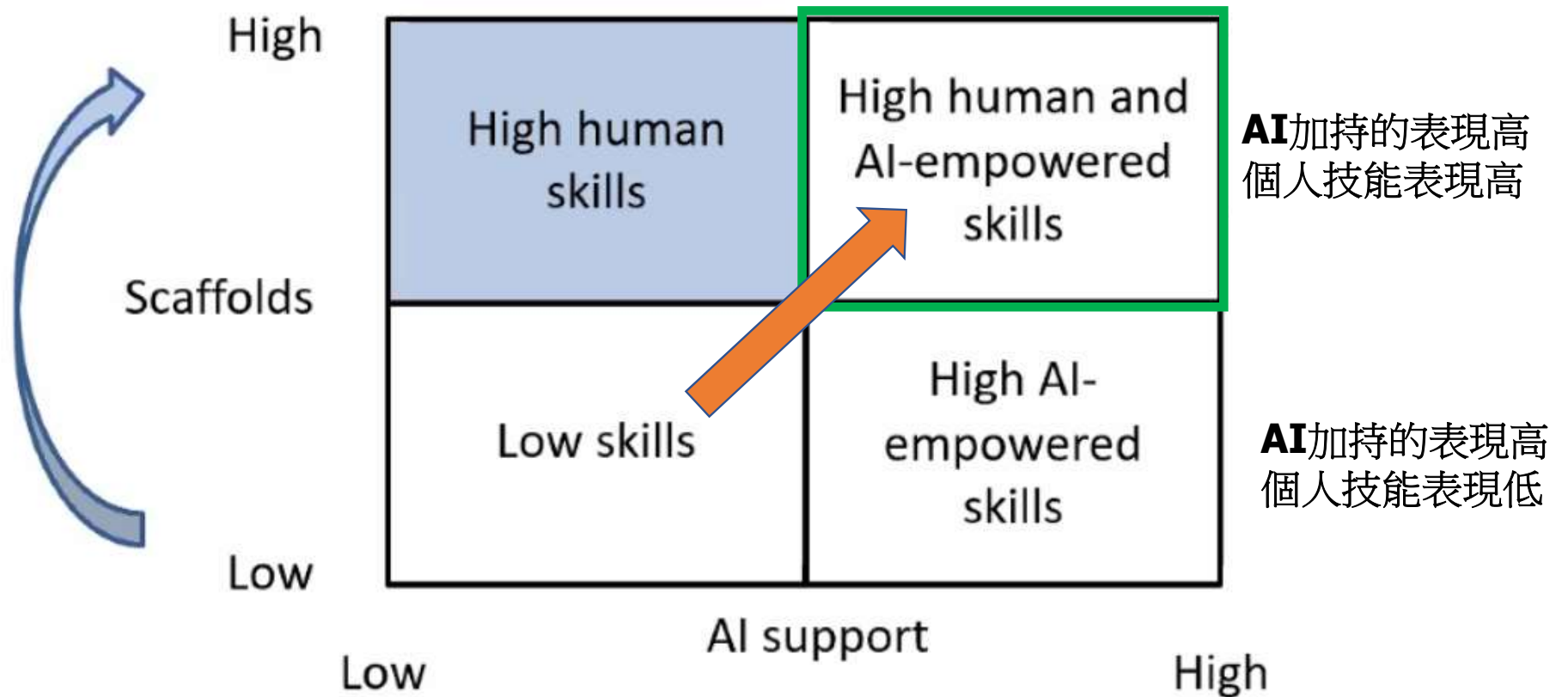
遣詞造句：4.5級分

此篇文章使用的語言準確且易於理解。使用了適當的專業術語，如"致癌物質"、"食安法"等，以及詳細描述了事件的發展過程。但在某些地方，句子稍微冗長，可能會影響閱讀流暢性。

錯別字、格式、標點：5.5級分

全文的字詞選擇都非常準確，並未發現明顯的錯別字。標點符號的使用也十分恰當，尤

AI 在教育應用的目的




From the keynote of Prof. Dragan Gasevic in ICOIE 2024

ORIGINAL ARTICLE

British Journal of
Educational Technology



Beware of metacognitive laziness: Effects of generative artificial intelligence on learning motivation, processes, and performance

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Shufang Tan¹ | Yueying Zhao¹ | Yuan Shen³ | Xinyu Li² |
Dragan Gašević²

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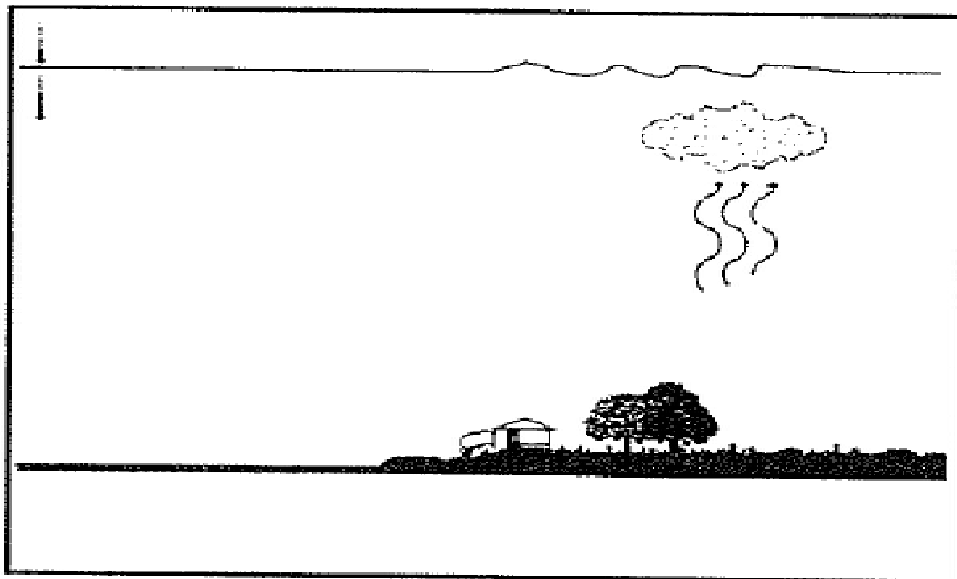
Abstract: With the continuous development of techno-

Challenges of using ChatGPT in educational settings

- Students might over rely on the content provided by ChatGPT
 - They might adopt content directly without verification
 - They might stop thinking → metacognition laziness

A test item of Multimedia Learning Theory. Assuming that there are two movies, A and B, and that A uses native-speaking audios to illustrate the content of the movie and B uses native-speaking subtitles to illustrate the content of the movie, which design is easier for students to learn? What principles do you use to make this judgment? (10%).

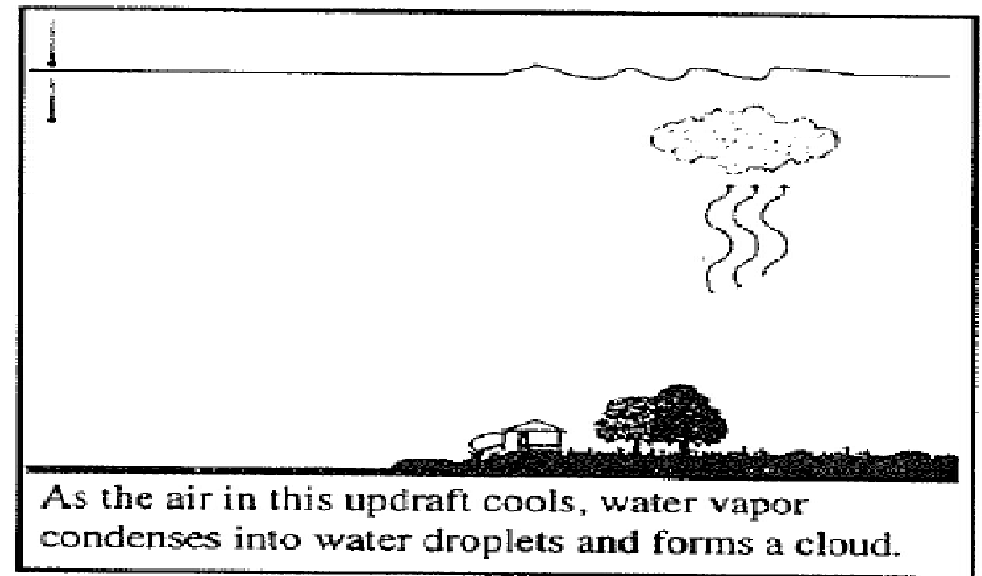
Words as Narration



A

"As the air in this updraft cools, water vapor condenses into water droplets and forms a cloud."

Words as On-Screen Text



B

As the air in this updraft cools, water vapor condenses into water droplets and forms a cloud.

Answer by a student who directly adopted ChatGPT's response

According to the multimedia learning theory proposed by Mayer (2001), the design of Movie A (where the content of the movie is narrated in the native language) is easier for students to learn. This judgment is based on the following principles: **Principles of Multimedia Learning Theory**

1. **the dual-channel assumption**: Learners have two channels of information processing: visual and auditory. Movie A uses voice-over narration to illustrate the content, so it can assign visual information (movie screen) and auditory information (native voice-over narration) to different channels, making full use of the information processing power of these two channels.
2. **capacity constraint assumptions**: The working memory of each channel has a capacity limit. Reading subtitles takes up the capacity of the visual channel, and students need to process subtitles and movie frames simultaneously, which may lead to overloading of the visual channel. This can be avoided by using narration because the auditory channel handles the speech and the visual channel only needs to focus on the movie screen, which reduces the load on the visual channel.
3. **Dual-channel integration assumption**: learners can learn multimedia information through a dual-channel cognitive processing model. When the movie screen and the voice-over are synchronized, students can integrate the visual and auditory information more easily, thus forming a more complete understanding and memory.

Rationale:

-**Narration provides synchronized information**: The use of native-speaker narration allows students to listen to the narration while watching the movie screen, which helps students integrate auditory and visual information for better comprehension and retention of the content.

-**Reduce the load on the visual channel**: Watching movies with native language subtitles increases the load on the visual tract because students need to read the subtitles while watching the screen. This can be distracting and less effective. The use of voice-over narration avoids this and allows students to focus more on the movie screen. This

Answer by another student

Movie A is a better one easier for students to learn. The judgment is based on the **Modality Principle**.

In the cognitive load theory proposed by Swell, it is believed that the working memory of the human cognitive system is limited. In Swell's theory of cognitive load, it is believed that **human beings receive information from the outside world through two different channels: the visual image channel and the auditory-linguistic channel**. When learning pictures and text messages through the visual image channel, it is easy to generate a high load; when designing multimedia teaching materials, we try to replace the original text messages with audio playback, as in the case of a movie using a voice-over to explain the content of the movie, which is more conducive to the students' learning.

Generative AI (GAI) in Education research design(1)

- 探討教師或學生對於在教育現場使用GAI的概念
接受度、態度或意願
conceptions/acceptance/attitude/intention
- 條件：必須展現受測者已經接受了充分的GAI培訓：
透過互動流程的照片及系統畫面進行解說
- 最好加入獨特的議題及特殊的分析方法來增加創新性及貢獻



University students' conceptions of ChatGPT-supported learning: a drawing and epistemic network analysis

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ABSTRACT

The present study employed the draw-a-picture technique and epistemic network analysis (ENA) to reveal university students' viewpoints on ChatGPT-supported learning, as well as the conceptions, roles, and educational objectives of ChatGPT-supported learning among university students with different learning attitudes. The results showed that university students' conceptions of ChatGPT-supported learning were diverse and interrelated. Most students agreed that ChatGPT could facilitate learning anytime and anywhere, and held positive emotions and attitudes. In the conceptions of ChatGPT-supported learning, there were significant differences in the four categories of locations, learning

ARTICLE HISTORY

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KEYWORDS

ChatGPT-supported learning; university students; draw-a-picture technique; epistemic network analysis

研究問題：

1. 透過繪畫表達的大學生使用ChatGPT支援學習的整體概念結構是什麼？
2. 高低學習態度(learning attitude)的大學生對ChatGPT-supported learning的概念（包括 participants involved, locations, learning content, learning activities, objects, and emotions and attitudes）是否存在差異？在他們在繪圖描述中最常提到的關鍵詞是什麼？
3. 大學生在學習的過程中，ChatGPT可能扮演的角色有哪些？高低學習態度的大學生對於使用ChatGPT可達成的教育目標的概念認知是否存在差異？

使用 **Draw-a-Picture Technique** 及 **Epistemic Network Analysis (ENA)** 分析

學生畫圖的編碼

Table 1. Coding scheme for students' drawings.

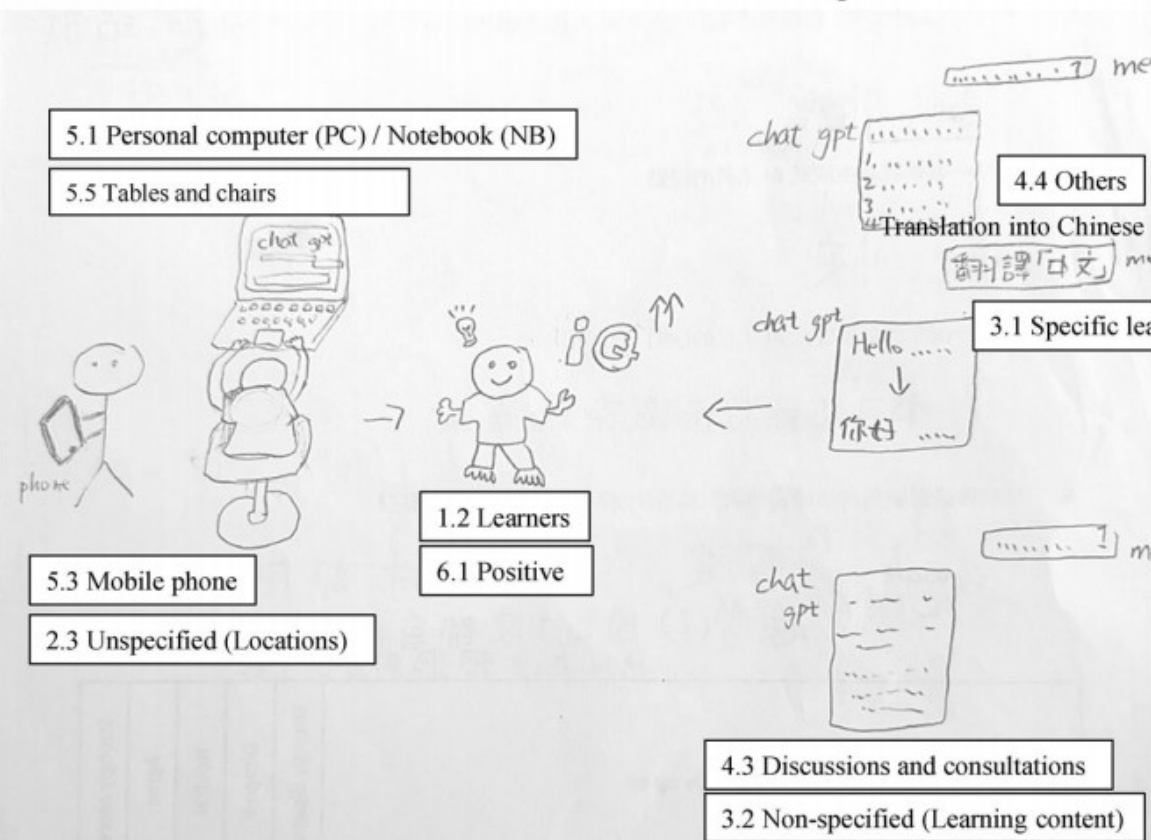
Categories	Subcategories	
1. Participants involved	1.1 Teachers 1.2 Learners	1.3 Robot 1.4 No human drawn
2. Locations	2.1 Home 2.2 In-class activities	2.3 Unspecified
3. Learning content	3.1 Specific learning content	3.2 Non-specified
4. Learning activities	4.1 Search Information 4.2 Reports/assignments	4.3 Discussions and consultations 4.4 Others
5. Objects	5.1 Personal computer (PC) / Notebook (NB) 5.2 Tablet 5.3 Mobile phone 5.4 Books	5.5 Tables and chairs 5.6 Traditional classroom equipment 5.7 Bed 5.8 Others
6. Emotions and attitudes	6.1 Positive 6.2 Negative	6.3 No use of affective words or symbols

學生文字敘述的編碼

Table 2. Coding scheme for students' drawing captions.

Categories	Subcategories	Descriptions
Roles	Tutee	ChatGPT plays a tutee and receives instruction and training from the learner to accomplish specific tasks (e.g. teaching ChatGPT to solve specific programming problems or math problems). For example, the learner will input a specific math problem into ChatGPT and try to get it to give the correct answer. When it gets something wrong, the learner analyzes what went wrong and tries to teach it the correct solution. This process not only allows the learner to practice problem solving, but also enhances the learner's understanding of mathematical concepts.
	Tutor	As a source of specialized knowledge, ChatGPT answers learners' questions and assists them in understanding complex concepts. For homework assistance, learners could search for specific topics or concepts to complete their assignments, and for exam preparation, learners could use ChatGPT to take simulated quizzes and receive real-time feedback. For example, learners have recognized ChatGPT as an excellent online tutor. Whether it is an assignment question or test preparation, learners receive real-time, professional answers and guidance.
	Tool	ChatGPT acts as a tool that could assist learners in a variety of research or creative tasks. For example, learners could use it to generate first drafts of creative works to stimulate their imagination, or to edit academic essays to improve their writing skills.
Educational objectives	Remembering	ChatGPT is designed to assist learners in reviewing and validating basic concepts or factual information. Learners could use ChatGPT to practice an exam's core concepts or verify basic facts of various subjects using a question-and-answer format. For example, for a simple information search, or if a learner wants to review anatomy terminology, they will ask ChatGPT to generate a set of flashcards from a list for memory practice.
	Understanding	Learners could use the explanations and examples generated by ChatGPT to deepen their knowledge and understanding, and to ask further high-level questions to enhance topic mastery. For example, students could ask ChatGPT to explain the basic concepts and workings of the food chain, or even ask for examples for better understanding.
	Applying	Learners could use ChatGPT to generate examples related to daily life or academics to apply and understand knowledge from multiple perspectives. For example, learners could contextualize a problem and then ask ChatGPT to assist in applying appropriate mathematical formulas or methods to solve the problem.
	Analyzing	Learners conduct preliminary data analysis with ChatGPT to validate research hypotheses

Based on your understanding and experience, please draw a picture to describe how ChatGPT can be used to facilitate learning.



Please write down three to five sentences to describe your drawing.

使用電腦 手機 就可以幫助你學習
可以回答問題, 提供解決方式, 或是外文翻譯

You can use ChatGPT via your computer or mobile phone to assist you to learn, e.g. by answering questions, providing solutions or language translations.

- Tool
- Understanding
- Applying

Table 3. Distribution of university students' conceptions of ChatGPT-supported learning by categories and sub-categories.

Categories and subcategories	HLA group N (% = N/35)	LLA group N (% = N/25)	Total N (%=N/60)	χ^2
Participants involved				
Teachers	1 (2.86%)	3 (12.00%)³	4 (6.67%)³	1.959
Learners	31 (88.57%)¹	19 (76.00%)¹	50 (83.33%)¹	1.659
Robots	3 (8.57%)²	0 (0%)	3 (5.00%)	2.256
No human drawn	3 (8.57%)²	6 (24.00%)²	9 (15.00%)²	2.723
Locations				
Home	0 (0%)	7 (28.00%)²	7 (11.67%)³	11.094**
In-class activities	1 (2.86%)²	7 (28.00%)²	8 (13.33%)²	7.978**
Unspecified	34 (97.14%)¹	11 (44.00%)¹	45 (75.00%)¹	21.966***
Learning content				
Specific learning content	22 (62.86%)¹	7 (28.00%)²	29 (48.33%)²	7.096**
Non-specified	13 (37.14%)²	18 (72.00%)¹	31 (51.67%)¹	7.096**
Learning activities				
Search Information	13 (37.14%)²	4 (16.00%)³	17 (28.33%)²	3.210
Reports/assignments	4 (11.43%)³	9 (36.00%)²	13 (21.67%)³	5.188*
Discussions and consultations	33 (94.29%)¹	19 (76.00%)¹	52 (86.67%)¹	4.220*
Others	4 (11.43%)³	3 (12.00%)	7 (11.67%)	0.005
Objects				
PC/NB	33 (94.29%)¹	18 (72.00%)¹	51 (85.00%)¹	5.681*
Tablet	11 (31.43%)³	6 (24.00%)³	17 (28.33%)³	0.396
Mobile phone	18 (51.43%)²	9 (36.00%)²	27 (45.00%)²	1.403
Books	7 (20.00%)	5 (20.00%)	12 (20.00%)	0
Tables and chairs	1 (2.86%)	6 (24.00%)³	7 (11.67%)	6.326*
Traditional classroom equipment	1 (2.86%)	6 (24.00%)³	7 (11.67%)	6.326*
Bed	0 (0%)	6 (24.00%)³	6 (10.00%)	9.333**
Others	2 (5.71%)	0 (0%)	2 (3.33%)	1.478
Emotions and attitudes				
Positive	25 (71.43%)¹	18 (72.00%)¹	43 (71.67%)¹	0.002
Negative	0 (0%)	0 (0%)	0 (0%)	0
No use of affective words or symbols	10 (28.57%)²	7 (28.00%)²	17 (28.33%)²	0.002

Note: The top three subcategories are marked in boldface, and the superscript denotes ranking within each category.

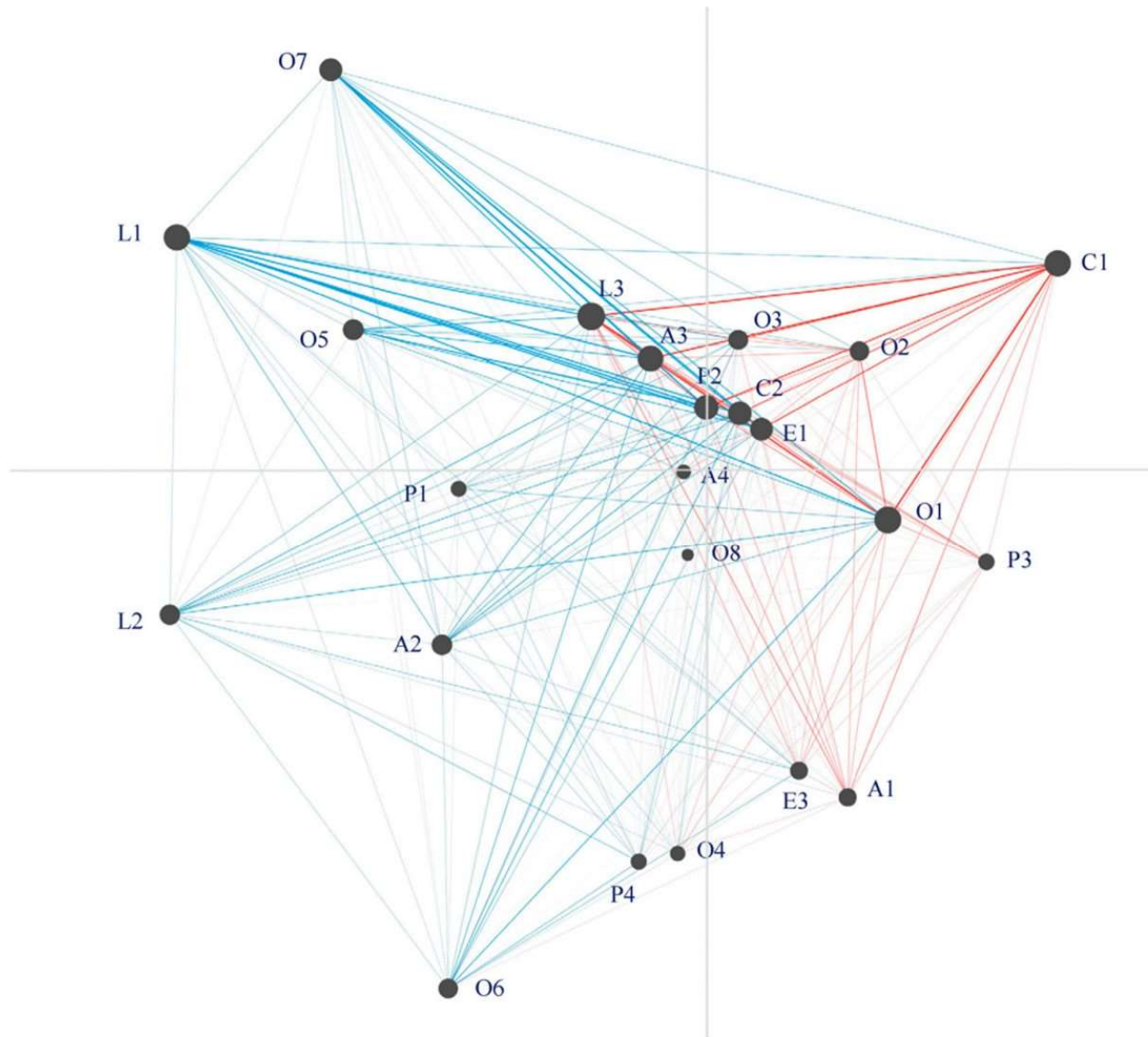







Figure 4. The network model for the HLA group (red) and the LLA group (blue) on ChatGPT-supported learning.



Conceptions of image-generative AI-supported instruction of preservice teachers with different levels of learning attitude: a drawing and epistemic network analysis

Yuchen Chen^a , Xinli Zhang^b , Yun-Fang Tu^b , Gwo-Jen Hwang^{c,d,e}  and Lailin Hu^b 

^aThe University of Sydney, Sydney, NSW, Australia; ^bWenzhou University, Wenzhou, China; ^cNational Taichung University of Education, Taiwan; ^dNational Taiwan University of Science and Technology, Taiwan; ^eYuan Ze University, Taoyuan, Taiwan

ABSTRACT

This study explored 106 Chinese pre-service teachers' (PSTs') conceptions of image-generative artificial intelligence (image-GAI) supported instruction and how their conceptions differed by learning attitudes. The draw-a-picture technique was employed for PSTs to convey their ideas through drawings. A coding checklist with six categories was developed to code PSTs' drawing features. Epistemic network analysis (ENA) was then utilized to visualize PSTs' conceptual model. Results revealed that most PSTs conceptualized that image-GAI was an ideal tool for teachers lecturing on specific content (e.g. language, arts, mathematics, science) to students in the classroom. Additionally, PSTs with different learning attitudes held different conceptions in categories of participants, activities, content, and objects. In partic-

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KEYWORDS

Image-generative artificial
intelligence (image-GAI);
Draw-a-picture technique;
Drawing analysis;
Epistemic network
analysis (ENA); Pre-service
teacher

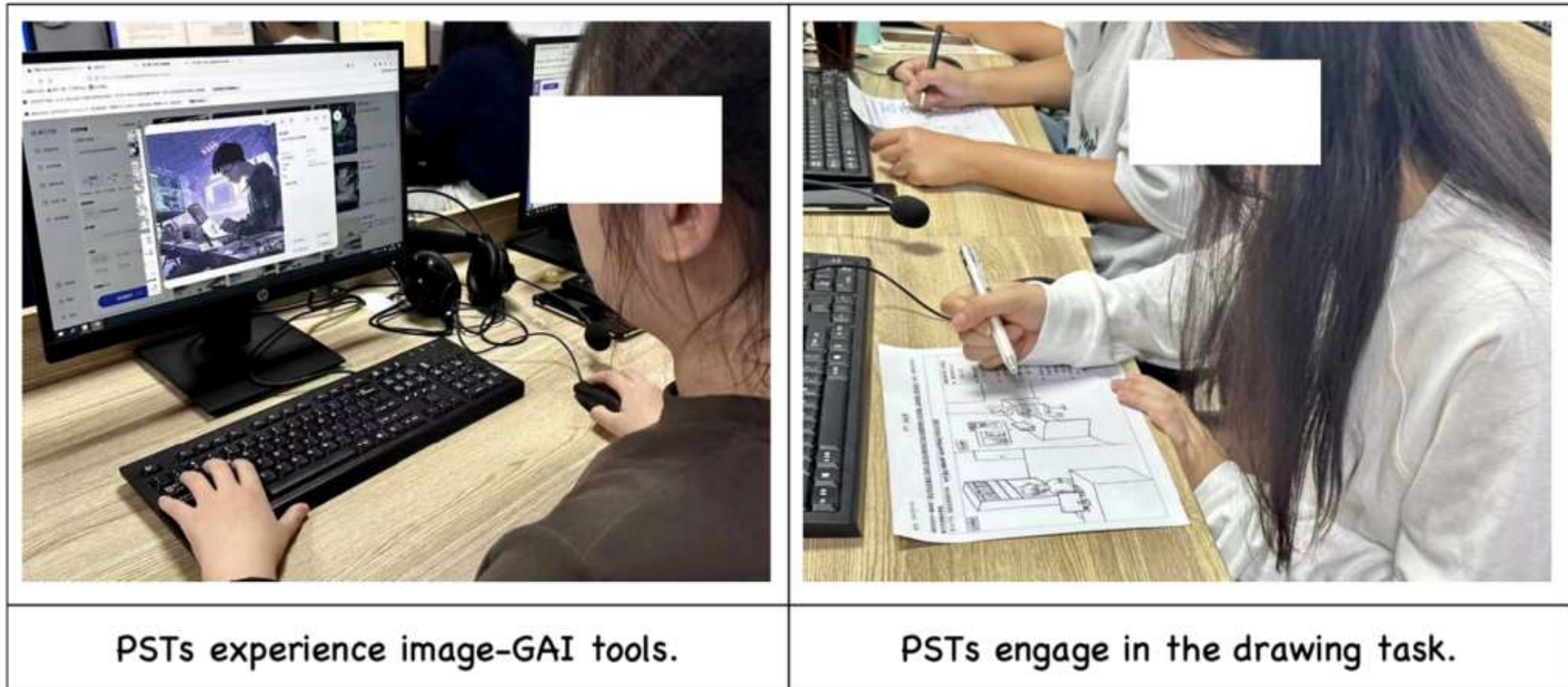


Figure 1. PSTs engaged in the image-GAI training program.

Coding checklist

Participant ID:

Evaluator ID:

Participants

☐ P1 Learners
☐ P3 Others _____

☐ P2 Teachers
☐ P4 No human drawn

Locations

☐ L1 Inside the classroom
☐ L3 Unspecified

☐ L2 Outside the classroom

Activities

☐ A1 Teacher lecturing
☐ A3 Student learning
☐ A5 Hands-on practicing
☐ A7 Others _____

☐ A2 Teacher generating teaching resources
☐ A4 Student visualizing learning content
☐ A6 Design

Content

☐ C1 Specific learning content

☐ C2 Unspecified

Objects

☐ O1 Computers
☐ O3 Blackboards/whiteboards
☐ O5 Others _____

☐ O2 Tablets/smartphones
☐ O4 Desks/chairs

Emotions & attitudes

☐ E1 Positive
☐ E3 Unspecified

☐ E2 Negative

Notes

Figure 2. Coding checklist.

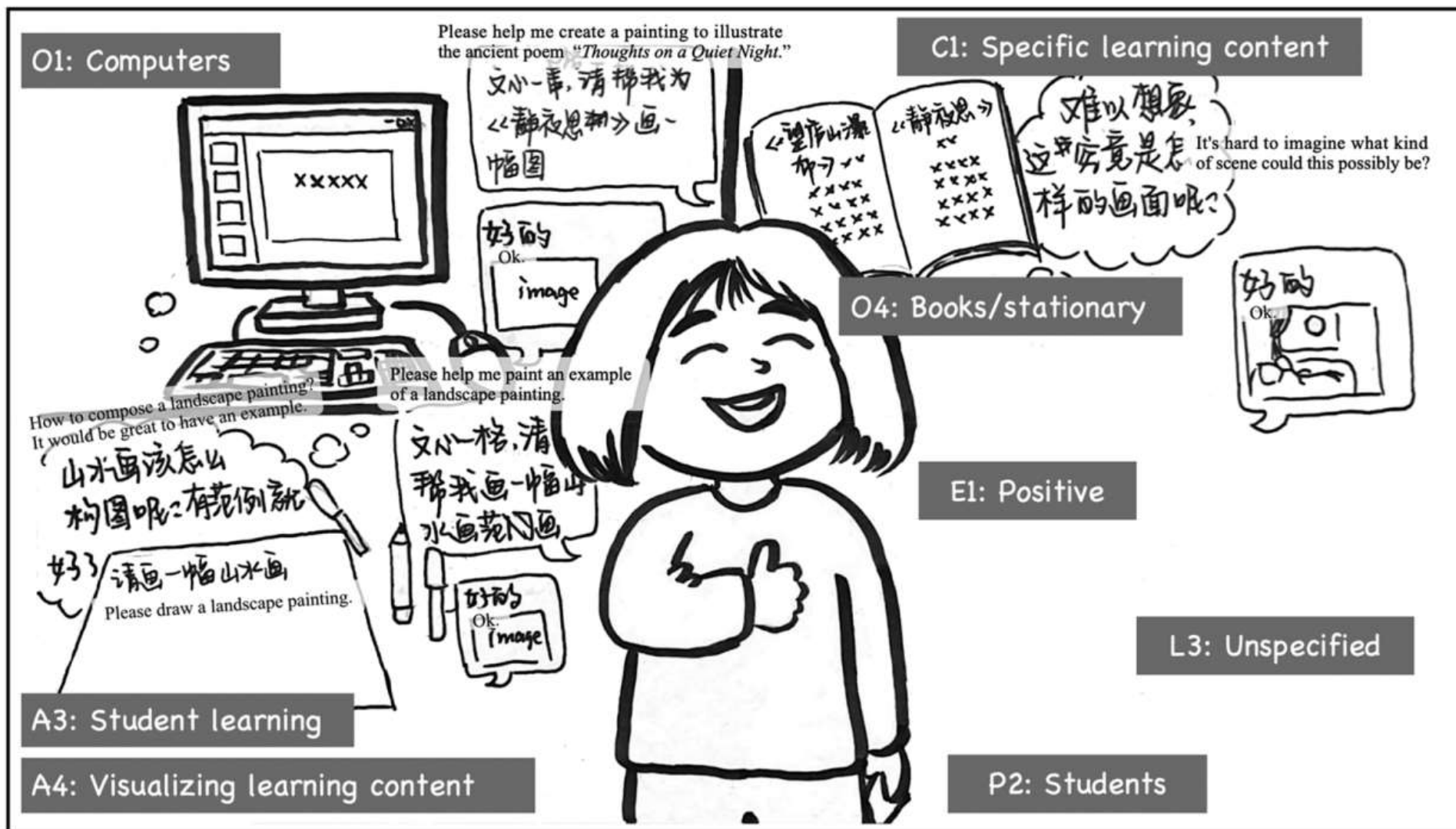


Figure 3. One sample drawing labeled with subcategories.

橘色連線區塊（**MPLA**：學習態度較正向）

•強連結節點組合：

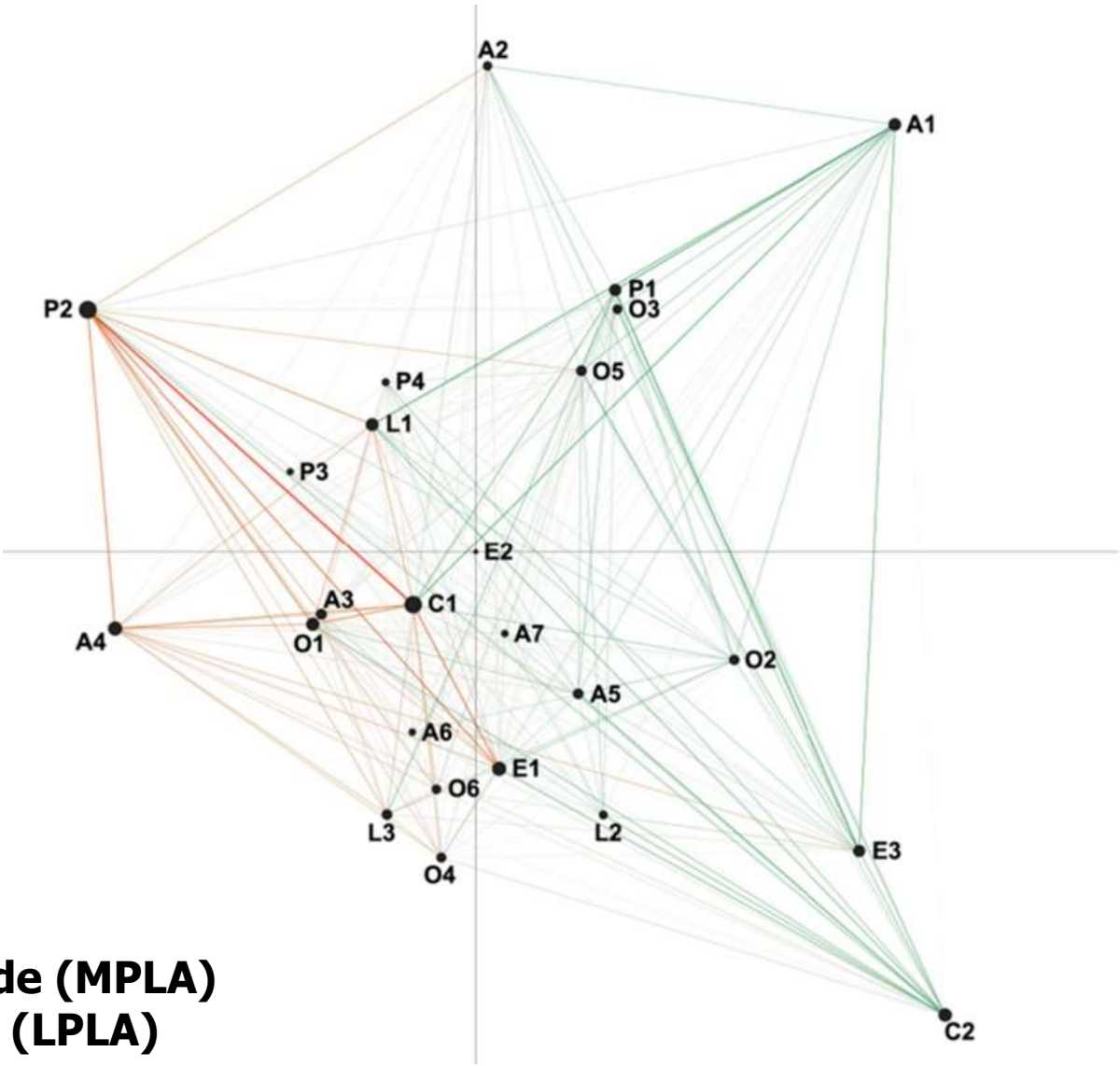
- P2（教師）與 A3（學生學習）、A4（學生視覺化學習內容）、C1（具體學習內容）、O1（電腦）、O6（其他工具）

•代表意義：

- 學生在圖像中傾向描繪教師積極參與教學、且學生在數位工具輔助下進行主動學習與內容視覺化。
- 明顯連結至 C1 表示對「明確學習內容」的關注與整合。
- 結合 O1、O6 這些物件類節點，顯示學習資源與工具使用頻繁，具有「策略性學習與任務導向」特徵。

✓推論：

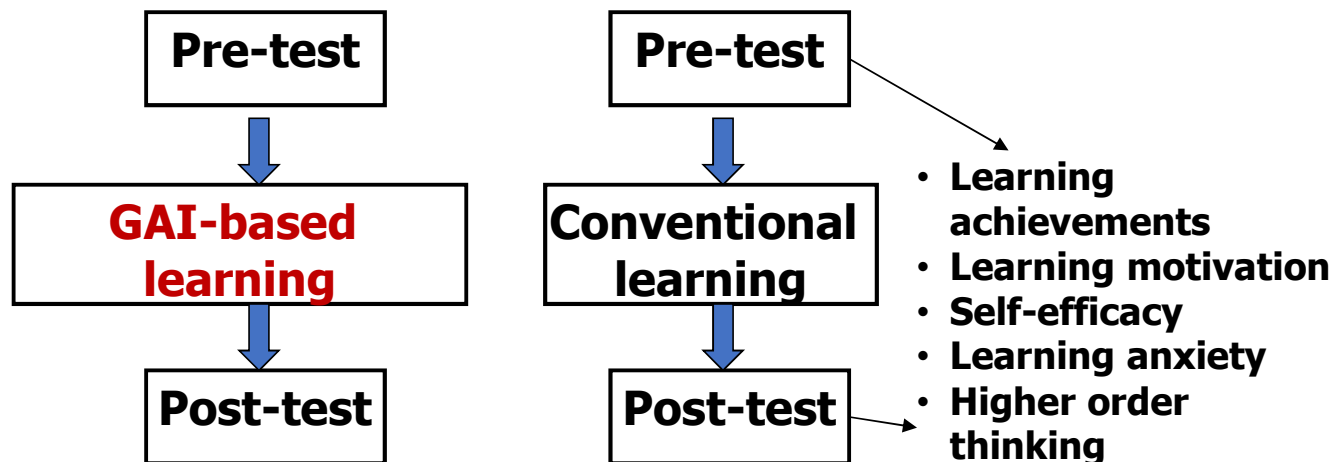
學習態度正向的學生，更可能從整體教學情境出發，將教師教學、學生投入、工具使用與具體內容整合成具有學習目標導向的圖像。



Orange: More positive learning attitude (MPLA)
Green: Less positive learning attitude (LPLA)

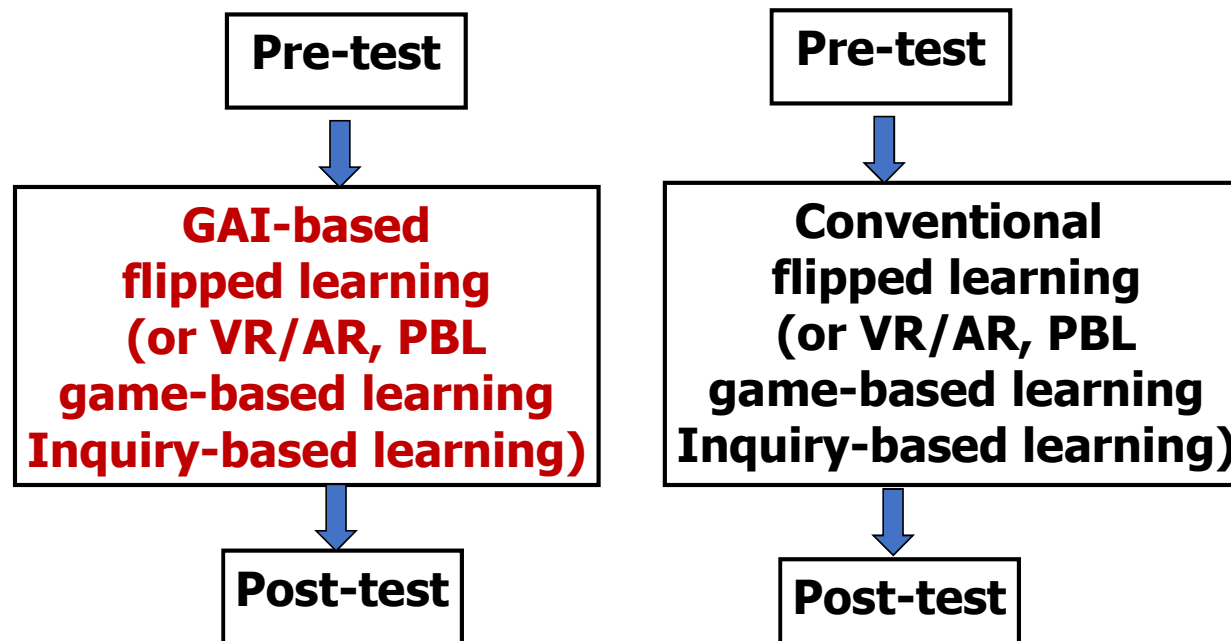
Generative AI in Education research design(2A)

- Exploring the impact of adopting GAI in conventional educational settings on students' academic achievement and perceptions
- **The contribution could be insufficient since GAI is no longer an innovative learning tool in school settings**



Generative AI in Education research design(2B)

- Explore the impact of adopting GAI in **advanced learning models or activities** (e.g., flipped learning, VR, AR, game-based learning, inquiry-based learning, PBL)





ChatGPT-facilitated professional development: evidence from professional trainers' learning achievements, self-worth, and self-confidence

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^aDepartment of Nursing, Chang Gung University of Science and Technology, Taoyuan City, Taiwan; ^bGraduate Institute of Educational Information and Measurement, National Taichung University of Education, Taoyuan City, Taiwan; ^cGraduate Institute of Digital Learning and Education, National Taiwan University of Science and Technology, Taoyuan City, Taiwan; ^dTaiwanYuan Ze University, Taoyuan City, Taiwan

ABSTRACT

Professional trainers play an important role in helping new recruits adapt to the workplace. In general hospitals, training courses for clinical teachers still adopt the lecture method. Such a teacher training approach focuses on the way of delivering knowledge and skills, while the training for their teaching of case handling as well as their self-worth and self-confidence could be insufficient. In order to cope with this problem, the present study proposed a ChatGPT-based training mode (ChatGPT-TM) for professional development. To verify its effects, we conducted an experiment in a “Using ChatGPT in Case Teaching” course for clinical teachers in hospitals, and explored their learning achievement, self-worth, self-confidence, and

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KEYWORDS

ChatGPT; generative artificial intelligence; professional training; self-worth; self-confidence

ChatGPT-based training vs. conventional (Google-supported) training in the QRV contexts

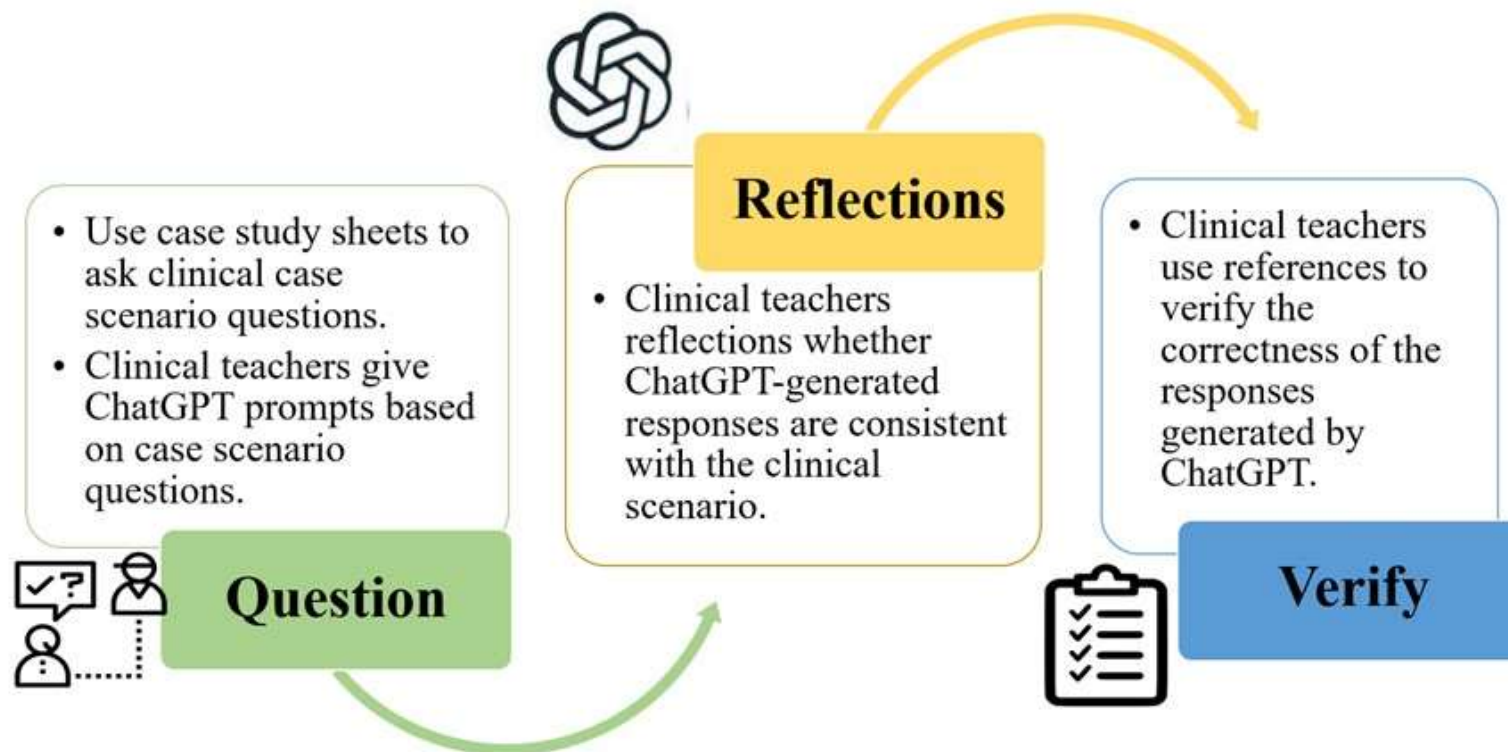


Figure 1. ChatGPT-based training mode (ChatGPT-TM)

Question stage: Clinical teachers (trainees) give ChatGPT prompts based on case scenario questions

Use case study sheets to ask clinical case scenario questions.

Case study sheet

Nurse Wong Siu Yung is taking care of a 70-year-old patient with asthma and heart failure. The patient must undergo Chest Physical Therapy (CPT) 4 times a day and take Digoxin medication, what are the nursing instructions and precautions for Chest Physical Therapy (CPT)? What are the nursing instructions and precautions for CPT? What are the precautions for taking Digoxin?

Clinical teachers give ChatGPT prompts based on case scenario questions.



Reflection stage: Clinical teachers reflect on the differences between chest physical therapy (CPT) and clinical situations generated by ChatGPT

PU You

Nurse Wong Siu Yung is taking care of a 70-year-old patient with asthma and heart failure. The patient must undergo Chest Physical Therapy (CPT) 4 times a day and take Digoxin medication, what are the nursing instructions and precautions for Chest Physical Therapy (CPT)? What are the nursing instructions and precautions for CPT? What are the precautions for taking Digoxin?

ChatGPT

For Chest Physical Therapy (CPT):

Clinical teachers reflect on whether ChatGPT-generated responses are consistent with the clinical scenario.

1. **Explain the Procedure:** Make sure to educate the patient about the purpose and benefits of CPT. Discuss how it helps in clearing mucus from the airways, making it easier for them to breathe.
2. **Comfort Positioning:** Ensure the patient is comfortable and positioned correctly for the therapy. Typically, a seated or slightly reclined position is preferred.
3. **Monitor Respiratory Status:** Keep a close eye on the patient's respiratory status throughout the procedure. If they show signs of distress or increased difficulty in breathing, stop the therapy and inform the healthcare provider.
4. **Posture Adjustments:** Periodically adjust the patient's posture during CPT to target different areas of the lungs and enhance mucus drainage.
5. **Hydration:** Encourage the patient to drink plenty of fluids before and after CPT sessions to help loosen secretions.
6. **Gentle Techniques:** Use gentle and appropriate techniques during CPT to avoid causing discomfort or injury to the patient. Be attentive to their responses and adjust your approach accordingly.
7. **Monitor Vital Signs:** Regularly check the patient's vital signs, especially respiratory rate and oxygen saturation, to ensure they remain stable.

Clinical teachers reflect that this patient is in heart failure and should be considered not to be overhydrated and that the CPT position should be lateral.

Validity stage: Clinical teachers used references to validate what were provided by ChatGPT

Clinical teachers used references to validate ChatGPT-generated chest physiotherapy (CPT) and the correctness of precautions

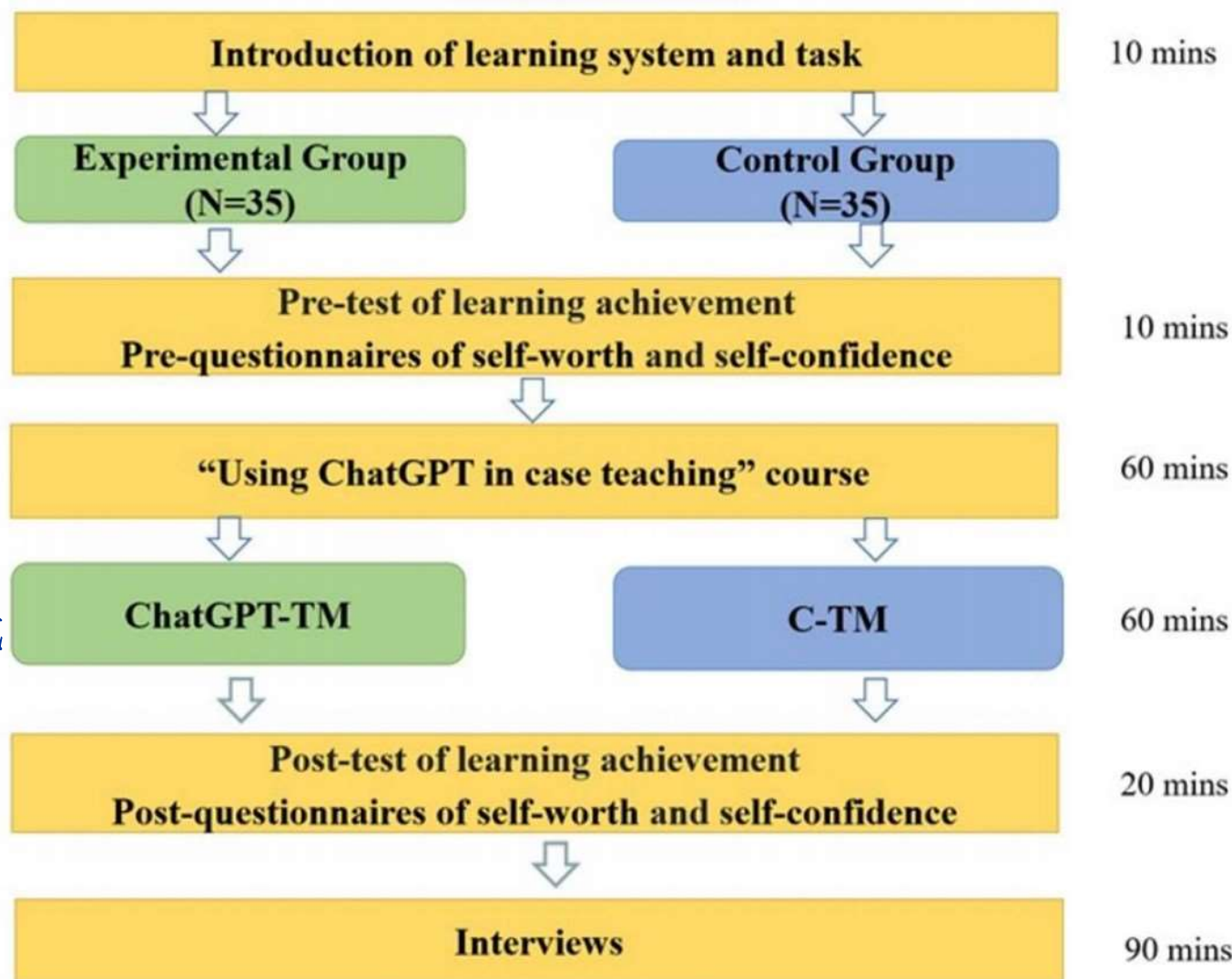
- Kubo et al, (2021) the precautions for performing Chest physical therapy are: **do it before or one hour after meals to avoid vomiting and choking that may cause complications. Maintain the drainage position for 5-10 minutes after sputum tapping as long as tolerated to facilitate sputum expulsion.** Follow the doctor's instructions to administer medication, such as phlegmolytic drugs. **After the tap, rest for 20-30 minutes before eating.**
- Sereearuno Kubo et al, (2020) performed Chest physical therapy with the following nursing instructions: **arch the hand into a cup shape, keep the fingers together as an air cushion to reduce the stimulation of the chest wall, do quick flexion and extension of the arm, and keep the wrist relaxed in order to loosen the sputum in the bronchial wall. The direction of patting is from the bottom of the back to the top, 3-5 minutes for each part. Don't tap on the prominence of bones such as the sternum and spine, as well as the abdomen, liver, stomach, kidney and breast.**

References

The differences between the content generated by ChatGPT and the references are shown in red text.






- Kubo, T., Osuka, A., Kabata, D., Kimura, M., Tabira, K., & Ogura, H. (2021). Chest physical therapy reduces pneumonia following inhalation injury. *Burns*, 47(1), 198-205.
- Sereearuno, T., Rittayamai, N., Lawansil, S., & Thirapatarapong, W. (2020). Effectiveness of a chest physiotherapy care map in hospitalized patients. *Heart & Lung*, 49(5), 616-621.

使用**ChatGPT**
的**QRV**訓練模式



一般的**QRV**訓練
模式

Integrating large language models into EFL writing instruction: effects on performance, self-regulated learning strategies, and motivation

Ze-Min Liu^a , Gwo-Jen Hwang^b , Chuang-Qi Chen^c , Xiang-Dong Chen^d  and Xin-Dong Ye^c 

^aDepartment of Educational Information Technology, East China Normal University, Shanghai, China; ^bGraduate Institute of Educational Information and Measurement, National Taichung University of Education, Taichung City, Taiwan; ^cDepartment of Educational Technology, Wenzhou University, Wenzhou, Zhejiang, China; ^dFaculty of Education, East China Normal University, Shanghai, China

ABSTRACT

This study aimed to investigate the efficacy of utilizing large language models (LLMs) to enhance self-regulated learning (SRL) strategy instruction in English as a Foreign Language (EFL) writing. An LLM-supported Cognitive Academic Language Learning Model (CALLA-LLM) was developed and examined for its potential to improve elementary students' EFL writing performance, SRL strategy use, and writing motivation. In a randomized controlled trial, 65 elementary school students were divided into an experimental group

ARTICLE HISTORY

Received 27 January 2024
Accepted 3 August 2024

KEYWORDS

Large language models;
AI in education; self
regulated learning;
English writing; English
as a second/foreign
language (ESL/EFL)

推薦閱讀

The Cognitive Academic Language Learning Approach (CALLA) designed by Chamot and O'Malley (1994)

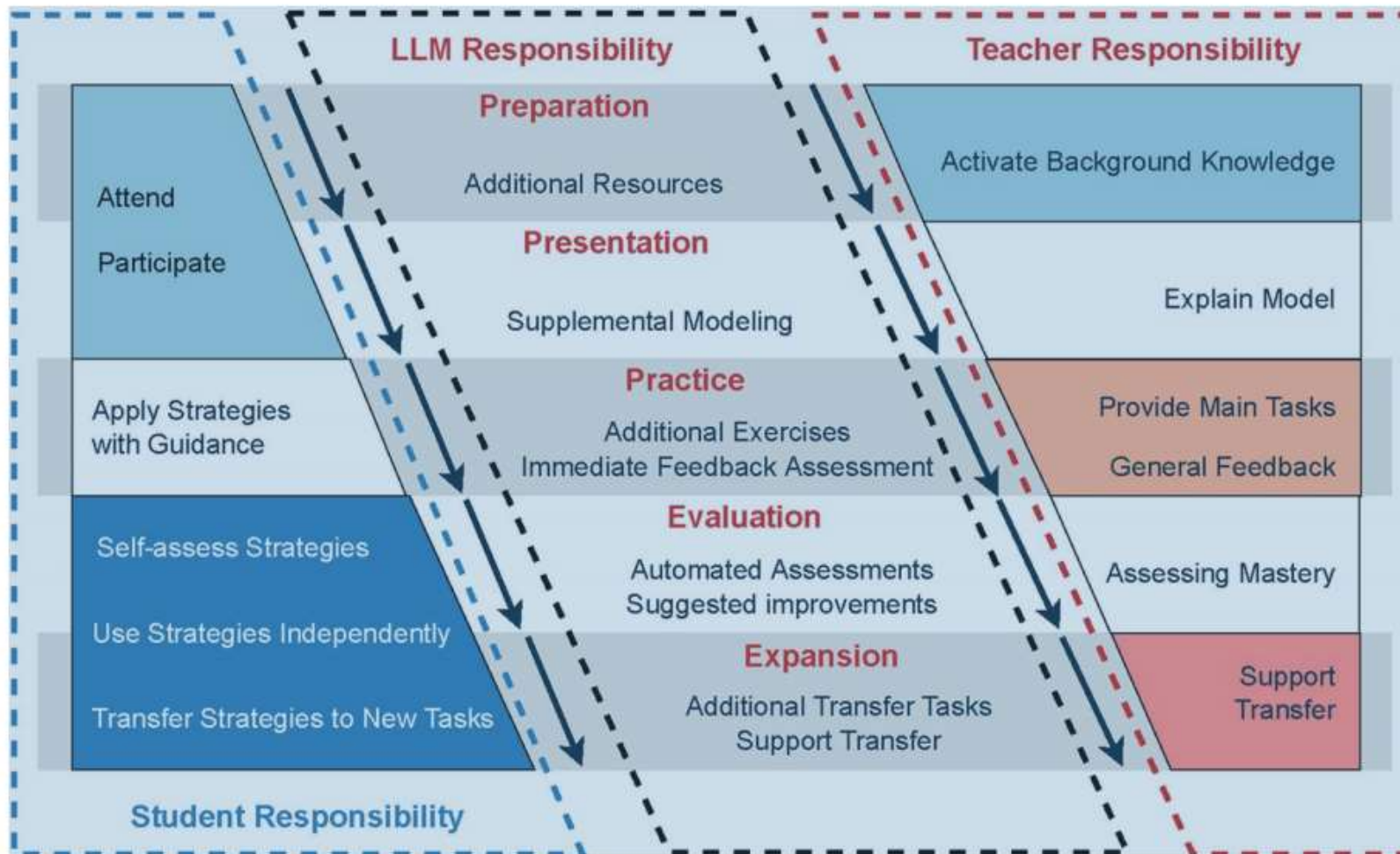
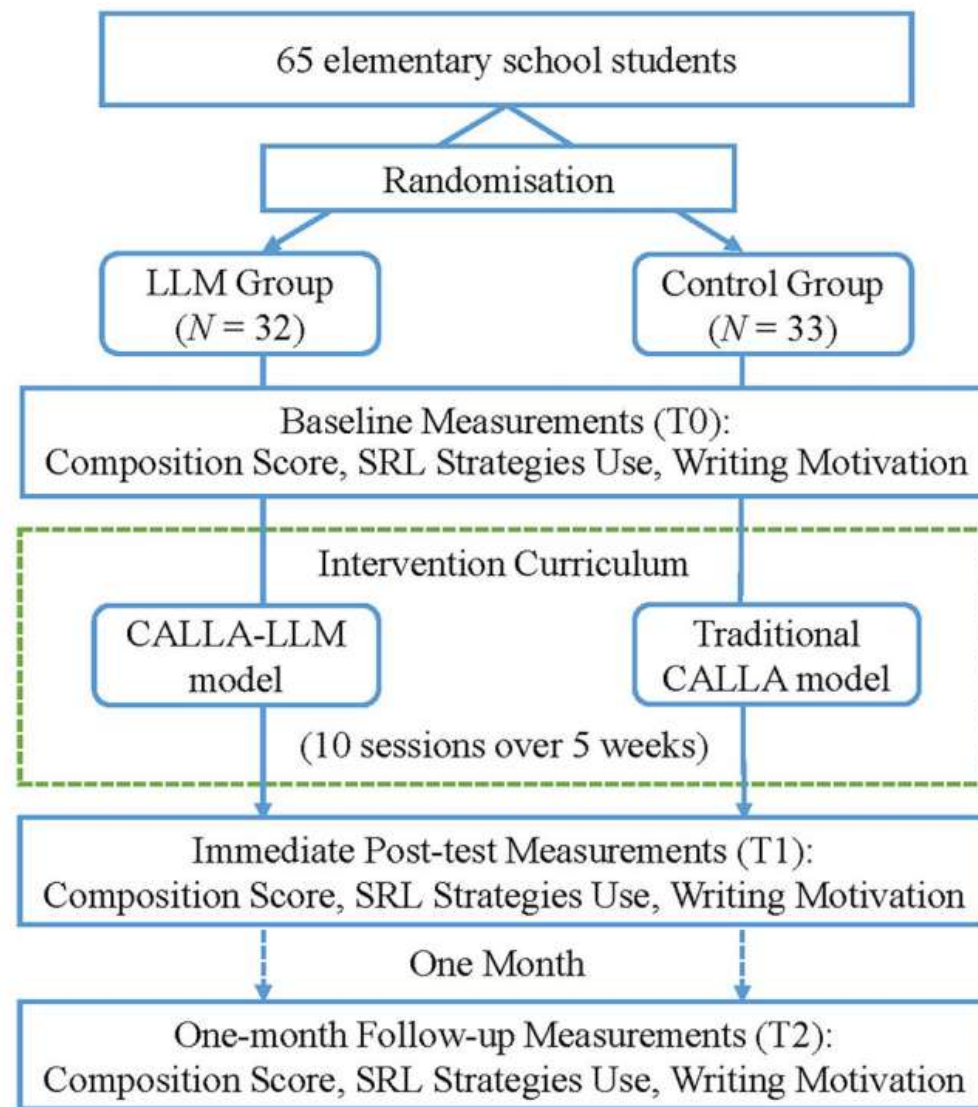


Figure 1. The CALLA-LLM model.

ChatGPT支持的
**CALLA (Cognitive
Academic Language
Learning)** 學習模式




一般的**CALLA**學習模式

Figure 2. Experimental procedure.

生成式AI的研究設計



ChatGPT-supported collaborative argumentation: Integrating collaboration script and argument mapping to enhance EFL students' argumentation skills

Darmawansah Darmawansah^{1,6} · Dzul Rachman² · Febiyani Febiyani² ·
Gwo-Jen Hwang^{3,4,5} 

Received: 11 March 2024 / Accepted: 12 August 2024

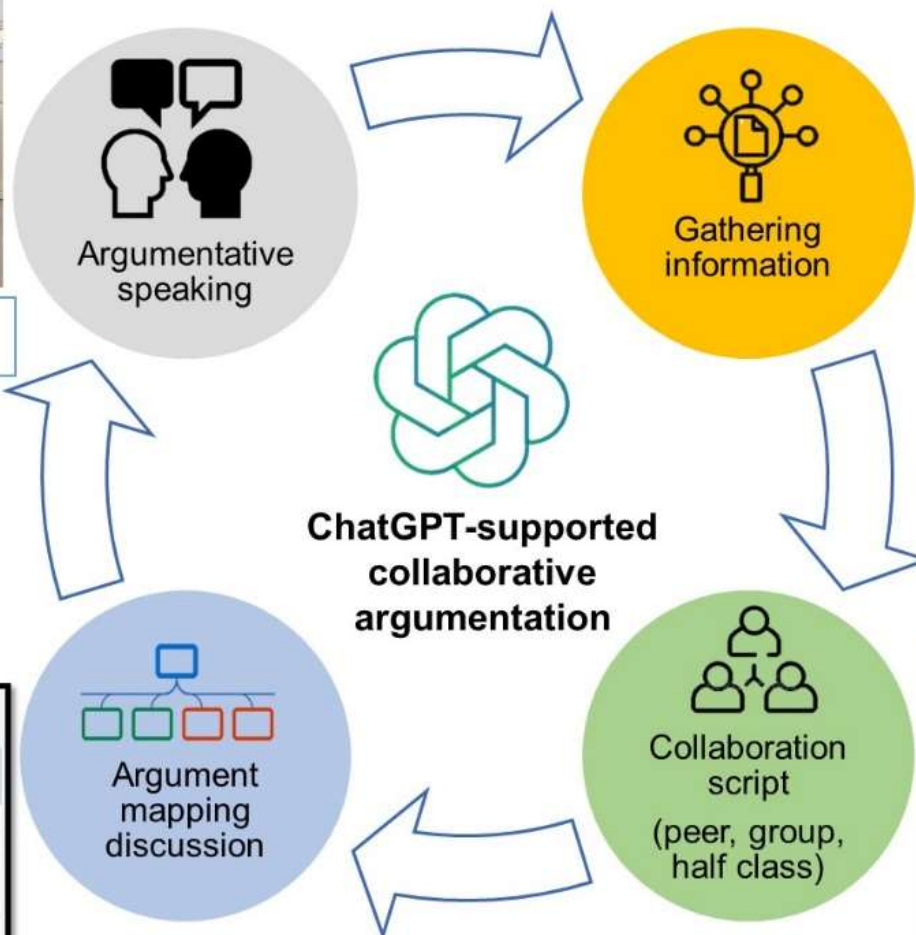
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2024

Abstract

Argumentation is a complex skill essential for English as a Foreign Language (EFL) students to effectively use their English language and reasoning abilities in writ-

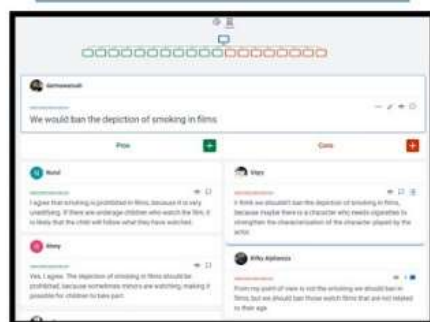


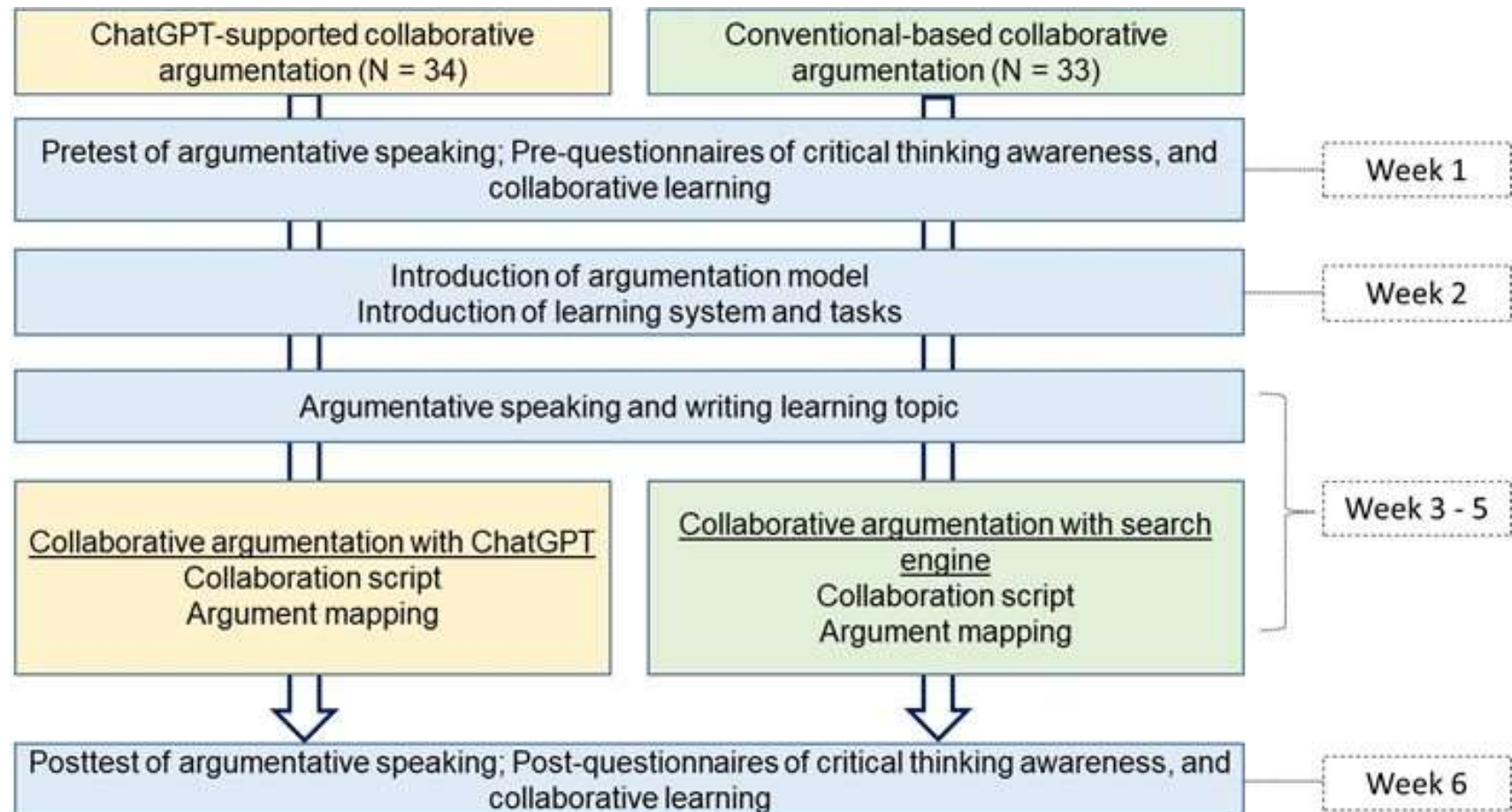
EFL Students performed argumentative speaking



The ChatGPT was used to assist students during discussion

Argument mapping task







推薦閱讀

From empathy to quality long-term care: a generative AI-based art therapy approach based on the self-directed learning model

Ching-Yi Chang ^a, Pei-Ling Wang^{b,c}, Chia-Jung Li^{c,d} and Gwo-Jen Hwang ^{c,e,f}

^aSchool of Nursing, College of Nursing, Taipei Medical University, Taipei, Taiwan; ^bInformation Technology Department, Taipei Medical University Hospital, Taipei, Taiwan; ^cGraduate Institute of Digital Learning and Education, National Taiwan University of Science and Technology, Taipei, Taiwan; ^dNursing Department of Nursing, Shuang Ho Hospital, Taipei Medical University, New Taipei City, Taiwan; ^eGraduate Institute of Educational Information and Measurement, National Taichung University of Education, Taichung, Taiwan; ^fYuan Ze University, Taoyuan City, Taiwan

ABSTRACT

The demand for a multi-disciplinary workforce in long-term care is paramount, particularly in the realm of life care services. Art therapy has been recognized as being a promising approach for promoting learners' empathy and competences for long-term care. However, in traditional art therapy courses, most students who are not interested in artworks or who do not have experience in artwork creation could lack confidence in their ability and motivation to engage in relevant activities, which could

ARTICLE HISTORY

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KEYWORDS

ChatGPT; art therapy;
empathy; health education;
concept change

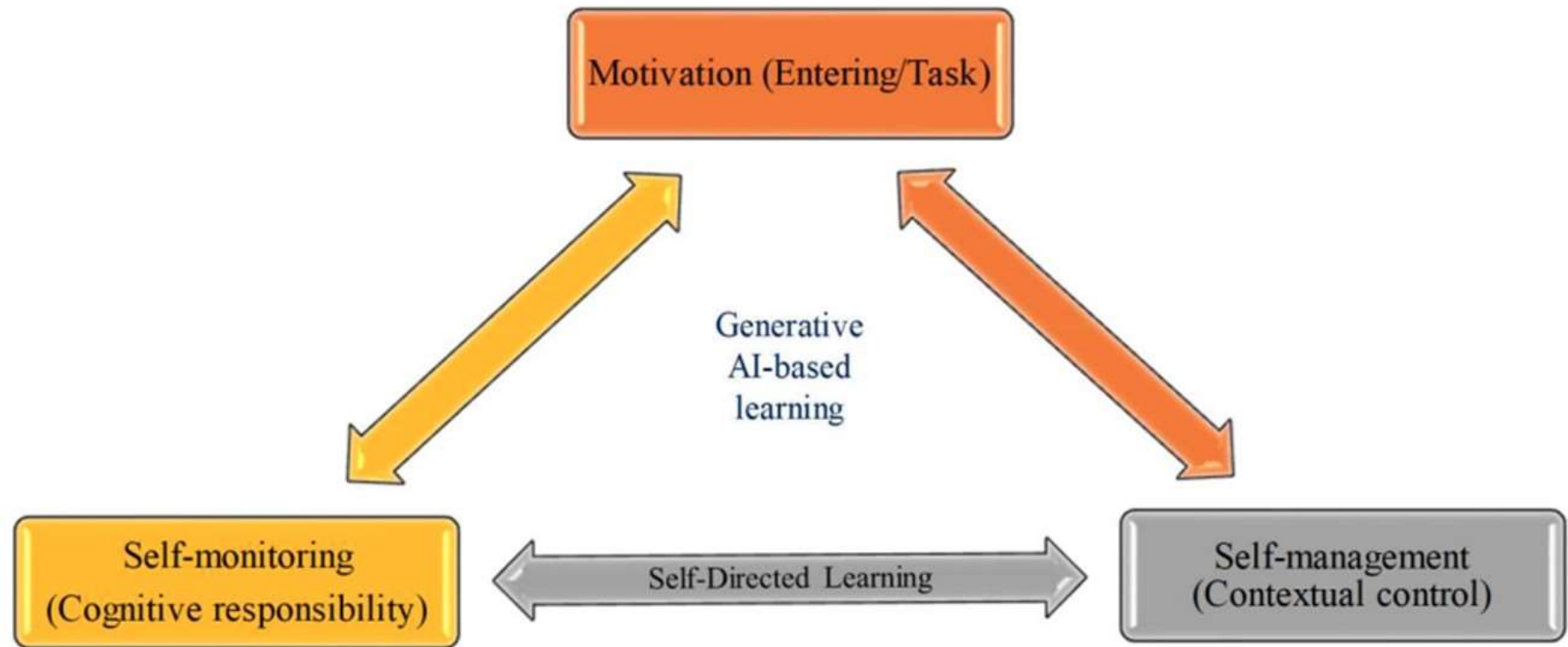


Figure 1. Generative AI-based self-directed learning model.

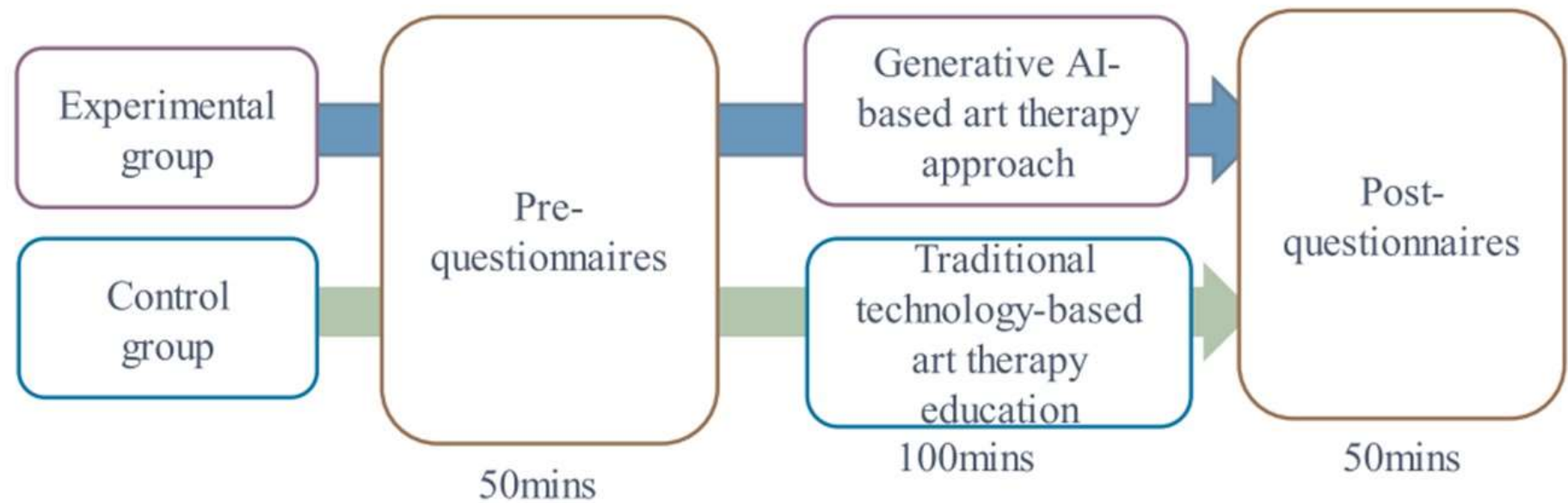


Figure 6. Experimental procedure

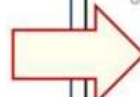
For the self-monitoring stage, students follow the task in an image-to-image example within the Generative AI-based environment.



please try to image-to-image the picture



Here is the image inspired by the reference you provided. If you need any further adjustments or modifications, feel free to let me know!



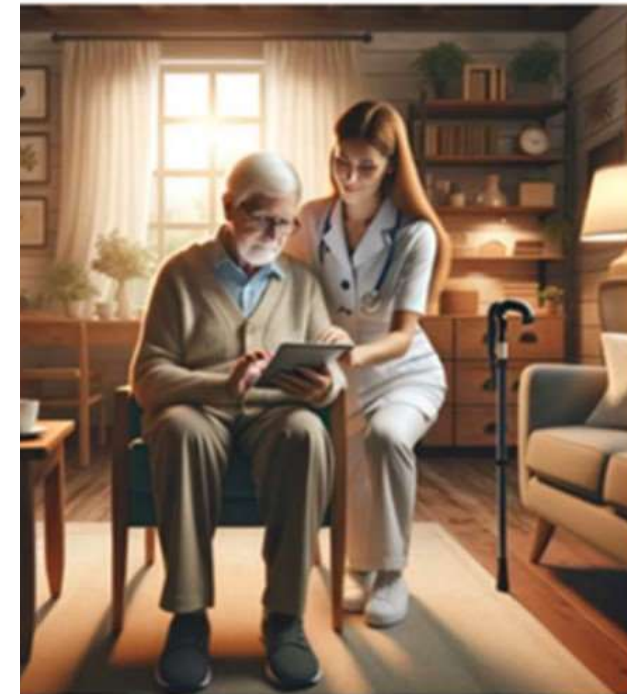
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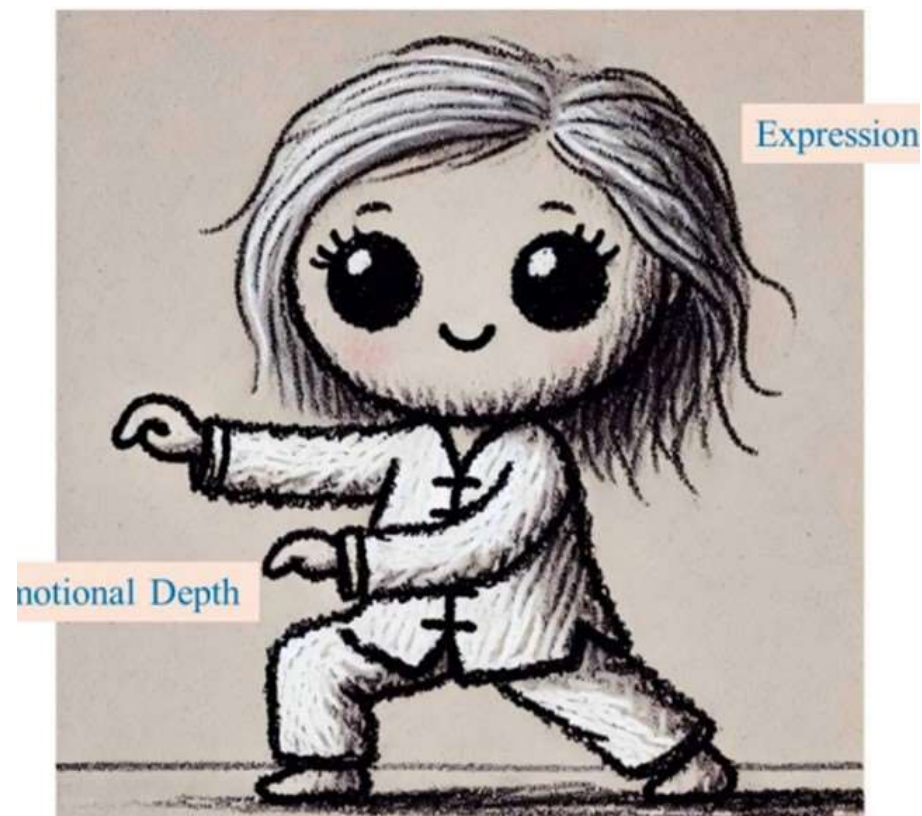
image of a 65-year-old man playing a cello in a cozy room.

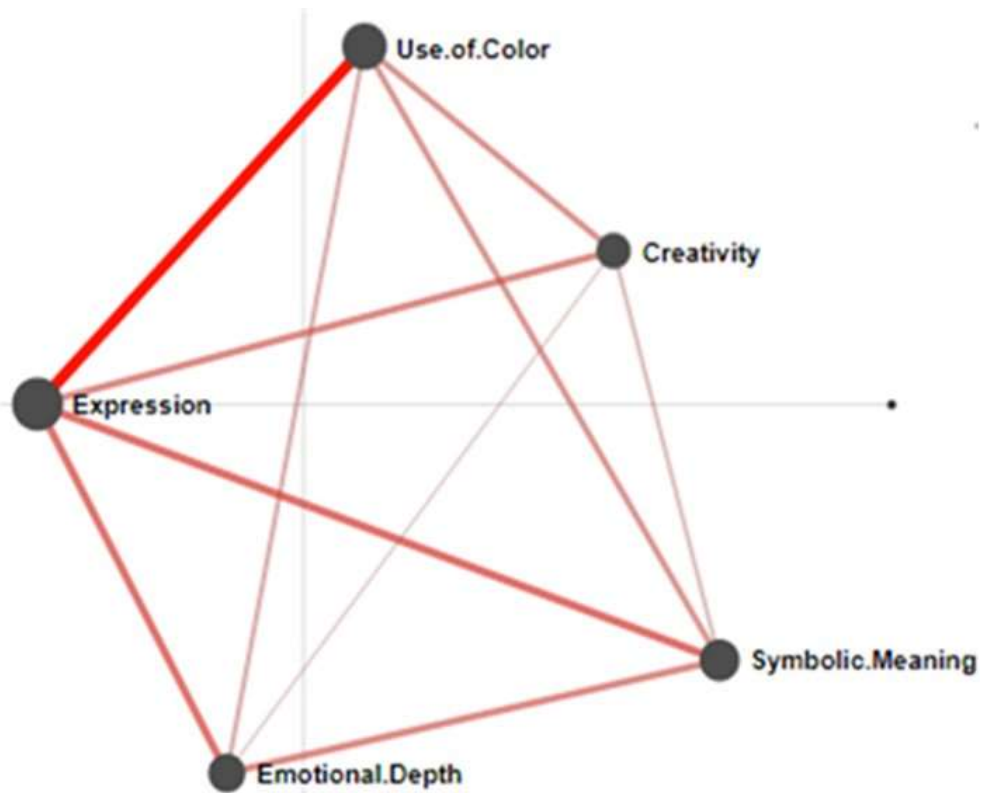


Here is the image of a 65-year-old man playing a cello in a cozy room. If there are any further changes or additional details you would like, please let me know!

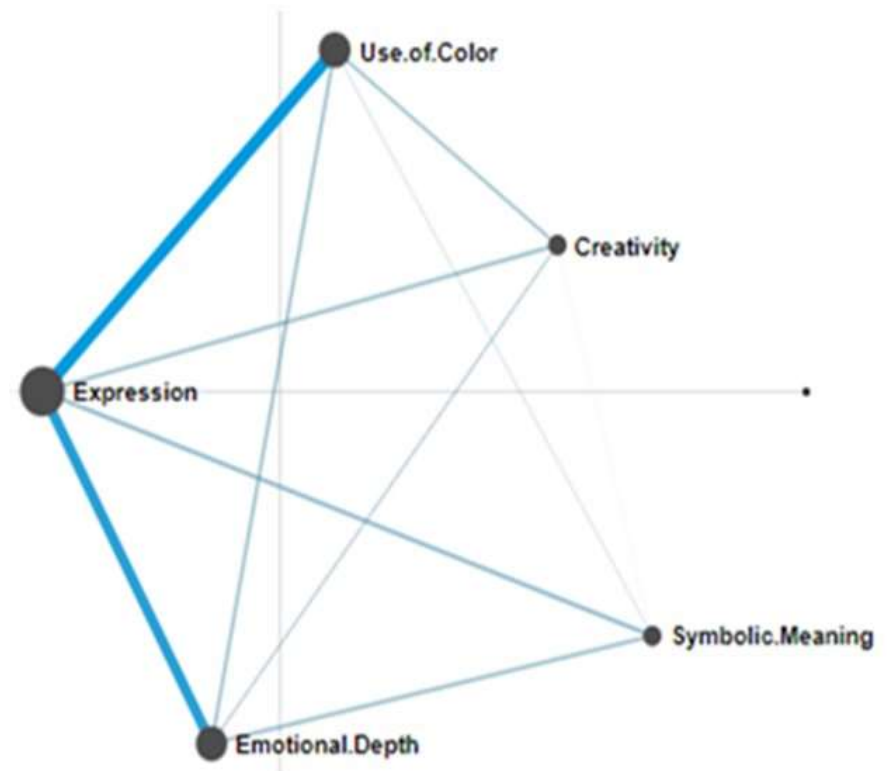
Students follow the task in a text-to-image feature with a detailed prompt to generate the graphic example in a Generative AI-based environment.







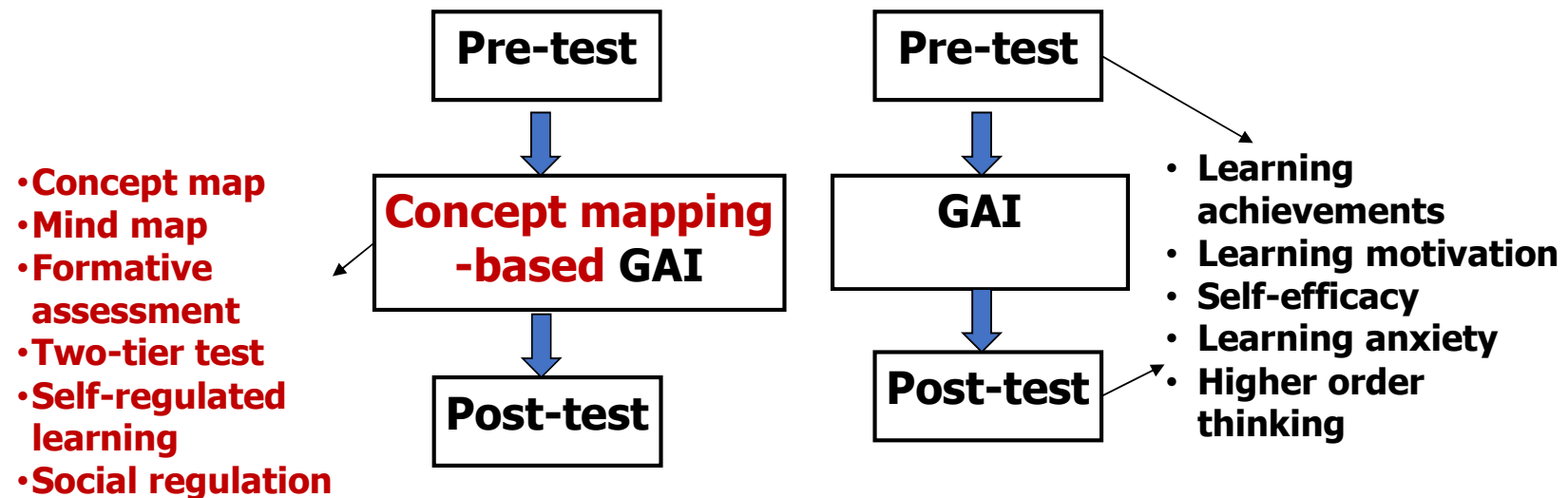
Experimental group of ENA results



Control group of ENA results

Generative AI in Education research design(3A)

- Incorporating ONE effective strategy or tool into GAI-supported learning:



Effects of a GenAI-based debugging approach integrating the reflective strategy on senior high school students' learning performance and computational thinking ↵

↵
Jian-Wen Fang, Jing Chen and Qiu-Lin Weng ↵

School of Teacher Education, Wenzhou University, Chashan Higher Education Park, Wenzhou City, Zhejiang Province, China ↵

↵
Yun-Fang Tu ↵

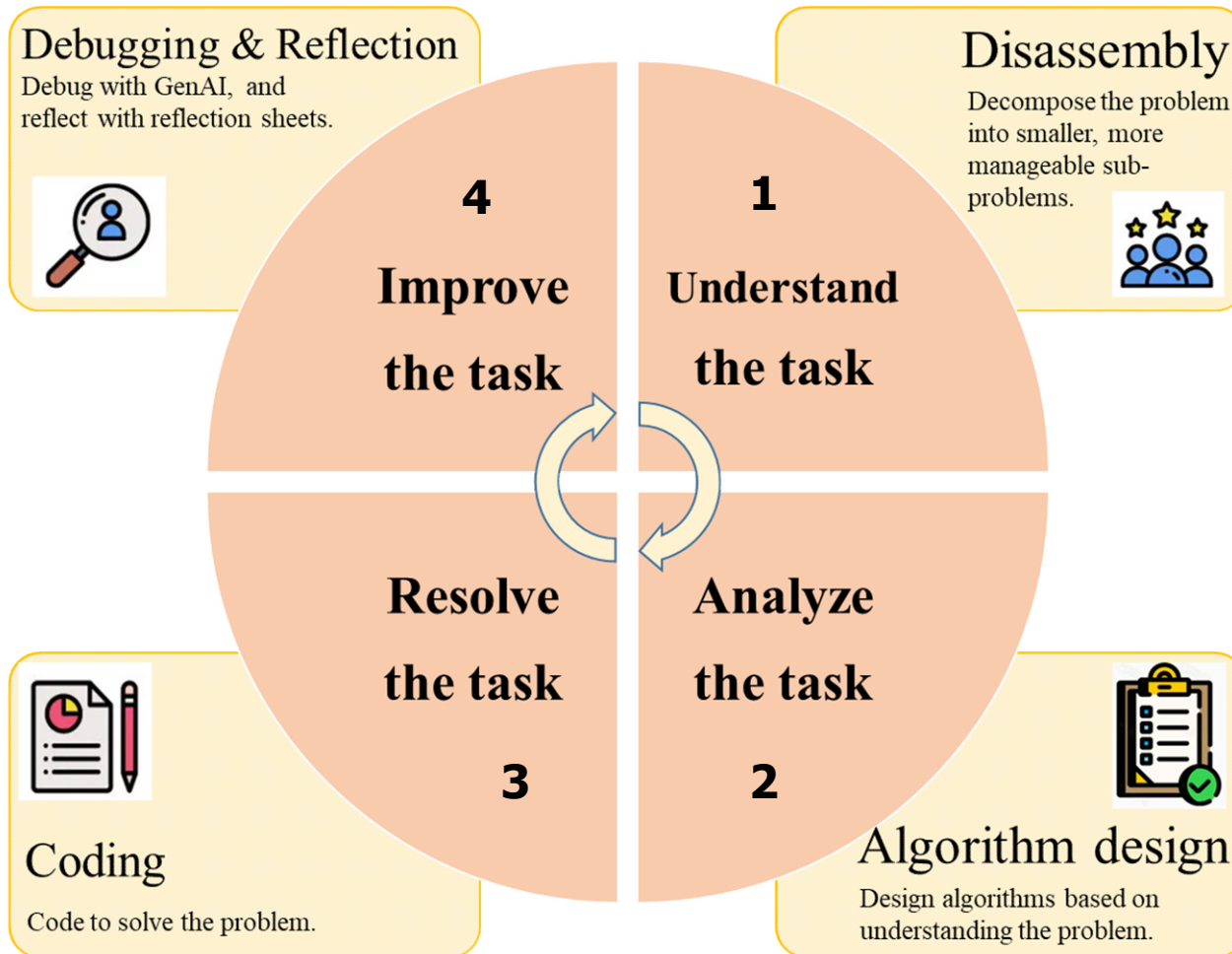
Empower Vocational Education Research Center, National Taiwan University of Science and Technology, Taipei City, Taiwan ↵

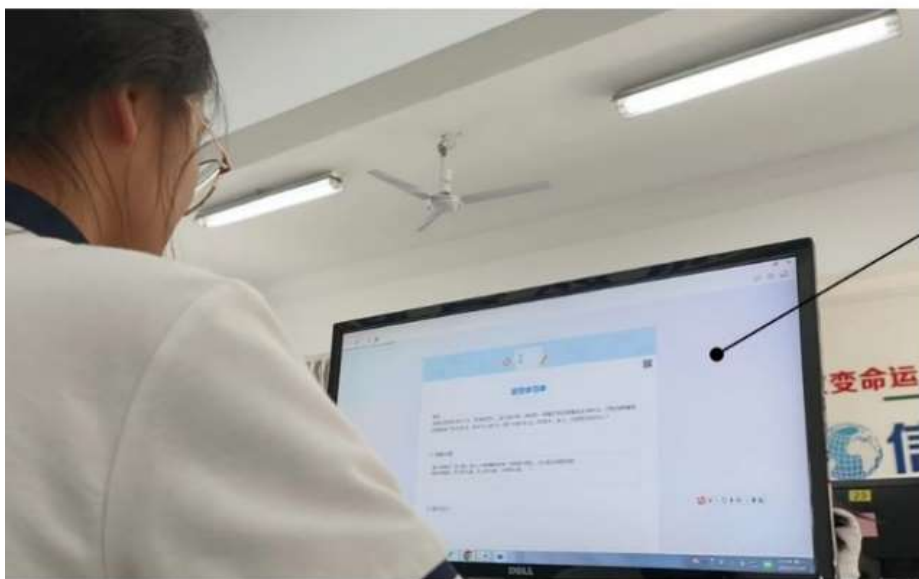
↵
Gwo-Jen Hwang* ↵

Address: Graduate Institute of Educational information and Measurement, National Taichung University of Education, Taiwan// Graduate Institute of Digital Learning and Education, National Taiwan University of Science and Technology, Taiwan// Yuan Ze University, Taoyuan, Taiwan ↵
gjhwang.academic@gmail.com ↵

↵
ABSTRACT: Debugging constitutes a pivotal component in the learning curve of programming, serving not only to enhance coding proficiencies but also to cultivate thinking skills. However, debugging tools embedded in integrated development environments (IDEs) often provide limited error diagnosis, which may reduce students' engagement with coding and inhibit their learning performances. This study therefore proposed a Reflective Generative Artificial

生成式AI的研究設計





反思学习单

Reflection sheets

题目:

某旅行团共有 30 个人, 其中有男人、女人和小孩, 他们在一家餐厅吃自助餐花去 500 元。已知自助餐的价格是每个男人30 元, 每个女人20 元, 每个小孩 10 元。问:男人、女人、小孩各为多少人?

There are 30 people in a travelling group, including men, women and children, who spend \$500 on a buffet in a restaurant. The price of the buffet is 30 yuan per man, 20 yuan per woman and 10 yuan per child. Question: How many men, women and children are there?

* 1. 理解问题

输入变量: 总人数 (30人)、自助餐的价格, 包括每个男人、女人和小孩的价格

输出变量: 男人的人数、女人的人数、小孩的人数

拆解问题: a. 总人数为30人, 根据这个约束, 我们可以列出一个方程: 男人数 + 女人数 + 小孩数 = 30

b. 自助餐的总费用为500元, 根据不同性别和年龄段的价格, 我们可以列出一个方程: $30 * \text{男人数} + 20 * \text{女人数} + 10 * \text{小孩数} = 500$

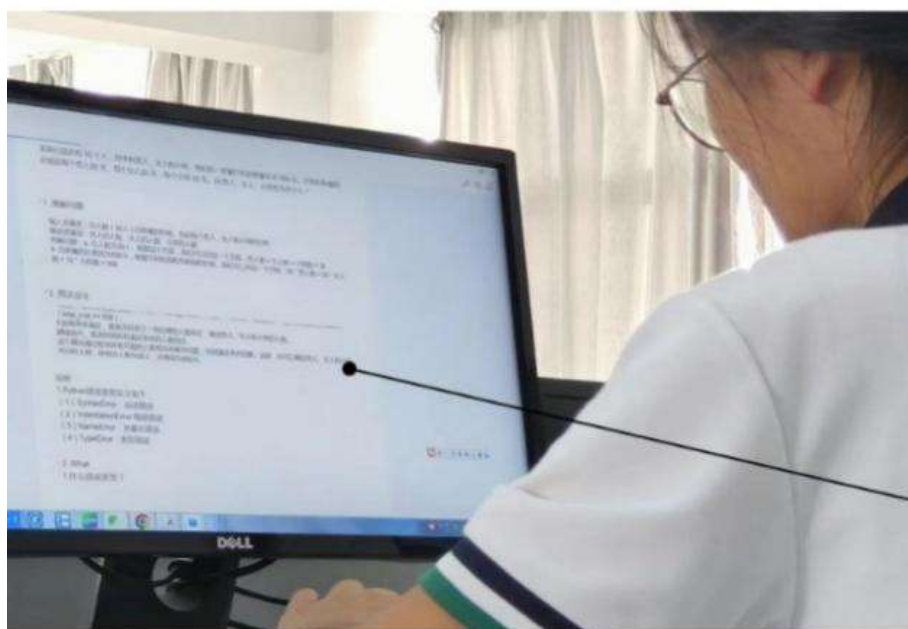
Input variable: price of the buffet for the total number of people (30), including the price per man, woman and child

Output variables: number of men, number of women, number of children

Disassembly the problem:

a. The total number of people is 30, and based on this constraint, we can make an equation: number of men + number of women + number of children = 30

b. The total cost of the buffet is \$500, and based on the prices for different genders and age groups, we can make an equation: $30 * \text{number of men} + 20 * \text{number of women} + 10 * \text{number of children} = 500$



2. 算法设计

1. 总人数是30人，总费用是500元。需要找出满足这两个条件的男人、女人和小孩的人数。
2. 可以使用三个循环，分别代表男人的人数 (men)、女人的人数 (women) 和小孩的人数 (children)。这些循环的范围通常从0到30，因为人数不能为负数，也不可能超过总人数。
3. 在每一组循环迭代中，计算总费用，即 $\text{total_cost} = 30 * \text{men} + 20 * \text{women} + 10 * \text{children}$ 。
4. 然后，检查是否满足两个条件：总人数为30人 ($\text{men} + \text{women} + \text{children} == 30$) 和总费用为500元 ($\text{total_cost} == 500$)。
5. 如果条件满足，就表示找到了一组合理的人数组合，输出男人、女人和小孩的人数。
6. 继续迭代，直到找到所有满足条件的人数组合。

2.Design algorithm

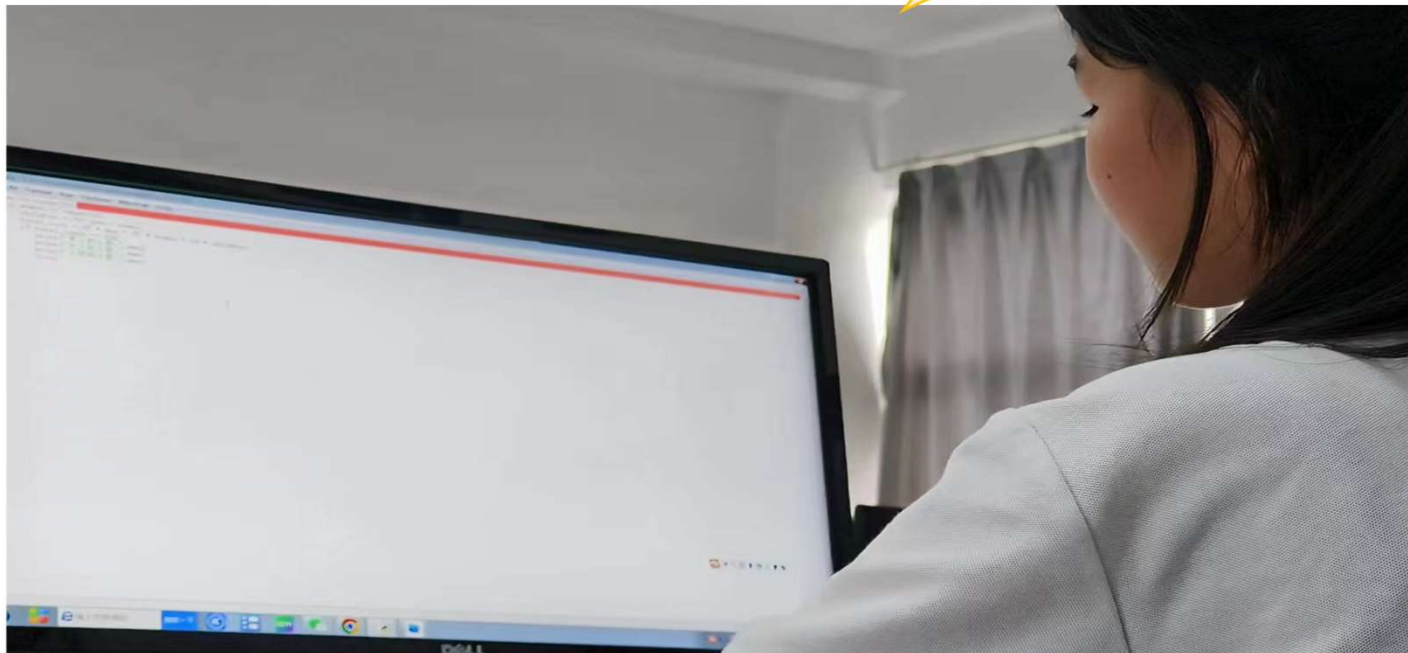
1. The total number of people is 30 and the total cost is \$500. It is necessary to find the number of men, women and children who fulfil these two conditions.
2. Three loops can be used, representing the number of men, women and children. These loops usually range from 0 to 30, because the number of people cannot be negative and cannot exceed the total number of people.
3. In each set of loop iterations, we calculate the total cost, i.e. $\text{Total_cost} = 30 * \text{men} + 20 * \text{women} + 10 * \text{children}$.
4. Then, check that two conditions are met: the total number of people is 30 ($\text{men} + \text{women} + \text{children} == 30$) and the total cost is \$500 ($\text{total_cost} == 500$).
5. If the conditions are met, it means that a reasonable combination of the number of people was found, output the number of men, women and children
6. Continue to iterate until you find all combinations of numbers that satisfy the condition.

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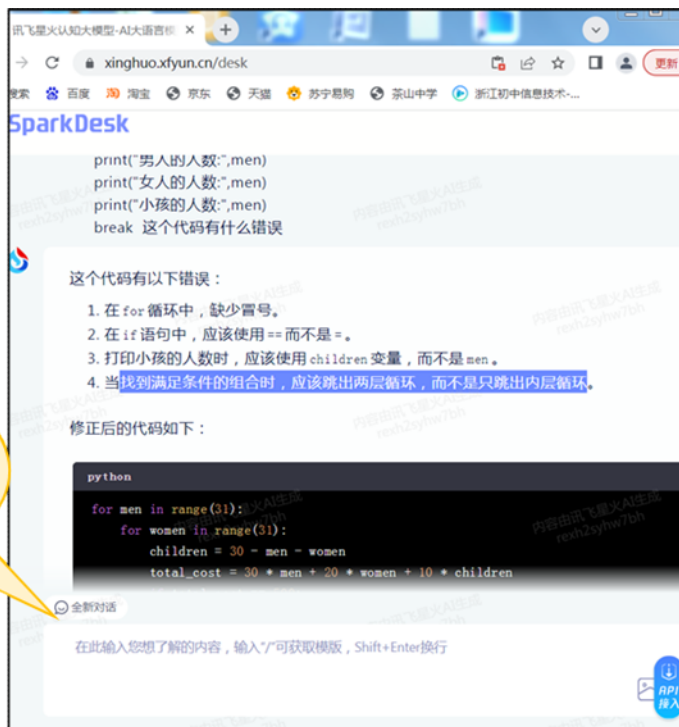
```
for men in range(31)
    for women in range(31)
        children = 30 - men - women
        total_cost = 30 * men + 20 * women + 10 * children
        if total_cost == 500:
            print("男人的人数：", men)
            print("女人的人数：", women)
            print("小孩的人数：", children)
            break
```

Code in IDE



Debugging
with
GenAI

Debugging
code and
completing
reflection
sheets



说明：

Python错误类型定义如下：

- (1) SyntaxError: 语法错误
- (2) IndentationError: 缩进错误
- (3) NameError: 变量名错误
- (4) TyperError: 类型错误

Reflection
sheets

★ 1. What

What type of error was made?

SyntaxError
IndentationError

★ 2. Why

Why did the error occur?

The For loop statement is missing a colon.
Variable assignment is done with '='.

★ 3. How1

How to correct the error?

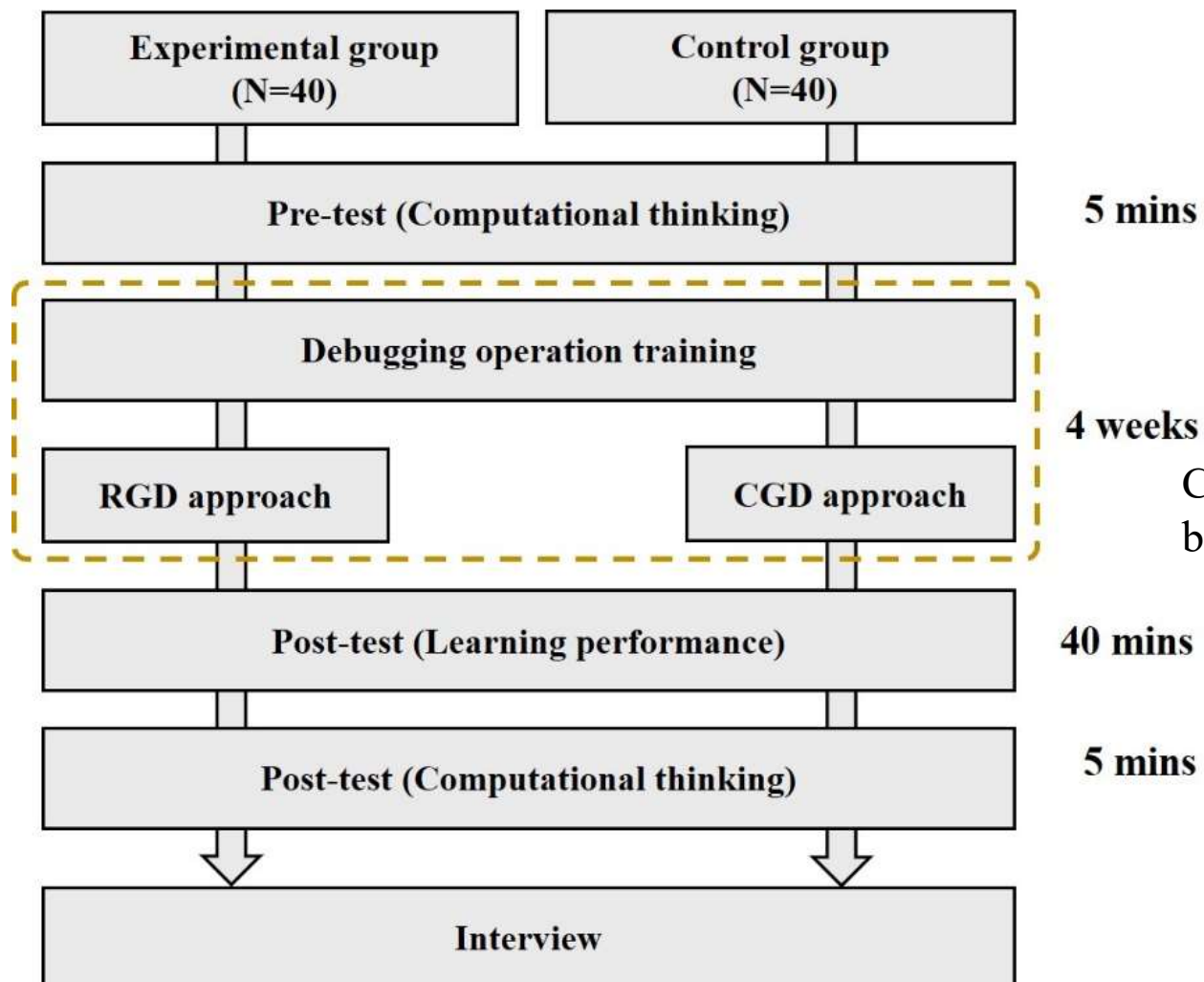
The For loop statement ends with a colon.
Variable assignment with '==' instead of '='.

★ 4. How2

How to avoid making the error again?

Intensive practice to master the syntax

GenAI-based
debugging with
the **reflective
strategy**



Conventional GenAI-
based debugging

Chen, Y., Zhang, X., & Hu, L. (2024). A progressive prompt-based image-generative AI approach to promoting students' achievement and perceptions in learning ancient Chinese poetry. *Educational Technology & Society*, 27(2), 284-305. [https://doi.org/10.30191/ETS.202404_27\(2\).TP01](https://doi.org/10.30191/ETS.202404_27(2).TP01)

A progressive prompt-based image-generative AI approach to promoting students' achievement and perceptions in learning ancient Chinese poetry

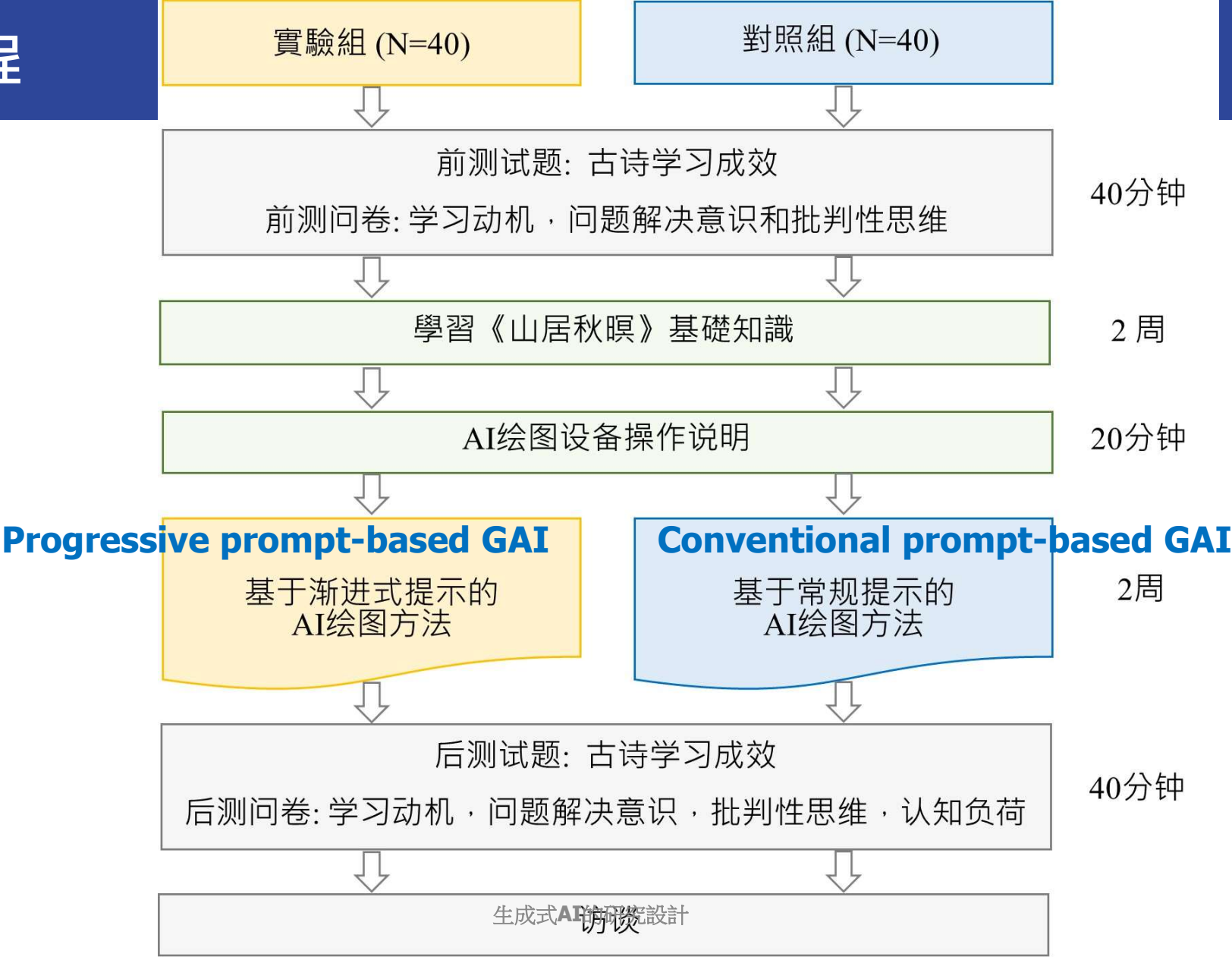
Yuchen Chen, Xinli Zhang* and Lailin Hu

Department of Educational Technology, Wenzhou University, Wenzhou, China // oakleychen@foxmail.com // zhxl@wzu.edu.cn // hll@wzu.edu.cn

*Corresponding author

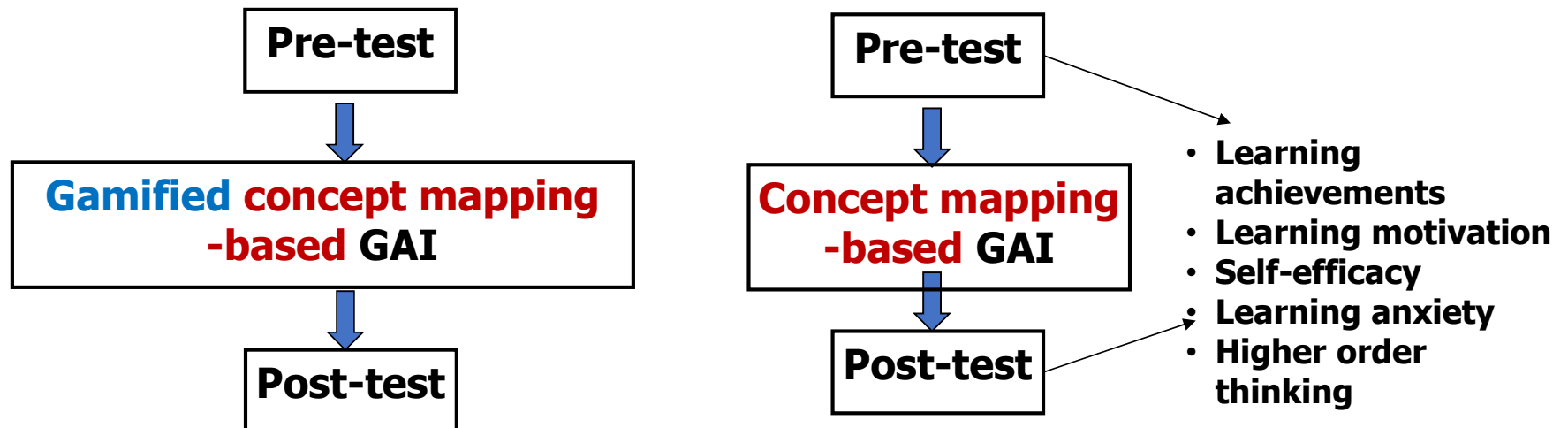
ABSTRACT: In conventional ancient Chinese poetry learning, students tend to be under-motivated and fail to understand many aspects of poetry. As generative artificial intelligence (GAI) has been applied to education, image-GAI (iGAI) provides great opportunities for students to generate visualized images based on their descriptions of poems, and to situate students in a context similar to what a poem describes. In addition, the progressive prompt is a strategy that can progressively provide students with clues and guidance in technology-enhanced learning environments. Hence, this study proposed a progressive prompts-based image-GAI (PP-iGAI) approach to support students' ancient Chinese poetry learning. To evaluate its effectiveness, the present study employed a quasi-experiment design and recruited 80 fifth-grade elementary school students to engage in one of two conditions: one class was assigned as the experimental group and adopted the PP-iGAI approach, while the other class was assigned as the control group and used the conventional prompt-based iGAI (C-iGAI) approach. The results revealed that the PP-iGAI approach could better promote students' learning achievement, extrinsic motivation, problem-solving awareness, critical thinking, and learning performance. In addition, no significant differences were found in the two groups' cognitive load. Moreover, the results of the interview disclosed the learning perceptions and experiences of both groups. Accordingly, the present study can provide a reference not only for ancient Chinese poetry learning but also for the application of GAI in educational fields for future research.

實驗流程



Generative AI in Education research design(3B)

- Incorporating TWO effective strategies or tools into GAI-supported learning:



ChatGPT 的教育研究要測量什麼？

- **學習成就 (測驗成績)**
- **自我效能、學習參與、學習動機**
- **專題活動：創作思考表現、合作傾向、溝通傾向、批判思考傾向、問題解決傾向**
- **討論活動：溝通傾向、批判思考傾向、問題解決傾向**
- **個人任務或學習單：批判思考傾向**
- **問題解決任務 (例如OSCE)：透過評分標準來測量任務的表現、批判思考傾向、問題解決傾向**

ChatGPT 的教育研究用什麼理論來支持？

- **Social development theory**
 - **Emphasizing that knowledge is constructed through interaction with others**
- **Double-loop learning theory**
 - **Emphasizing the importance of acquiring additional knowledge or seeking advices before making attempts to solve problems.**



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推薦閱讀

Single loop or double loop learning: English vocabulary learning performance and behavior of students in situated computer games with different guiding strategies

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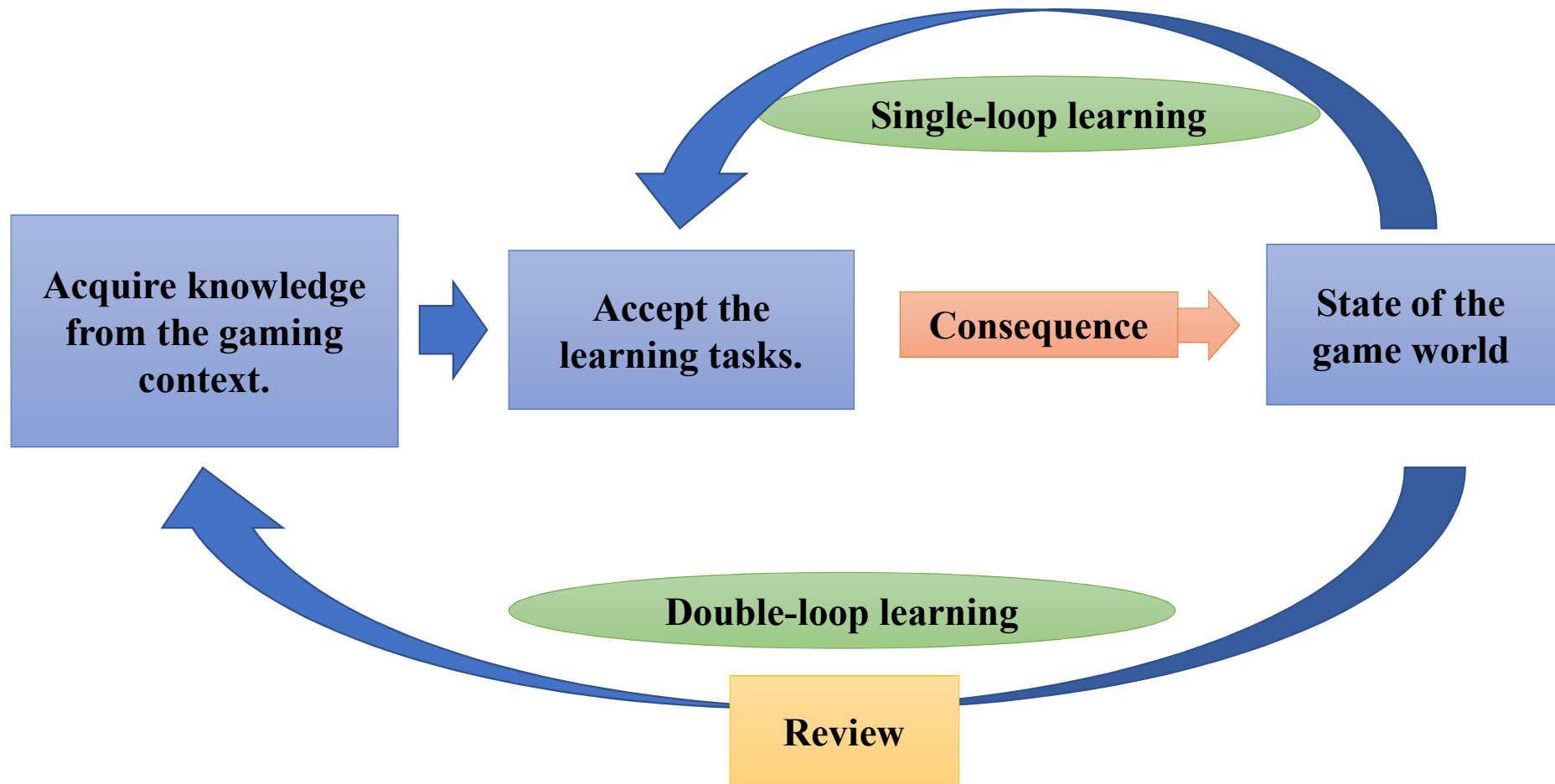
Available online 27 July 2016

ABSTRACT

In this study, a situated computer game was implemented for engaging students in English vocabulary contexts. Furthermore, two test-item guiding approaches, the cloze and multiple-choice guiding strategies, were embedded in the game to serve as guidance for the students. To investigate the students' performance and behaviors of learning English vocabulary with different guiding strategies, two classes of students were included to learn

生成式AI的研究設計

Double-loop learning theory





ChatGPT 的論文寫作注意事項

- 提到**ChatGPT**時，不要用**keywords**或**Search**等字眼；請使用**Prompts**及**Generate** (或**Provide**)
- 要強調**ChatGPT**提供的資料是用來刺激學員的多元思考，而非代替學員思考或提供解答；所以學員被告知要判斷其資料的正確性，並且透過文獻進行驗證
- 要強調**ChatGPT**的應用是基於教育理論（例如社會建構主義）；透過認知衝突來強化學生的反思及知識建構（要引用文獻），而非只是幫忙找答案
- 學習過程的系統畫面、學習單、**prompts**、回饋的使用方式都要詳細說明

運用生成式AI的歷程反思學習單

活動階段	說明	內容：
闡述給予生成式 AI 的提示	請提供你對於 ChatGPT 下達的提示或指令。 與 ChatGPT 互動，持續追問是很重要的。因此，請把你每一次下達的提示或指令分開呈現。	第一次： 第二次： 第三次：
呈現 GAI 的建議	請展現你每一次下達提示或指令後， ChatGPT 的回應內容。	第一次： 第二次： 第三次：
驗證 GAI 的建議	請注意： GAI 的解答不一定正確；因此，針對 ChatGPT 每次的回應內容，請說明你做了什麼驗證的行動（例如用 Google 搜尋相關資訊）；若覺得不需要驗證，則寫「無」。	第一次： 第二次： 第三次：
比較個人的想法與 GAI 的異同	針對這次的任務，你自己有什麼想法或是答案？ 比較你的想法與 ChatGPT 提供資訊的相同或不同點；你會堅持自己的想法，還是採用 ChatGPT 的建議？	寫下你原來的想法： 寫下與 ChatGPT 提供的資訊的比較：
呈現最後的結果或解答	根據上述的互動、驗證及比較過程，寫下你執行本任務最後的結果或解答	結果或解答：

Hwang, G.-J., & Chen, N.-S. (2023). Editorial Position Paper: Exploring the Potential of Generative Artificial Intelligence in Education: Applications, Challenges, and Future Research Directions. *Educational Technology & Society*, 26(2). [https://doi.org/10.30191/ETS.202304_26\(2\).0014](https://doi.org/10.30191/ETS.202304_26(2).0014)

Editorial Position Paper: Exploring the Potential of Generative Artificial Intelligence in Education: Applications, Challenges, and Future Research Directions

推薦閱讀

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ABSTRACT: Generative artificial intelligence (GAI) applications, such as ChatGPT (Chat Generative Pre-trained Transformer) and Midjourney, have recently attracted much attention from researchers and school teachers. While many people are eager to learn more about GAI applications, some scholars are concerned about the potential misuse of them. It is predicted that the use of GAI applications will increase rapidly in the coming years. Therefore, it is important to consider the challenges and research issues through some concrete application examples of using GAI for education. In this position paper, the authors aim to address these issues from the perspectives of academic research and educational objectives. Along with defining GAI, several illustrative examples of using GAI applications in educational settings are provided. Moreover, potential research issues of GAI-based learning, including research design, relevant learning strategies, research focus, and measuring tools, are discussed. ET&S journal is especially welcoming research on unlocking the potential of GAI for education to realize the two notions of “Knowing [why] is the essential element for learners to have in-depth understanding” and “It is all about prompts: Get rid of the ‘search’ mindset and use ‘programming prompt’ instead.”



結論：發表ChatGPT論文須知

- 對ChatGPT有正確的理解（它不是搜尋引擎）
- 對ChatGPT有充分的使用能力及態度
- 對於ChatGPT的使用情境有充分描述，並提供圖文舉例說明
- 引用教育理論來支持使用ChatGPT的必要性
- 如果可能，考慮把ChatGPT-based learning作為控制組；找一個合理的學習策略或工具作為實驗組的介入
- 提醒：歐美國家要求13歲以上的學生才能夠使用ChatGPT；中國大陸不允許使用ChatGPT

《生成式AI融入教育的理論、策略與研究設計》是世界首本全面探討生成式AI研究議題與方法的專著，與其他只強調工具操作或教學應用的書籍相比，這本書對生成式AI在教育研究的理論、策略、研究設計與分析方法都有深入的討論。

書中首先概述了生成式AI在教育領域的研究趨勢，並指出一般學者在進行相關研究所遭遇的困難及需要改善之處。書中針對多數學者在研究過程遭遇的問題，提出了可行的研究設計模式，並透過結合不同學習策略及教育理論，來提升研究的價值。

此外，書中還透過實例展示生成式AI在不同學科、對象及學習活動的研究設計實例與分析結果。對於有意進行生成式AI研究及教學的學者及教師，這是一本必讀的啟蒙書。



定價：NT\$ 600元

生成式AI 融入教育的理論、策略與研究設計

黃國禎、涂芸芳 主編

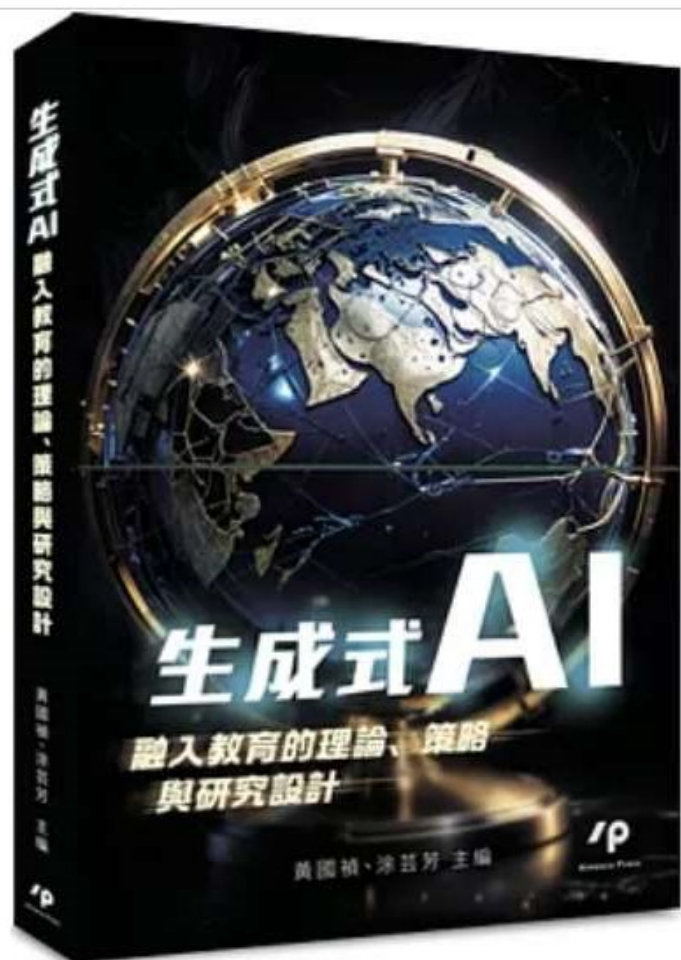


生成式AI

融入教育的理論、策略 與研究設計

黃國禎、涂芸芳 主編





生成式AI融入教育的理論、策略與研究設計

編者：黃國禎, 涂芸芳

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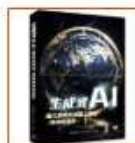
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Call for papers

18 February 2025

Generative Artificial Intelligence-enhanced Adaptive/Personalized Learning

Submission deadline: 30 June 2025

This special issue aims to explore innovative applications of GenAI in adaptive learning, pedagogical theories, instructional strategies, and assessment models. It will provide a platform for discussing the challenges and opportunities of AI-driven education and highlight best practices for integrating GenAI into various educational contexts.

Guest editors:

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黃教授已發表超過**900**篇的論文，包括將近**500**篇發表在SSCI期刊。目前擔任**50**多個SSCI/SCI學術期刊的論文審查委員，International Journal of Mobile Learning and Organisation、Journal of Computers in Education及Computers & Education: Artificial Intelligence的主編，以及IEEE Transactions on Education 副主編。

