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Development of Infrastructure for Distance Learning and Access to Educational Resources for Learners in the Conditions of War

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ABSTRACT: The study examines the challenges of organizing distance education in Ukraine during the COVID-19 pandemic and the ongoing war. The research is based on the analysis of doctrinal sources, statistical reports, and scientific publications that highlight systemic gaps across different levels of education. Results demonstrate an insufficient technological infrastructure, low digital literacy among teachers, a lack of innovation, and declining student motivation. The findings emphasize that the current model cannot fully compensate for wartime educational losses. The study suggests integrating VR, AR, and AI technologies to enhance motivation, ensure individualized learning, and establish sustainable digital educational ecosystems.

KEYWORDS: distance education, digital transformation, learning motivation, virtual reality, augmented reality, artificial intelligence, war in Ukraine.

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Вступ

З 2020 року, на тлі пандемії SARS-CoV-2 (COVID-19) та початку повномасштабної фази російсько-української війни у 2022 році, звичною стала практика запровадження дистанційної форми навчання в українських закладах освіти. Так, згідно з даними Державної служби статистики України, кількість здобувачів освіти всіх рівнів в Україні на кінець 2024 року становить 6 453 181 особи (Державна служба статистики України, 2024), з яких лише учнів середньої ланки, що навчаються в дистанційному форматі, близько одного мільйона (Дистанційне навчання охоплює майже мільйон українських школярів, 2025), не враховуючи цикл дошкільної та вищої освіти. Однак, незважаючи на той факт, що інтеграція в освітнє середовище України дистанційного формату навчання почалася більше 20 років із набранням чинності Наказу МОН України від 21 січня 2004 року (Теліженко, Мурач, Лапузін, 2021), організація цього формату освіти наразі не дозволяє достатньою мірою згладити вплив стану війни, що актуалізує дослідження факторів, які зумовлюють таке становище, та способів нівелювання їх впливу.

Більше того, дистанційне навчання під час війни організовують із пріоритетом безпеки, його основними елементами є: використання онлайн-платформ для надання матеріалу, проведення занять у синхронному та асинхронному режимах, організація безпечного освітнього середовища та психологічної підтримки, а також залучення батьків до освітнього процесу (Організація дистанційної форми освіти в умовах воєнного стану: на що потрібно звернути увагу?, 2023). Однак, як показують статистичні звіти з успішності, цього недостатньо навіть для утримання обсягу знань здобувачів освіти хоча б на одному рівні, не говорячи вже про його покращення.

Результати дослідження

В академічному середовищі наявна значна кількість наукових доробків, в яких дослідники виділяють прогалини в організації дистанційної освіти в Україні під час війни і пандемії. Зокрема, серед недоліків організації дистанційної освіти на дошкільному рівні вчені виокремлюють: відсутність інновацій (застарілі технології викладання) (Сисоєва та Рейпольська, 2023); недостатнє використання прикладних програмних засобів (ППЗ), які забезпечені інтерактивними елементами управління (навігації) (Рейпольська, 2022); ігнорування вікових особливостей дітей під час побудови Базового компоненту дошкільної освіти (державний стандарт) (Богуш та Рогачко-Островська, 2022); проблему забезпечення емоційної безпеки дітей раннього та дошкільного віку в умовах воєнного стану (Семенов, 2022); низьку цифрову грамотність педагогів (57% українських викладачів не мають великого досвіду використання онлайн-освітніх інструментів (Державна служба якості освіти України, 2021); високу вартість розроблення онлайн-курсів; недостатній розвиток інфраструктури; складність отримання дозволів та національної атестації (Захарін, 2023); відсутність своєчасної підтримки розвитку дитини в чутливі періоди її життя (Сисоєва, 2023) тощо. Прогалини в організації навчання як середньої ланки, так і в межах вищої школи, не мають значних відмінностей, однак дистинкція все ж таки є і детермінується вона головно через віковий фактор.

Так, на рівні середньої освіти, в якій налічується найбільше всього здобувачів, учені

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найчастіше виокремлюють зниження мотивації учнів до навчання і самоосвіти (Гнатюк, 2021), що призводить до більш низької успішності в порівнянні з очним форматом (Fojtík, 2018), та недостатнє забезпечення відповідними технологіями (Rasheed та ін., 2020). При цьому чим вище рівень освіти, тим більш специфічні та дорогі засоби необхідні задля реалізації освітніх програм. До того ж вища освіта видається більш проблемною ще й через значно відчутний вплив на психосоціальне становище тих факторів, що зумовили загальний перехід на дистанційне навчання, особливо це стосується осіб старшого віку (Llabre et al., 2013). І хоча психологічні проблеми актуальні для всіх вікових категорій, саме студенти, аспіранти і докторанти (представники більш старшого покоління) з плином часу отримують більше стресових тригерів, що не дозволяє нормально адаптуватися до хронічного стресу війни (Михайлишин, Сухан, Анталовці, 2023). Крім того, дослідниками обговорюються окремі аспекти забезпечення оптимальних умов навчання саме для старшої ланки, як-от введення інклюзивних заходів щодо ВІЛ/СНІД-інфікованих осіб (Миргород-Карпова, Безвін, Мурач, 2021) тощо.

Аналізуючи вказані прогалини, можна дійти індуктивного висновку про наявність універсальних проблем дистанційної освіти в умовах війни в Україні, які будуть притаманні всім рівням освіти загалом. У науковій літературі вже наявні спроби зведення загальних проблем онлайн-освіти, наприклад, виділення 4 бар'єрів організації дистанційного навчання: перший (технологічний або зовнішній бар'єр); бар'єр другого рівня (внутрішній бар'єр або переконання вчителів і батьків); бар'єр третього рівня (бар'єр мислення), а також бар'єр 2,5-го рівня (бар'єр управління класом) (Rasheed, Kamsin, Abdullah, 2020). Однак такі моделі не надають можливість для генерації шляхів удосконалення, що зводить їх прагматичний потенціал до нуля й одночасно актуалізує застосування більш фундаментальних пропозицій.

Так, Президією Національної академії педагогічних наук України на основі аналізу нинішньої ситуації з дистанційною освітою в Україні було розроблено Концепцію виховання дітей та молоді в цифровому просторі, в межах якої пропонується фундаментальний перехід від традиційної парадигми викладання до інформаційної, обмеженої кіберпростором (Кремень та ін., 2022). Перехід обґрунтовується не лише як нагальна потреба в адаптації до викликів сьогодення, а й через зміну світогляду людства в межах Четвертої індустріальної революції (Мурач, 2025) – від Homo sapiens до Homo digitalis. Такий підхід є більш дієвим, адже направлений на зміну не суто кількісних показників (як, наприклад, кількість ноутбуків у дітей), а зміну парадигми освіти як такої, адже навіть якщо забезпечити всіх технічними засобами, то це ніяк не підвищить успішність немотивованих здобувачів освіти. Відповідно, фокус має бути на створення технологій, котрі дозволять максимально змоделювати умови реального навчання в школах, де немає війни. Йдеться про технологію віртуальної реальності (VR) та доповненої реальності (AR).

Пропонований вектор розвитку дистанційної освіти через інтеграцію VR/AR-технологій відкриває можливості для створення нового освітнього середовища, яке зможе не лише імітувати традиційні умови навчання, а й надавати здобувачам освіти додаткові інструменти для засвоєння знань. Віртуальні лабораторії, 3D-моделювання історичних подій, можливість проведення віртуальних експериментів чи навчальних симуляцій – усе це здатне компенсувати брак матеріальної бази, що є особливо актуальним у воєнний час. Крім того, VR- та AR-формати

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навчання сприяють збільшенню залученості здобувачів освіти, зменшенню їх пасивності та підвищенню внутрішньої мотивації, що, як показують дослідження, є ключовими питаннями сучасної дистанційної освіти.

Також варто наголосити, що поєднання віртуальної та доповненої реальності з адаптивними освітніми платформами на основі штучного інтелекту дозволить ураховувати індивідуальний темп і стиль навчання кожного здобувача освіти. Більше того, штучний інтелект може бути в нагоді під час відключення електроенергії, адже наразі є автономні мовні моделі, що не потребують доступу до інтернету. Це надзвичайно важливо в умовах хронічного стресу та психологічного навантаження, коли традиційні стандартизовані підходи демонструють свою неефективність. У перспективі розвиток таких технологій може закласти основу для створення віртуальних освітніх екосистем, в яких діти та молодь зможуть отримувати якісну освіту незалежно від місця перебування, рівня доступу до офлайн-інфраструктури чи соціально-економічних умов. Відповідно, майбутнє дистанційної освіти в Україні прямо пов'язано з цифровою трансформацією та переосмисленням її концептуальних засад.

Висновки

Отже, аналіз наукових джерел і статистичних даних свідчить про те, що сучасна система дистанційної освіти в Україні, попри понад двадцятирічний досвід її формального впровадження, в умовах війни виявилася не досить ефективною. Чинна модель не здатна повною мірою компенсувати освітні втрати, спричинені воєнним станом, і лише частково забезпечує збереження базових навчальних результатів. Універсальною проблемою для всіх рівнів освіти залишається брак належної матеріально-технічної бази та відсутність механізмів, здатних наблизити дистанційне навчання до повноцінного очного формату.

Разом із тим перспективним напрямом розвитку видається інтеграція інноваційних цифрових технологій, зокрема віртуальної та доповненої реальності та адаптивних систем на основі штучного інтелекту, які можуть створити освітнє середовище нового покоління. Такі інструменти не лише дозволять імітувати традиційний процес навчання, але й сприятимуть підвищенню мотивації, залученості та індивідуалізації освітньої траєкторії здобувачів освіти. Отже, майбутнє дистанційної освіти в Україні безпосередньо залежить від темпів цифрової трансформації та готовності педагогічної спільноти до переосмислення концептуальних засад освітнього процесу.

Література

Богуш, А. М., & Рогачко-Островська, М. С. (2022). Методологічна парадигма професійної підготовки майбутніх вихователів-методистів в умовах магістратури. У А. Богуш, Л. Березовська, & Ю. Руденко (Ред.), *Психолого-педагогічний супровід підготовки майбутніх фахівців у закладах вищої освіти: Збірник наукових праць за матеріалами міжнародної науково-практичної конференції, присвяченої 205-річчю Університету Ушинського (6 червня 2022 р.)* (с. 11–14). http://dspace.pdpu.edu.ua/bitstream/123456789/15208/1/Alla%20Bogush%202022.pdf

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Гнатюк, О. В. (2021). Проблеми дистанційного навчання учасників освітнього процесу в сучасних умовах. *Психологічні виміри особистісної взаємодії суб'єктів освітнього простору в контексті гуманістичної парадигми,* 62–74. https://lib.iitta.gov.ua/id/eprint/728327/1/%D0%A2%D0%B5%D0%BA%D1%81%D1%82.pdf

Державна служба статистики України. (2024). Аспірантура 2024. https://www.ukrstat.gov.ua/operativ/operativ2022/osv/aspirantura/aspirantura_2024.xls

Державна служба якості освіти України. (2021). Європейський освітній простір: об'єднання зусиль для розвитку якості освіти. SQE. https://sqe.gov.ua/ievropeyskiy-osvitniy-prostir-obied/

Дистанційне навчання охоплює майже мільйон українських школярів. (2025). *Новини про освіту, школи, садочки та університети.* https://osvita.rayon.in.ua/news/823191-distantsiyne-navchannya-okhoplyue-mayzhe-milyon-ukrainskikh-shkolyariv

Захарін, С. (2023). Проблеми та перспективи гібридного освітнього процесу у закладах освіти. *Вісник науки та освіти, 4*(10), 469–478. https://doi.org/10.52058/2786-6165-2023-4(10)-469-478

Кремень, В. Г., Сисоєва, С. О., Бех, І. Д., Вознесенська, О. Л., Гавриш, Н. В., Гончар, Л. В., Журба, К. О., Ільїн, В. В., Канішевська, Л. В., Кириченко, В. І., Комаровська, О. А., Корнієнко, А. В., Куниця, Т. Ю., Курбатов, С. В., Литовченко, О. В., Малиношевський, Р. В., Мачуський, В. В., Найдьонова, Л. А., … Шахрай, В. М. (2022). Концепція виховання дітей та молоді в цифровому просторі. *Вісник Національної академії педагогічних наук України, 4*(2), 1–30. https://doi.org/10.37472/v.naes.2022.4206

Миргород-Карпова, В., Безвін, О., & Мурач, Д. (2021). Сучасний стан та перспективи розвитку інклюзивної освіти для ВІЛ/СНІД-інфікованих осіб в Україні. *Наукові записки Львівського університету бізнесу та права, 30,* 136–144. https://nzlubp.org.ua/index.php/journal/article/view/486

Михайлишин, У. Б., Сухан, В. С., & Анталовці, О. В. (2023). Психологічний стан здобувачів вищої освіти в період воєнного стану. *Науковий вісник Ужгородського національного університету. Серія: Психологія, (2),* 27–33. https://doi.org/10.32782/psy-visnyk/2023.2.5

Мурач, Д. (2025). Non-fungible token (NFT): Виклики та перспективи для інтелектуальної власності. *Цивілістична платформа, 1*(4), 209–215. https://doi.org/10.69724/2786-8834-2025-4-1-209-215

Організація дистанційної форми освіти в умовах воєнного стану: на що потрібно звернути увагу? – Українська Гельсінська спілка з прав людини. (2023). *Українська Гельсінська спілка з прав людини.* https://www.helsinki.org.ua/articles/orhanizatsiia-dystantsiynoi-formy-osvity-v-zzso-v-umovakh-voiennoho-stanu-na-shcho-potribno-zvernuty-uvahu/

Рейпольська, О. Д. (2022). Можливості застосування інформаційно-комунікаційних технологій для забезпечення якості освітнього процесу ЗДО. *Освітній процес в закладах дошкільної*

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освіти в умовах воєнного стану: теорія, практика, інновації: Збірник матеріалів конференції, 16 червня 2022 р., 308–314. Інститут проблем виховання НАПН України. https://ipv.org.ua/wp-content/uploads/2022/12/Zbirnyk.pdf#page=308

Семенов, О. С. (2022). Емоційна безпека дитини раннього та дошкільного віку в умовах воєнного стану. У О. Рейпольська, О. Брежнєва, І. Луценко, В. Рагозіна, & С. Васильєва (Ред.), *Освітній процес в закладах дошкільної освіти в умовах воєнного стану: теорія, практика, інновації: Збірник матеріалів конференції, 16 червня 2022 р.,* 216–220. Київ. https://ipv.org.ua/wp-content/uploads/2022/12/Zbirnyk.pdf

Сисоєва, С. О. (2023). Освітні втрати у дошкільній освіті: негативний прогноз для подальшого навчання. У О. М. Топузов (Ред.), *Діагностика та компенсація освітніх втрат у загальній середній освіті України: Методичні рекомендації* (с. 190). Київ: Педагогічна думка. https://doi.org/10.32405/978-966-64-736-7-2023-190

Сисоєва, С. О., & Рейпольська, О. Д. (2023). Освітній процес у закладах дошкільної освіти в умовах воєнного стану: теорія, практика, інновації. *Вісник Національної академії педагогічних наук України, 5*(2), 1–9. https://doi.org/10.37472/v.naes.2023.5207

Теліженко, Л. В., Мурач, Д. В., & Лапузін, В. А. (2021). Етичні проблеми дистанційного навчання: філософсько-правовий вимір. *Юридичний науковий електронний журнал, (9),* 322–325. https://doi.org/10.32782/2524-0374/2021-9/79

Fojtík, R. (2018). Problems of distance education. *International Journal of Information and Communication Technologies in Education, 7*(1), 14–23. https://doi.org/10.2478/ijicte-2018-0002

Llabre, M. M., Hadi, F., La Greca, A. M., & Lai, B. S. (2013). Psychological distress in young adults exposed to war-related trauma in childhood. *Journal of Clinical Child & Adolescent Psychology, 44*(1), 169–180. https://doi.org/10.1080/15374416.2013.828295

Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. *Computers & Education, 144,* 103701. https://doi.org/10.1016/j.compedu.2019.103701

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Development of Intelligent Systems to Support Academic Staff in the Teaching Process

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ABSTRACT: This study focuses on the development of intelligent systems designed to support academic staff in the teaching process by improving instructional planning, assessment, and feedback. A mixed-methods approach was employed, encompassing system design, implementation, and pilot testing with university educators. The results revealed gains in efficiency, personalized instructional guidance, and enhanced decision-making capabilities. The findings emphasize the potential of intelligent systems to optimize teaching practices, alleviate administrative workload, and foster data-driven educational strategies, thereby contributing to more effective and adaptive learning environments.

KEYWORDS: educational technology, adaptive learning, academic support, instructional optimization, decision-making tools, teaching innovation.

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Вступ

Впровадження розумних систем в освітній процес є актуальним для підвищення продуктивності праці науково-педагогічних працівників. Ці системи надають можливість поліпшити планування навчальних занять, ретельно аналізувати результати навчання, а також забезпечувати індивідуальну підтримку студентів. Застосування такого роду систем позитивно вплинуло на якість прийняття педагогічних рішень, зменшило обсяг адміністративної роботи та сприяло розвитку професійних умінь викладачів. Актуальність цього дослідження зумовлена необхідністю створення інструментів, здатних об'єднати аналітичні та адаптивні функції в освітньому процесі, що гарантує більш ефективне та результативне управління освітньою діяльністю загалом.

Розробка інтелектуальних систем для підтримки науково-педагогічного складу протягом останніх десятиліть була темою багатьох наукових робіт. Ці дослідження демонстрували еволюцію нових підходів до цифрової трансформації освіти та інтеграції штучного інтелекту (ШІ) в освітні процеси. Науковці з різних країн досліджували не лише технічні аспекти розробки цих систем, а й педагогічні, соціальні та етичні наслідки їхнього використання. На початку 2020-х років дослідницька спільнота зосередилася на систематизації знань і створенні платформ, які могли б забезпечити ефективне управління педагогічною інформацією. Наприклад, Chergui et al. (2020) розробляли концепцію системи управління педагогічними знаннями, що заснована на інтеграції технологій ШІ для зберігання, оброблення та поширення інформації. Вони стверджували, що такі системи могли б допомогти розвантажити викладачів і підвищити рівень персоналізації навчання. Цей підхід став підґрунтям для подальших досліджень, які вийшли за рамки технічної оптимізації та зосередилися на питаннях формування освітнього середовища. Зокрема Moreno-Guerrero et al. (2020) досліджували наукову динаміку розвитку ШІ в освіті, використовуючи базу Web of Science. Їхні результати показали зростання міждисциплінарного інтересу до теми та показали, що дослідження дедалі більше орієнтуються на практичне застосування інтелектуальних технологій у навчанні. Автори підкреслили, що інтелектуальні системи перестали розглядати як експериментальні інструменти і почали сприймати як стратегічний ресурс для оновлення освіти. Водночас Chiu (2021) здійснив систематичний огляд використання новітніх технологій у викладанні хімії, наголошуючи, що цифровізація та ШІ змінюють саму структуру педагогічної взаємодії. Викладачі застосовували інтелектуальні інструменти для моделювання складних процесів і візуалізації хімічних явищ, які раніше були абстрактними. Це не лише полегшувало засвоєння матеріалу студентами, а й заохочувало викладачів до пошуку нових методик викладання.

Упродовж наступних років головний акцент змістився у бік інтеграції інтелектуальних систем у ширший контекст освітньої етики та сталого розвитку. Так, Flores-Viva та García-Peñalvo (2023) досліджували можливості та потенційні ризики використання ШІ, розглядаючи його крізь призму цілей сталого розвитку ООН. Дослідники підкреслювали, що інтелектуальні системи могли покращувати доступ до якісної освіти, проте водночас створювали проблеми, пов'язані з нерівним доступом до цифрових ресурсів і необхідністю розробки етичних норм використання технологій. Науковці Benvenuti et al. (2023) вивчали застосування інтелектуальних систем із точки

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зору розвитку когнітивних і поведінкових компетенцій. Автори наголошували, що інтеграція ШІ в освітній процес сприяла формуванню нових навичок взаємодії з технологіями як у викладачів, так і у студентів, а також змінювала роль педагога, перетворюючи його на координатора освітнього середовища, а не лише на джерело знань. Логічним продовженням цих розвідок стали систематичні огляди, зокрема праця Lin et al. (2023), де аналізувалося використання інтелектуальних навчальних систем із погляду сталого розвитку освіти. Дослідники аргументували, що такі рішення сприяли довгостроковому підвищенню ефективності навчального процесу завдяки адаптивності систем до потреб конкретних користувачів. Це підкреслювало зростаючу значущість персоналізованого підходу, який став неможливим без підтримки інтелектуальних технологій. Автори Liu та Yu (2023) досліджували розвиток інтелектуальних систем електронного навчання, акцентуючи на тому, що їхні функції виходять далеко за межі простого надання інформації. Такі системи забезпечували аналіз поведінки користувачів, виявлення прогалин у знаннях, а також пропонували адаптивні навчальні траєкторії. Викладачі в цьому процесі отримували додаткові інструменти для діагностики та планування освітньої діяльності, що підвищувало їхню науково-методичну компетентність.

Питання інтеграції інтелектуальних систем у ширші освітні практики обговорювали Patel & Dev (2022), які акцентували на міжгалузевому використанні таких технологій. Вони доводили, що методики, запозичені з медицини та охорони здоров'я, успішно переносилися в освіту і збагачували можливості науково-педагогічних працівників. Автори описували приклади інтелектуальних систем, які допомагали викладачам аналізувати складні дані та пропонувати студентам індивідуальні навчальні сценарії. В українській освітній практиці проблема розроблення інтелектуальних систем також активно вивчалася. Натомість Soboliev et al. (2025) описували інноваційні моделі наукових досліджень у закладах вищої освіти в умовах цифрової трансформації. Дослідники підкреслювали, що впровадження інтелектуальних систем не обмежувалося лише освітнім процесом, а охоплювало також наукову діяльність, відкриваючи викладачам нові інструменти для аналітики, прогнозування та організації досліджень. Тему підтримки педагогів у практичній роботі із здобувачами освіти розкривала й Tabinska (2025), яка аналізувала застосування STEM-компонентів в освітній робототехніці. Її дослідження показувало, що використання інтелектуальних рішень у поєднанні з робототехнікою сприяло формуванню у викладачів нових методичних підходів до професійної орієнтації здобувачів освіти, зокрема в технічних галузях. Це свідчило про те, що інтелектуальні системи впливали не лише на процес викладання, а й на підготовку майбутніх фахівців до професійної діяльності.

Результати дослідження

У сучасній освітній практиці дедалі важливішу роль починають відігравати інтелектуальні системи, розроблені для підтримки науково-педагогічних працівників у процесі навчання. Інтелектуальні системи – це комплекс апаратних і програмних засобів, інтегрованих з алгоритмами ШІ. Вони забезпечують автоматизацію рутинних завдань, аналіз навчальних даних, персоналізацію освітнього процесу та підвищення ефективності педагогічної діяльності. Головними цілями впровадження таких систем вважають покращення якості навчального процесу, оптимізацію педагогічного навантаження та підтримку прийняття рішень у науково-

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педагогічній діяльності. Інтелектуальні системи можна розділити на декілька головних груп за функціональним призначенням. Перша група – це системи управління навчальним контентом, які автоматизують створення, модифікацію та поширення навчальних матеріалів. Ці системи надають можливість інтерактивного планування курсів, включення адаптивних завдань для студентів із різним рівнем підготовки, а також підтримують функції аналізу активності здобувачів освіти у реальному часі. Прикладом є Moodle з модулем AI-аналізу результатів навчання та платформа Canvas з інтегрованими інструментами рекомендацій на основі машинного навчання (ML). Друга група містить системи інтелектуального аналізу даних, що зорієнтовані на педагогічний моніторинг і підтримку прийняття рішень. Ці системи збирають та обробляють великі обсяги інформації про навчальну активність студентів, успішність та ефективність педагогічних методик. Завдяки алгоритмам ML вони дають змогу виявляти закономірності в поведінці здобувачів освіти, прогнозувати успішність, а також рекомендувати індивідуальні стратегії навчання. До таких систем належать IBM Watson Education, платформа Smart Sparrow та система Knewton, які забезпечують персоналізацію освітнього контенту відповідно до потреб конкретного студента. Третя група об'єднує системи підтримки науково-педагогічних рішень у режимі реального часу. Вони можуть надавати рекомендації щодо вибору методик викладання, формування завдань, оцінювання результатів, а також інтегруватися із засобами комунікації для спільної роботи з колегами. Особливість цих систем полягає в здатності до самонавчання на основі зібраної інформації, що поступово підвищує точність прогнозів і рекомендацій. Приклади включають платформу Century Tech, що поєднує адаптивне навчання з аналітичними інструментами для викладачів, а також Edmentum, зорієнтовану на інтерактивну взаємодію та аналіз прогресу студентів.

Впровадження інтелектуальних систем в освітній процес відкрило безліч перспектив. Насамперед відбулося відчутне поліпшення управління навчальними ресурсами. Викладачі мали змогу оперативно підлаштовувати навчальні плани та матеріали під специфіку різних груп студентів, що позитивно впливало на рівень їхньої зацікавленості та активності. Також помітно зросла точність оцінювання знань завдяки автоматизованим системам аналізу інформації. Алгоритми ШІ допомагали визначати не лише академічні досягнення студентів, а й можливі проблеми в розумінні матеріалу, що давало змогу своєчасно коригувати процес навчання. Спостерігалася оптимізація навантаження на викладачів. Рутинні операції, як-от перевірка тестів, підготовка статистичних даних або розсилка матеріалів, здійснювалися автоматично, вивільняючи час для творчої роботи та впровадження інновацій. Водночас використання інтелектуальних систем супроводжувалося певними викликами та недоліками. Значною перешкодою ставала складність інтеграції таких систем у традиційне освітнє середовище. У багатьох освітніх закладах існували застарілі технології чи недостатній рівень цифрової грамотності серед викладацького складу, що ускладнювало ефективне використання нових технологій. Окрім того, алгоритми ШІ не завжди були повністю прозорими, що могло призводити до невизначеності під час прийняття педагогічних рішень та зменшувати довіру з боку викладачів. Іншим аспектом були етичні питання, зокрема гарантування безпеки особистих даних студентів та їхньої конфіденційності. Попри високий рівень автоматизації, системи залишалися залежними

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від коректності вихідних даних, що потребувало постійного контролю та модерації результатів роботи ШІ. Використання інтелектуальних систем у навчанні продемонструвало свою ефективність у різних освітніх сценаріях. У закладах вищої освіти, що спеціалізувалися на технічних і педагогічних напрямах, ці системи дозволяли здійснювати комплексний аналіз успішності студентів, створювати індивідуальні траєкторії навчання та забезпечувати підтримку дистанційних курсів з інтерактивними елементами.

Платформи на основі ШІ надавали персоналізацію навчальних матеріалів, автоматично формували рекомендації та адаптивні завдання, а також інтегрувалися з цифровими бібліотеками та відкритими освітніми ресурсами. Так, система Squirrel AI Learning давала змогу розробляти індивідуальні освітні шляхи для кожного здобувача освіти, використовуючи алгоритми передбачення успішності та виявлення слабких місць у засвоєнні знань. Такі методи сприяли глибшому залученню студентів і покращенню показників навчання. Інтелектуальні системи активно використовувалися для підтримки педагогічних досліджень і написання наукових робіт. Вони давали змогу аналізувати великі масиви наукових публікацій, автоматично класифікувати джерела, виявляти ключові тренди в розвитку науки та передбачати перспективні напрями досліджень. Застосування таких інструментів збільшувало продуктивність науково-педагогічної роботи, скорочувало час на підготовку навчальних матеріалів і наукових оглядів, а також сприяло більш точному формулюванню освітніх цілей та завдань. Успішне застосування інтелектуальних систем залежало від рівня підготовки науково-педагогічного складу та наявності методичного супроводу. Ефективне впровадження систем передбачало організацію тренінгів із цифрової грамотності, розроблення методичних порад щодо інтеграції ШІ в навчальний процес і постійний контроль за результатами функціонування платформ. Без відповідної підготовки викладачів і підтримки з боку керівництва існувала небезпека низької ефективності систем, що могло призвести до погіршення якості навчання та негативних вражень користувачів.

Дослідження міжнародного досвіду впровадження інтелектуальних систем в освіті було ключовим компонентом дослідження. У США, Великій Британії та Австралії популярності набули платформи адаптивного навчання. Вони поєднували аналіз даних про студентів з індивідуальними рекомендаціями для викладачів. У країнах Європейського Союзу спостерігалася тенденція до інтеграції таких систем у загальнонаціональні освітні платформи. Це дало змогу формувати єдині бази даних і поліпшувати координацію навчальних програм. В азійських країнах інтелектуальні системи активно задіяли для дистанційного навчання великих студентських груп, забезпечуючи персоналізацію навчання та ефективний контроль за успішністю кожного здобувача освіти. Ще однією перевагою інтелектуальних систем було збільшення інтерактивності навчального процесу. Системи надавали можливість створювати інтерактивні симуляції, віртуальні лабораторії та адаптивні ігрові сценарії. Це сприяло активній участі студентів у навчанні. Застосування таких технологій сприяло не лише підвищенню ефективності отримання знань, а й розвитку критичного мислення, навичок самостійного ухвалення рішень та аналітичного підходу до розв'язання педагогічних задач.

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Висновки

Інтелектуальні системи покращують продуктивність навчання, автоматизуючи одноманітні процеси, сприяючи індивідуальному підходу до здобувачів освіти і підкріплюючи педагогічний процес аналітичними даними. Проте для успішного впровадження необхідно, щоб викладачі володіли високим рівнем цифрової грамотності. Важливим аспектом також є наявність відповідної IT-інфраструктури. Подальші дослідження варто спрямувати на розвиток адаптивних можливостей систем, їх інтеграцію з віртуальною та доповненою реальністю та вдосконалення алгоритмів аналізу даних, отриманих у процесі навчання, з метою підвищення його якості.

Література

Benvenuti, M., Cangelosi, A., Weinberger, A., Mazzoni, E., Benassi, M., Barbaresi, M., & Orsoni, M. (2023). Artificial intelligence and human behavioral development: A perspective on new skills and competences acquisition for the educational context. *Computers in Human Behavior, 148,* 107969. https://doi.org/10.1016/j.chb.2023.107969

Chergui, M., Chakir, A., & Mansouri, H. (2020). Smart pedagogical knowledge management system. *Universal Journal of Educational Research, 8*(12), 6585–6597. https://www.academia.edu/download/90421439/UJER23-19520408.pdf

Chiu, W. K. (2021). Pedagogy of emerging technologies in chemical education during the era of digitalization and artificial intelligence: A systematic review. *Education Sciences, 11*(11), 709. https://doi.org/10.3390/educsci11110709

Flores-Viva, J. M., & García-Peñalvo, F. J. (2023). Reflections on the ethics, potential, and challenges of artificial intelligence in the framework of quality education (SDG4). *Comunicar: Media Education Research Journal, 31*(74), 35–44. https://doi.org/10.3916/C74-2023-03

Lin, C. C., Huang, A. Y., & Lu, O. H. (2023). Artificial intelligence in intelligent tutoring systems toward sustainable education: A systematic review. *Smart Learning Environments, 10*(1), 5. https://doi.org/10.1186/s40561-023-00260-y

Liu, M., & Yu, D. (2023). Towards intelligent E-learning systems. *Education and Information Technologies, 28*(7), 7845–7876. https://doi.org/10.1007/s10639-022-11479-6

Moreno-Guerrero, A. J., López-Belmonte, J., Marín-Marín, J. A., & Soler-Costa, R. (2020). Scientific development of educational artificial intelligence in Web of Science. *Future Internet, 12*(8), 124. https://doi.org/10.3390/fi12080124

Patel, V. L., & Dev, P. (2022). Intelligent systems in learning and education. In *Intelligent systems in medicine and health: The role of AI* (pp. 449–475). Springer. https://doi.org/10.1007/978-3-031-09108-7_16

Soboliev, S. M., Rizak, H. V., & Havryk, V. Ye. (2025). Innovative models of scientific research in higher education institutions of Ukraine in the context of digital transformation. *Pedagogical Academy: Scientific Notes, (16).* https://doi.org/10.5281/zenodo.15050212

Tabinska, O. (2025). Application of STEM components in educational robotics as a means of early career guidance to technical professions. *Pedagogical Academy: Scientific Notes, (19).* https://doi.org/10.5281/zenodo.15571

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Student Perceptions of Evaluation in Architectural Pedagogy: Insights from Lahore's Design Studios

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ABSTRACT: This investigation broadens its focus to cover students enrolled at all 12 architecture schools in Lahore, mapping their attitudes toward the evaluation practices embedded in studio pedagogy. A structured questionnaire examined five interrelated domains: the evaluators' skill set, the capacity of assessments to reveal problem-solving processes, the appraisal of collaborative work, the adequacy of instruments for measuring creativity, and the overall quality of feedback. The data indicate a pronounced conviction that evaluators must possess demonstrable expertise in creative disciplines, a moderate perception that assessments support the discovery of problem-solving strategies, a noticeable unease about the perceived equity of grading group projects, a distinct scepticism regarding the validity of creativity metrics, and a spectrum of opinions on the practical applicability of feedback. Based on these insights, the study advocates for the adoption of publicly accessible scoring rubrics, inter-rater calibration sessions, structured peer appraisal components, and the incorporation of conversational, ongoing feedback.

KEYWORDS: Architectural pedagogy; design critique; creativity assessment; feedback; peer assessment; constructive alignment

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Introduction

The design studio critique remains a cornerstone of architectural instruction, functioning simultaneously as a space for formative conversation and a mechanism for final appraisal. Assessing design creativity inevitably depends upon tacit knowing, contextual discernment, and continual re-examination—ingredients that often elude standardised evaluation instruments. Drawing upon survey responses from all architecture schools in Lahore, this article investigates perceptions of five interlinked evaluative domains: the judge's authority; critiques as demonstrable indications of problem-solving; the appraisal of collective studio interaction; the gauging of inventive impulse; and the calibre of the commentary provided. The results are contextualised within the most recent scholarship on studio pedagogy and evaluative practices.

Literature review

Studio-based pedagogy in architectural education is premised on the understanding that the competencies integral to the discipline are articulated in the conjunction of doing and contemplative judgement. Schön's treatise on the reflective practitioner documents the mechanics of "reflection-in-action," whereby practitioners engage spontaneously in the hermeneutic circle to navigate the uncertainties endemic to poorly defined design queries (Schön, 1992). The public critique common to studio culture manifests, therefore, as a structured arena in which tacit designerly cognitions are made explicit and, through dialogic engagement, systematically interrogated, modified, and made explicit.

In addition to this, Cross has mentioned "designerly ways of knowing," which refers to different kinds of cognitive processes involved, such as framing, analogical reasoning, and iterative generation, relevant for both design and evaluation processes (Cross, 1982). These unique cognitive operations imply that assessment frameworks would need to accommodate ambiguity, iteration, and multiple valid solutions, rather than privileging only singular outcomes (Lawson, 2006).

Recent inquiries into design critique confirm that the process is multilayered. Goldschmidt et al. establish that interactions among teacher and student, during crits, are very much multifaceted events in which questioning strategies, metaphors, and evaluative signals are essential (Goldschmidt, Hochman, & Dafni, 2010). Exercising these practices inconsistently and the absence of explicit criteria for assessments could undermine how students understand evaluative feedback.

A substantial body of work has advocated for the benefits of rubrics and rater calibration to promote transparency, reliability, and validity in performance assessment. According to Jonsson and Svingby and Panadero et al., if these analytic rubrics are carefully constructed and combined with rater training, the rubrics can present their consistency and formative guidance (Jonsson & Svingby, 2007) (Panadero, Jonsson, Pinedo, & Fernández-Castilla, 2023). Stafford, however, notes that rubrics alone are insufficient in the absence of exercises for calibration, which guarantee fairness across juries (Stafford, Cousins, Bol, & Mize, 2023). In this regard, O'Donovan elaborates on how social moderation

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and rater training serve to reinforce the validity of certification (O'Donovan, 2024).

The assessment-for-learning focus promotes feedback, peer assessments, and constructive alignment (Biggs & Tang, 2007) (Boud & Falchikov, 2007). They argue that assessment needs to do more than be a performance test, but should also be a way to develop learning over time. In Architecture studios, rather than replacing summative juries (the final assessments), structured peer critique and focused feedback can provide critical feedback on development (if the student only considers grading as an assessment, then grading/assessment will not engage or help that student's learning).

Creativity assessment remains a challenge. Kaufman et al. and Li et al. indicated that creativity is multidimensional, context-dependent, and ultimately resistant to mere measurement (Kaufman, Plucker, & Baer, 2022) (Li, Chu, & Tang). Scholars within architectural education tend to advocate for mixed-method approaches that incorporate portfolios, peer evaluations, and design rationale (Williams & Ostwald, 2010). Rosen et al. further note that frameworks for assessing creative thinking should incorporate formative processes of conversation and reflection to enable a restitutive approach to creativity (Rosen, Wolf, & Stoeffler, 2020).

Overall, the current literature suggests that calibrated rubrics, peer assessment, and dialogic critique, when used in conjunction, can facilitate rigor and openness in evaluating the design studio. Thus, these ideas have informed how to interpret the responses to the survey presented to students based in Lahore.

Purpose of Study

This paper presents research into the perceptions of architecture students regarding evaluation methods in Lahore design studios and how these perceptions align with best practice pedagogy. The aim is to explore tangible methods such as rubric development, scaffolding peer review, and rater calibration to improve fairness, transparency, and formative value in design studio critiques.

Methods

Participants (N = 133) were undergraduate architecture students from multiple Lahore institutions. Data were collected via an online questionnaire addressing five domains. Open-text responses were coded into categorical variables for analysis. Coding rules: Q1 = {Significantly, Somewhat, Not at all, Not sure}; Q2 = {Provides insight, Formality, Don't help, Not sure}; Q3 = {Recognises strengths/weaknesses, Accurately reflect contributions, Don't reflect authentic learning, Not sure}; Q4 = {Yes – comprehensive, No – aspects overlooked, Not sure}; Q5 = {Helpful – guides improvement, Confusing/Not helpful, No specific feedback / Not sure}. Responses were cleaned and institutional names normalized. Descriptive statistics are presented below.

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Research Results

Descriptive results show respondent distributions across demographic groups and coded response categories. Key findings are presented in the tables and figures that follow. Tables 1–6 summarise demographics and principal question codes; Figures 1–3 visualise response distributions and institutional composition.

Table 1

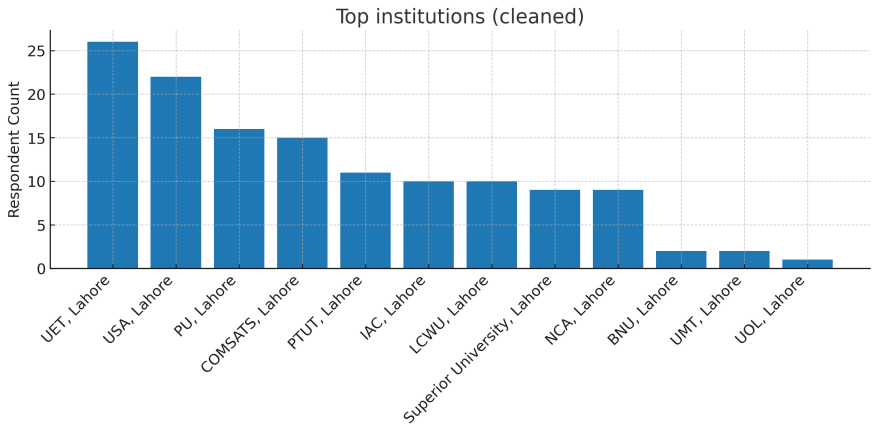
Participant demographics (N = 133)

Characteristic	Count (Percent)
Male	60 (45.1%)
Female	73 (54.9%)
3rd year (5th, 6th sem.)	86 (64.7%)
4th year (7th, 8th sem.)	28 (21.1%)
5th year (9th, 10th sem.)	19 (14.3%)

Source: author's own development

Figure 1

Top institutions by respondent count.



Source: author(s) own development

Table 2

Q1 — Evaluator expertise (coded responses)

Category	Count	Percent
Somewhat	59	44.4
Significantly	42	31.6
Not at all	21	15.8

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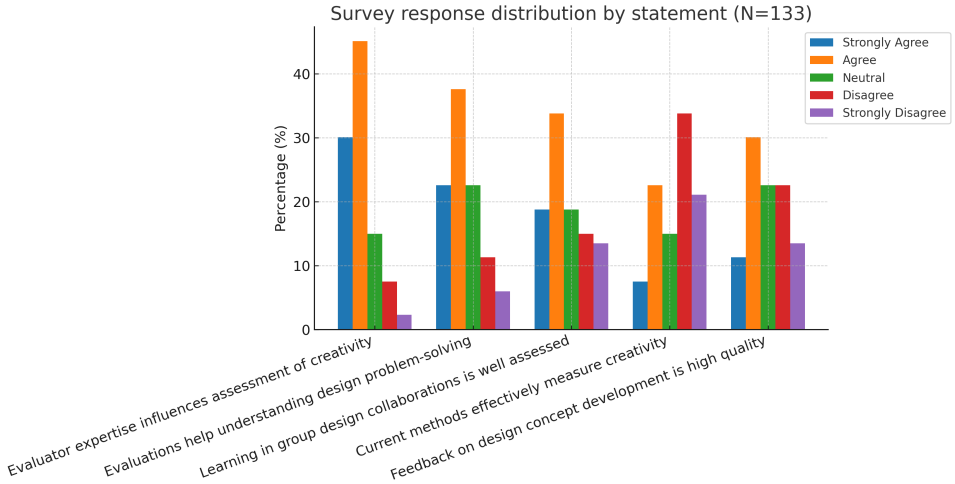
Not sure	11	8.3

Source: author(s) own development

Figure 2

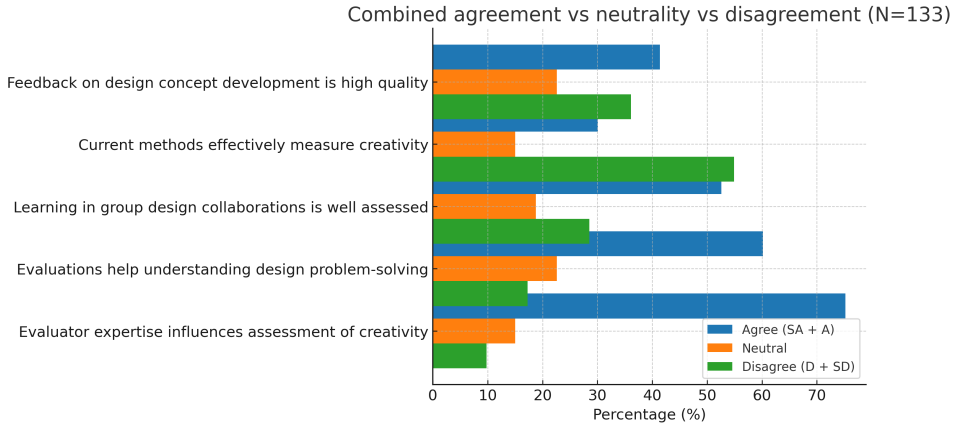
Response distribution by statement (grouped categories)



Source: author(s) own development

Figure 3

Combined agreement vs neutrality vs disagreement (counts)



Source: author(s) own development

Table 3

Q2 – Evaluations & problem-solving (coded responses)

Category	**Count**	**Percent**
Provides insight	92	69.2
Don't help	18	13.5
Not sure	12	9.0

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Formality	11	8.3

Source: author(s) own development

Table 4

Q3 – Group learning assessment (coded responses)

Category	**Count**	**Percent**
Recognises strengths/weaknesses	56	42.1
Accurately reflect contributions	36	27.1
Don't reflect true learning	29	21.8
Not sure	12	9.0

Source: author(s) own development

Table 5

Q4 – Creativity measurement (coded responses)

Category	**Count**	**Percent**
No - aspects overlooked	49	36.8
Not sure	45	33.8
Yes - comprehensive	39	29.3

Source: author(s) own development

Table 6

Q5 – Feedback quality (coded responses)

Category	**Count**	**Percent**
Helpful - guides improvement	96	72.2
Confusing/Not helpful	23	17.3
No specific feedback / Not sure	14	10.5

Source: author(s) own development

Conclusions

The results indicate that students view evaluator expertise as having a significant impact on creative assessment. Although evaluations are viewed as meaningful from the perspective of understanding problem solving, students struggle to regard overall group assessments positively due to equity concerns. Students generally show low confidence in the existing modes of creativity metrics, have mixed experiences with feedback, but many appreciate feedback as a means for improvement.

To address these concerns, the study recommends the use of analytic rubrics specific to the studio context, deliberate and engaging training and calibration of evaluators, structured peer assessment, and framing critique as a dialogic, formative act. Future work could measure the implementation of rubrics and inter-rater reliability with calibrated juries in architectural education.

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References

Biggs, J., & Tang, C. (2007). *Teaching for quality learning at university*. Open University Press / McGraw-Hill Education.

Boud, D., & Falchikov, N. (Eds.). (2007). *Rethinking Assessment in Higher Education, Learning for the Longer Term*. Routledge. doi:https://doi.org/10.4324/9780203964309

Cross, N. (1982). Designerly ways of knowing. . *Design Studies,, 3*(4), 221–227. doi:https://doi.org/10.1016/0142-694X(82)90040-0

Goldschmidt, G., Hochman, H., & Dafni, I. (2010). The design studio "crit": Teacher–student communication. *AI EDAM, 24*(3), 285–302. doi:https://doi.org/10.1017/S089006041000020X

Jonsson, A., & Svingby, G. (2007). The use of scoring rubrics: Reliability, validity and educational consequences. *Educational Research Review, 2*(2), 130–144. doi:https://doi.org/10.1016/j.edurev.2007.05.002

Kaufman, J. C., Plucker, J. A., & Baer, J. (2022). A critical review of assessments of creativity in education. *Review of Educational Research*, 1–36. doi:https://doi.org/10.3102/00346543221084326

Lawson, B. (2006). *How designers think* (4th ed.). Architectural Press / Elsevier. doi:https://doi.org/10.4324/9780080454979

Li, G., Chu, R., & Tang, T. (n.d.). Creativity self-assessments in design education: A systematic review. *Thinking Skills and Creativity, 52*, 101494. doi:https://doi.org/10.1016/j.tsc.2024.101494

O'Donovan, B. (2024). Social moderation and calibration versus codification: Rater training, norming and the challenge of valid certification. *Studies in Higher Education*. doi:https://doi.org/10.1080/03075079.2024.2321504

Panadero, E., Jonsson, A., Pinedo, L., & Fernández-Castilla, B. (2023). Effects of rubrics on academic performance, self-regulated learning, and self-efficacy: A meta-analytic review. *Educational Psychology Review, 35*, Article 113. doi:https://doi.org/10.1007/s10648-023-09823-4

Rosen, Y., Wolf, S., & Stoeffler, K. (2020). Design for creative thinking, learning, and assessment. *Thinking Skills and Creativity, 37*, 100696. doi:https://doi.org/10.1016/j.tsc.2020.100696

Schön, D. A. (1992). *The reflective practitioner: How professionals think in action*. Basic Books / Routledge. doi:https://doi.org/10.4324/9781315237473

Stafford, L., Cousins, E., Bol, L., & Mize, M. (2023). Improving reliability in assessing integrative learning using rubrics: Does group norming help? *Research & Practice in Assessment, 18*(1), 19-32. Retrieved from https://www.rpajournal.com/improving-reliability-in-assessing-integrative-learning-using-rubrics-does-group-norming-help/

Williams, A., & Ostwald, M. J. (2010). Assessing creativity in the context of architectural design education. *Design Research Society International*, (p. Paper 129). doi:https://doi.org/10.21606/drs.2010.129

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The Semiotics of Meaning: A Semantic Perspective on Language and Signs

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ABSTRACT: This paper examines the dynamic interplay between semantics and semiotics as interrelated disciplines that contribute to the study of meaning-making in language and communication. Semantics, as a core area of linguistics, focuses on the relationship between linguistic forms, concepts, and referents, analysing how words, phrases, and sentences encode meaning. Semiotics, on the other hand, provides a broader framework for understanding signs and signification, extending beyond verbal language to encompass cultural symbols, images, and multimodal forms of expression. By integrating these two perspectives, this study demonstrates how language functions simultaneously as a structural system and as a vehicle for cultural and ideological meaning. The research draws on classical and contemporary theoretical contributions, including Ferdinand de Saussure's dyadic model of the sign, Charles Sanders Peirce's triadic framework of semiosis, Roland Barthes's notion of denotation, connotation, and myth, and Umberto Eco's conceptualisation of semiotic codes. Through these perspectives, the paper highlights how semantic meaning (denotative reference) often interacts with semiotic meaning (cultural and symbolic interpretation) to produce complex layers of significance. Examples from discourse, media texts, and digital communication illustrate how semantic precision and semiotic richness converge in shaping interpretation. The discussion argues that a combined semantic–semiotic approach offers a more comprehensive understanding of linguistic meaning by addressing both structural and cultural dimensions. This integrated perspective not only enriches linguistic analysis but also provides valuable insights into literature, media studies, and cross-cultural communication.

KEYWORDS: semantics, semiotics, meaning-making, language and signs, Saussure, Peirce, Barthes, eco, denotation, connotation, discourse analysis, linguistic communication.

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Introduction

Language is not merely a collection of words strung together to convey information; it is a complex, dynamic system of signs through which humans interpret, negotiate, and reshape reality (Rabiah, 2018). Every utterance, written text, gesture, or symbol communicates meanings that extend beyond their surface structure, embedding social, cultural, and ideological dimensions. To understand this multifaceted nature of meaning, linguists and scholars have long turned to two interrelated disciplines: semantics and semiotics. While semantics investigates the internal linguistic mechanisms of meaning—focusing on words, phrases, sentences, and their referents—semiotics extends the analysis to the broader study of signs and signification, encompassing both linguistic and non-linguistic systems (Kravchenko, 2003). The dialogue between semantics and semiotics provides a comprehensive framework for examining how meaning is created, transmitted, and interpreted across diverse communicative contexts. Semantics, traditionally situated within the domain of linguistics, deals with sense and reference, lexical relations, and the principles governing how meaning is structured in language (Paradis, 2012). For example, it explains how words like *'dog' and 'animal'* are related hierarchically, how polysemy allows a single word to have multiple related meanings, and how truth-conditional approaches determine the accuracy of a proposition in relation to the real world. Semantics seeks precision and clarity, aiming to capture the logical and structural dimensions of meaning. Yet, by itself, semantics often remains limited to linguistic form, sometimes overlooking the social and cultural frameworks in which meanings are embedded. Semiotics, in contrast, broadens the scope of meaning-making. (Edgington, 1986). Emerging from the foundational works of Ferdinand de Saussure and Charles Sanders Peirce, semiotics treats meaning as a relational process in which signs acquire significance not only through their structural properties but also through cultural codes, symbolic associations, and interpretive practice. Saussure conceptualised the sign as a dyadic entity, consisting of the *signifier* (the form of the sign, such as a word or image) and the *signified* (the concept it represents). Peirce, in contrast, advanced a triadic model of semiosis, introducing the *representamen* (the form), the *object* (the referent), and the *interpretant* (the meaning generated in the interpreter's mind). Building on these foundations (Gile, 2009), later theorists, such as Roland Barthes and Umberto Eco, expanded semiotics into cultural and ideological domains, demonstrating how signs are not neutral carriers of information but rather sites of contestation, persuasion, and power (Leach, 1976).

The intersection of semantics and semiotics lies in their shared concern with meaning but diverging approaches to its scope (Hodge, 2016). Semantics provides the tools to analyse how words and sentences function logically within language, while semiotics situates these linguistic elements within broader sign systems and cultural contexts. For instance, the semantic meaning of the word *'home' refers to a physical dwelling; yet, semiotically, it can evoke powerful connotations of comfort, belonging, nostalgia, or national identity,* depending on the context. Similarly, a semantic reading of the colour *red* may reduce it to a mere descriptor of hue. Still, a semiotic analysis reveals its rich symbolic

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dimensions—encompassing love, danger, revolution, and prosperity — in different cultural traditions. Such examples demonstrate that semantics and semiotics, though distinct, are most effective when considered together, as each discipline compensates for the other's limitations (Brandt 2004). The significance of studying meaning through a combined semantic–semiotic lens has grown in contemporary contexts, where communication is increasingly multimodal and mediated by technology. In advertising, for instance, the semantic analysis of slogans alone cannot account for the persuasive impact of visual symbols, colours, and cultural narratives (Skorupa & Dubovičienė 2015). In political discourse, the semantic content of terms like *'freedom' or 'justice'* gains further depth when analysed semiotically to uncover the ideological myths embedded within them. In digital communication, emojis, hashtags, and memes function as semiotic resources whose meanings depend on both semantic interpretation and cultural conventions. Thus, integrating semantics with semiotics equips researchers with the methodological tools to address the complexity of meaning-making in modern communication (Leone 2024).

This paper situates its investigation within this interdisciplinary dialogue, exploring how semantics and semiotics interact to construct meaning across linguistic and cultural contexts (Hodge, 2016). It draws upon foundational theoretical contributions—from Saussure's structural linguistics to Peirce's philosophy of signs, from Barthes's notion of mythologies to Eco's semiotic codes — and applies them to contemporary communicative practices. The central argument advanced here is that semantics provides the logical and structural precision of meaning. At the same time, semiotics reveals the symbolic, cultural, and ideological dimensions that often operate beneath the surface. Together, they present a holistic view of meaning-making that is vital for understanding both language and society (Scarino, 2014).

By examining this intersection, the paper contributes to ongoing discussions in linguistics, discourse analysis, and cultural studies. It emphasises that meaning is not static or fixed but dynamic, shaped by the interplay of linguistic systems and semiotic processes. Ultimately, the study argues for the necessity of an integrated semantic–semiotic framework to capture the richness of human communication, offering insights not only for theoretical linguistics but also for applied fields such as media analysis, literary criticism, and intercultural communication (Kramsch, 2015).

Literature Review

Semantics and Its Scope

Semantics focuses on the study of meaning in language. It deals with concepts such as sense, reference, denotation, connotation, and truth conditions (Martin 2015). Scholars such as Gottlob Frege and John Lyons have emphasised how semantics investigates the relationship between linguistic expressions and the world they represent. Semantic theories—such as truth-conditional semantics,

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cognitive semantics, and formal semantics—each offer distinct perspectives on how meaning is encoded in linguistic structures.

Semiotics: The Study of Signs

Semiotics, as introduced by Saussure and Peirce, broadens the study of meaning to all sign systems. Saussure (1916) described the sign as consisting of the *signifier* (the form of expression) and the *signified* (the concept it represents). Peirce (1931) proposed a triadic model, comprising the *representamen* (the sign form), the *object* (what it refers to), and the *interpretant* (the understanding generated). Later, Barthes (1967) and Eco (1976) expanded semiotics into cultural analysis, demonstrating how signs function ideologically within society (Threadgold and culture 1986).

Intersection of Semantics and Semiotics

While semantics traditionally confines itself to linguistic meaning, semiotics broadens the scope to include all forms of symbolic communication (Hodge 2016). The overlap occurs when signs are verbal, as semiotic frameworks can enrich linguistic semantics. For instance, the semantic concept of *denotation* aligns with the semiotic notion of the *signified*, whereas *connotation* relates to cultural and ideological meanings studied in semiotics.

Theoretical Framework

This study employs a hybrid theoretical framework that integrates key insights from both semantics and semiotics to provide a comprehensive account of meaning-making (Whittle et al., 2023). Each tradition contributes unique perspectives: semantics offers analytical precision regarding the structure of meaning in language, while semiotics situates those meanings within wider cultural, ideological, and interpretive processes (Whittle et al., 2023).

Saussurean Semiotics

Ferdinand de Saussure's structuralist view of semiotics forms one of the foundational pillars of this framework. Saussure conceptualised language as a system of arbitrary signs, where the *signifier* (the sound or written form) is linked to the *signified* (the mental concept). Crucially, he emphasised that the relationship between signifier and signified is not natural but conventional, determined by social agreement. This perspective highlights the structural and relational nature of language: words derive meaning not in isolation, but through their differences from other words within the linguistic system.

Peircean Semiotics

Charles Sanders Peirce's semiotics expands this model by introducing a triadic process of meaning-making: the *representamen* (the form of the sign), the *object* (the thing referred to), and the *interpretant* (the understanding generated by the interpreter). This dynamic process, known as *semiosis*, highlights the interpretive and evolving nature of meaning. Unlike Saussure's relatively static

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model, Peirce's theory foregrounds the role of context and interpretation, showing how meaning is continuously produced and renegotiated.

Barthesian Semiotics

Roland Barthes extended semiotics into the cultural and ideological domain. He distinguished between denotation (the literal meaning of a sign) and connotation (the secondary, cultural, or emotional associations). In *Mythologies* (1957/1967), Barthes further demonstrated how signs can be transformed into "myths" that naturalise social values and ideologies, making them appear universal or commonsensical. For example, an image of a national flag not only denotes a piece of cloth with specific colours but also connotes ideas of patriotism, unity, or power. This perspective is vital in examining how language and signs function as vehicles of ideology.

Semantic Theories

While semiotics addresses the cultural dimension of meaning, semantics provides the tools for analysing meaning at the linguistic level. Three approaches are particularly relevant:

- Formal semantics emphasises truth-conditions, focusing on how the meaning of a sentence corresponds to states of affairs in the world.
- Cognitive semantics emphasises how meaning is grounded in human cognition, influenced by conceptual metaphors, frames, and embodied experience. For instance, metaphors like "time is money" reveal how abstract domains are understood through concrete experiences.
- Lexical semantics investigates word meaning relations, including synonymy, antonymy, hyponymy, and polysemy, thereby providing insight into the network of meanings within a language.

Integrative Perspective

By combining these theoretical traditions, the framework developed here strikes a balance between structural precision and cultural interpretation. Semantics ensures clarity in analysing literal, referential, and cognitive aspects of meaning, while semiotics situates these meanings within the broader contexts of ideology, culture, and communication. Taken together, these perspectives highlight that meaning is not fixed but emerges at the intersection of linguistic structures, interpretive processes, and cultural codes.

Discussion: The Semiotics of Meaning

Language as a Sign System

Language functions as a structured code where each word represents a signifier linked to a signified. For example, the word *"tree" denotes a plant but can also convey ideas such as life, growth,*

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or environmentalism, depending on the cultural context. Semantics captures the basic meaning, while semiotics reveals the complex, layered cultural meanings.

Semantic Interpretation Through Semiotic Lenses

A purely semantic analysis might explain how the word *freedom* refers to the state of being free. However, semiotics investigates how this term is ideologically loaded in political speeches, advertisements, or literature, often functioning as a myth or cultural construct. Thus, semiotics complements semantics by contextualising meaning in broader cultural narratives.

Semiotic Resources Beyond Language

Visual and multimodal signs—images, gestures, sounds—extend the study of meaning beyond verbal semantics. For instance, in advertising, the semantic meaning of a slogan combines with visual semiotic cues (colours, symbols, images) to construct persuasive messages. Kress and van Leeuwen's multimodal semiotics show how text and image interact to create complex layers of meaning.

Applications

- Combining semantics and semiotics helps uncover hidden ideologies in political and media discourse.
- Semiotic-semantic analysis reveals how metaphors, symbols, and intertextual references generate multiple meanings, thereby enriching the understanding of literary texts.
- Emojis, memes, and hashtags operate as semiotic resources whose semantic meanings are context-dependent.
- Different cultures attach varying connotations to the same semantic units, highlighting the role of semiotics in meaning negotiation.

Conclusion

The conclusion of this study highlights the close relationship between semantics and semiotics in the process of meaning-making. Semantics deals with the literal and referential aspects of language—how words and structures denote objects, actions, and concepts in the world. It focuses on the formal relationship between linguistic signs and what they stand for, offering precision and clarity in communication. Semiotics, however, goes beyond this surface level by examining how signs are embedded in cultural and ideological systems. It explores the additional layers of meaning—such as connotations, myths, values, and symbols—that shape how language is interpreted within a specific social context. By integrating these two perspectives, we see that language operates not merely as a neutral system of signs but also as a powerful medium that reflects and reproduces cultural norms, social ideologies, and collective identities. Thus, an interdisciplinary approach combining semantics and semiotics provides a more comprehensive understanding of language as both a communicative

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tool and an ideological force.

References

Brandt, P. A. J. (2004). Spaces, domains, and meaning. *Evolution of Communication, 4*, Article 4.

Edgington, D. (1986). Do conditionals have truth conditions? *Crítica: Revista Hispanoamericana de Filosofía, 18*(53), 3–39.

Gile, D. (2009). *Basic concepts and models for interpreter and translator training* (Rev. ed.). John Benjamins.

Hodge, B. (2016). *Social semiotics for a complex world: Analysing language and social meaning*. John Wiley & Sons.

Kramsch, C. (2015). Applied linguistics: A theory of the practice. *Applied Linguistics, 36*(4), 454–465. https://doi.org/10.1093/applin/amv039

Kravchenko, A. V. (2003). The ontology of signs as linguistic and non-linguistic entities: A cognitive perspective. *Annual Review of Cognitive Linguistics, 1*(1), 179–191.

Leach, E. R. (1976). *Culture and communication: The logic by which symbols are connected. An introduction to the use of structuralist analysis in social anthropology*. Cambridge University Press.

Leone, M. (2024). *Semiotic ideologies: Patterns of meaning-making in language and society*. Brill.

Martin, R. M. (2015). *Truth & denotation: A study in semantical theory*. Routledge.

Paradis, C. (2012). Lexical semantics. In C. A. Chapelle (Ed.), *The encyclopedia of applied linguistics*. Wiley-Blackwell. https://doi.org/10.1002/9781405198431.wbeal0680

Rabiah, S. (2018). Language as a tool for communication and cultural reality disclosure. *Advances in Language and Literary Studies, 9*(2), 1–6.

Scarino, A. (2014). Learning as reciprocal, interpretive meaning-making: A view from collaborative research into the professional learning of teachers of languages. *The Modern Language Journal, 98*(1), 386–401. https://doi.org/10.1111/j.1540-4781.2014.12068.x

Skorupa, P., & Dubovičienė, T. J. C. (2015). Linguistic characteristics of commercial and social advertising slogans. *Santalka: Filologija, Edukologija / Coactivity: Philology, Educology, 23*(2), 108–118. https://doi.org/10.3846/cpe.2015.493

Threadgold, T. (1986). Semiotics–ideology–language. *Social Semiotics, 3*(1), 1–16. https://doi.org/10.1080/10350338609359476

Whittle, A., Housley, W., Gilchrist, A., & Lenney, P. (2023). The role of language in organizational sensemaking: An integrative theoretical framework and an agenda for future research. *Organization Studies, 49*(6), 1807–1840. https://doi.org/10.1177/01708406231152984

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English as a Platform for the Implementation of Ecological Projects by Bachelor Students

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ABSTRACT: This paper explores the potential of English as a medium for implementing ecological projects among bachelor students. The study aims to identify the objectives and benefits of integrating environmental topics into English language learning. It applies project-based learning methods, encouraging students to design and implement ecological initiatives while enhancing their linguistic and communicative skills. The results show that students acquire not only language competence but also critical awareness of environmental challenges. The findings confirm that English, combined with ecological project work, fosters interdisciplinary knowledge and sustainable values, thereby strengthening professional training and civic responsibility in higher education. Moreover, the study demonstrates that ecological projects promote teamwork, creativity, and problem-solving skills. These outcomes highlight the importance of integrating language education with sustainable development practices in contemporary academia.

KEYWORDS: environmental awareness, project work, higher education, civic responsibility, sustainable values, interdisciplinary learning, sustainable development, language education.

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Вступ

Розвиток вищої освіти потребує поєднання мовної підготовки студентів із вирішенням актуальних соціальних та екологічних проблем. Англійська мова, як міжнародний засіб комунікації, є платформою для реалізації освітніх проєктів, спрямованих на підвищення екологічної свідомості здобувачів освіти та формування їхньої компетентності у сфері сталого розвитку. Використання англійської мови в проєктній діяльності дає змогу студентам не лише вдосконалювати мовні навички, а й залучатися до міжнародного обміну досвідом, застосовувати сучасні методики розв'язання екологічних питань та комунікувати із широкою аудиторією (Kazazoglu, 2025; Rafiee Moghadam, Haddad Narafshan, & Anjomshoa, 2022).

Проєктна діяльність у навчальному процесі бакалаврату створює умови для активного засвоєння знань через практичну реалізацію екологічних ініціатив. Англомовне середовище втілення таких проєктів сприяє розвитку критичного мислення, навичок командної роботи та здатності до самостійного пошуку рішень складних екологічних завдань (Li, Nelson & Shen, 2025; Duda et al., 2022). Інтеграція мовної та екологічної підготовки стимулює мотивацію студентів до активної громадянської позиції та формує в них відповідальне ставлення до проблем довкілля на локальному та глобальному рівнях (Baek et al., 2023; Suwandi et al., 2024).

Актуальність дослідження зумовлена потребою у виробленні в студентів навичок інтеграції мовної та екологічної підготовки, що дає можливість ефективно вирішувати практичні завдання сталого розвитку. Попередні праці показують, що застосування англійської мови в проєктній діяльності підвищує екологічну свідомість, становлення комунікативної компетенції та інтеграцію студентів у міжнародні освітні та наукові ініціативи (Kazazoglu, 2025; Mercer et al., 2022). Проте недостатньо вивчено, як саме англійська мова стає платформою для практичного втілення екологічних проєктів у бакалавраті та які фактори впливають на результативність такої роботи.

Мета роботи – аналіз можливостей використання англійської мови як платформи для реалізації екологічних проєктів студентами бакалаврату та визначити вплив такої практики на формування професійних та комунікативних компетенцій здобувачів освіти.

Результати дослідження

Реалізація англомовних екологічних проєктів у навчальному процесі бакалаврату забезпечує комплексний розвиток мовних, соціальних та професійних компетенцій студентів. Виконання завдань проєктного характеру передбачає практичне застосування теоретичних знань, що стимулює формування критичного мислення, комунікативних навичок, а також здатності до самостійного розв'язання складних екологічних проблем. Залучення англійської мови як засобу комунікації дає змогу інтегрувати міждисциплінарні знання, порівнювати локальні та глобальні екологічні виклики та брати участь у міжнародному академічному обміні (Kazazoglu, 2025; Rafiee Moghadam, Haddad Narafshan, & Anjomshoa, 2022).

Особливу увагу приділяють становленню комунікативної компетенції, що проявляється у вмінні аргументовано висловлювати екологічні концепції, обґрунтовувати пропозиції та ефективно взаємодіяти з колегами та викладачами під час командної роботи. Емпіричні дані

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свідчать про підвищення рівня екологічної обізнаності та мовних навичок студентів після виконання англомовних проєктів, що підтверджується результатами кількісного оцінювання знань і компетенцій.

Отримані показники представлено в таблиці 1, яка відображає динаміку змін у рівні освітніх та комунікативних здібностей студентів до та після участі в проєктах.

Таблиця 1

Освітні та комунікативні переваги студентів після участі в англомовних проєктах

Показник	До проєкту	Після проєкту	Зростання (%)
Теоретичні знання з екології	65	78	20
Комунікативна компетенція	60	76	27
Навички командної роботи	58	73	26

Джерело: розробка авторів на основі (Kazazoglu, 2025; Rafiee Moghadam, Haddad Narafshan, & Anjomshoa, 2022)

Аналіз даних, відтворених у таблиці 1, окреслює позитивну динаміку розвитку ключових компетенцій студентів у процесі реалізації англомовних екологічних ініціатив. Рівень теоретичних знань з екології підвищився на 20 %, що вказує на ефективність інтеграції екологічного змісту в навчальні проєкти. Комунікативна компетенція студентів зросла на 27 %, що відображає поліпшення навичок усного та письмового мовлення англійською мовою, а також здатності до аргументованої презентації результатів. Навички командної роботи продемонстрували приріст на 26 %, що свідчить про формування вміння колективно вирішувати завдання та дієво взаємодіяти в групі. Отримані показники підтверджують, що участь в англомовних проєктах сприяє комплексному розвитку як мовних, так і професійних компетенцій студентів, інтегруючи навчання англійської мови та екологічних знань.

Емпіричні дослідження показують, що студенти бакалаврату в процесі виконання англомовних екологічних проєктів часто стикаються з когнітивними та лінгвістичними бар'єрами. Основними проблемами є малий словниковий запас, недостатній рівень загальної мовної компетенції та складність специфічної термінології у сфері екології (Li, Nelson, & Shen, 2025; Suparman et al., 2021).

Під час проєктної роботи спостерігається низька здатність до формулювання екологічних концепцій у письмовій та усній формі, складнощі з розумінням наукових текстів англійською мовою та необхідність значного часу для підготовки презентацій і наукових матеріалів. Ці аспекти обмежують ефективність академічної діяльності та створюють додаткові вимоги до організації навчального процесу.

Для подолання зазначених викликів застосовують методи підтримки, зокрема консультації викладачів, спеціалізовані словники та онлайн-ресурси, а також кооперативне навчання в

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групах. Вони сприяють підвищенню рівня володіння англійською мовою в професійній і науковій комунікації та розвитку компетенцій у сфері екології.

Аналітичний огляд сучасних практик навчання демонструє ефективність інтеграції інтерактивних та проєктних методів, таких як цифрові платформи, кейс-стаді та моделювання екологічних процесів, для формування мовних і професійних компетенцій студентів (Baek et al., 2023; Duda et al., 2022).

Інтеграція міждисциплінарного навчання (англійська мова та екологія) передбачає комплексне засвоєння знань і розвиток критичного мислення. Використання цифрових ресурсів для збору й аналізу даних забезпечує формування аналітичних та технологічних компетенцій. Колективні проєкти з презентацією результатів англійською мовою перед міжнародною аудиторією підвищують рівень комунікативної компетенції та навичок публічного виступу. Застосування структурованого зворотного зв'язку та рефлексії дає змогу оцінити прогрес студентів та вдосконалити професійні навички.

Для систематизації методів та підходів, що поліпшують ефективність англомовних екологічних проєктів, доцільно подати їх у вигляді таблиці. Таблиця 2 узагальнює основні навчальні стратегії та конкретний вплив кожної з них на формування ключових компетенцій студентів у межах бакалаврської підготовки.

Таблиця 2

Методи та підходи підвищення ефективності англомовних екологічних проєктів

Метод / Підхід	Вплив на навчальний процес
Цифрові платформи та онлайн-ресурси	Формування аналітичних і цифрових навичок
Проєктна робота в командах	Розвиток комунікативної та командної компетенції
Презентації та наукові виступи	Підвищення рівня навичок публічного виступу та аргументації
Інтегративний підхід	Інтеграція мовної та екологічної підготовки

Джерело: власна розробка авторів

Після аналізу таблиці 2 можна констатувати, що використання цифрових платформ забезпечує розвиток аналітичних та технологічних навичок, необхідних для збору та обробки екологічних даних. Проєктна робота в командах стимулює формування комунікативних компетенцій та навичок колективного розв'язання завдань. Презентації та наукові виступи англійською мовою підвищують рівень публічних мовних навичок і вміння аргументовано відстоювати позиції. Інтегративний підхід гарантує комплексну інтеграцію мовної та екологічної підготовки, що сприяє становленню професійних компетенцій бакалаврів у сфері сталого розвитку та виробленню здатності до практичного застосування знань у вирішенні актуальних

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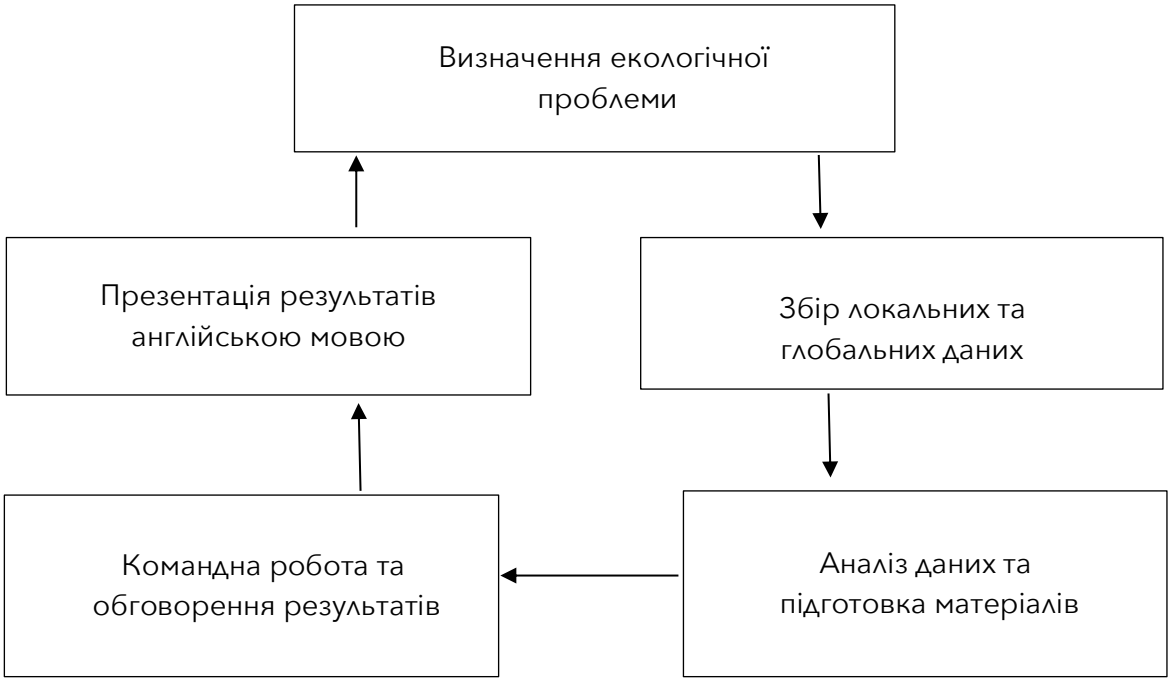
екологічних проблем.

Рисунок 1 показує послідовність етапів реалізації англомовного екологічного проєкту в бакалавраті. Він ілюструє взаємозв'язок основних складових процесу: визначення екологічної проблеми, збір і аналіз локальних та глобальних даних, підготовку матеріалів, організацію командної роботи та обговорення результатів, презентацію англійською мовою та оцінювання сформованих компетенцій студентів.

Рисунок 1

Процес реалізації англомовного екологічного проєкту в бакалавраті



Джерело: власна розробка авторів

Аналіз структурних елементів на рис. 1 вказує на те, що послідовне виконання етапів проєктної діяльності сприяє комплексному розвитку компетенцій студентів. Використання англійської мови на всіх стадіях забезпечує формування мовної компетентності та навичок усного й письмового висловлювання наукових концепцій. Застосування цифрових платформ та інтерактивних ресурсів стимулює вироблення аналітичних і технологічних навичок. Організація командної роботи та презентацій результатів допомагає підвищити комунікативні та колективні компетенції. Інтеграція цих елементів передбачає системне вдосконалення професійних умінь бакалаврів і поліпшує ефективність навчального процесу у сфері сталого розвитку.

Для збільшення ефективності реалізації англомовних екологічних проєктів у бакалавраті рекомендовано активніше використовувати цифрові платформи та інтерактивні ресурси для збору та аналізу даних, надавати систематичну підтримку студентам у засвоєнні спеціалізованої термінології, а також упроваджувати міждисциплінарні підходи, що поєднують мовну й екологічну підготовку. Доцільно організовувати роботу в командах із чітким розподілом ролей, а

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результати проєктів представляти на внутрішніх і міжнародних наукових платформах для формування навичок публічного виступу та обґрунтування рішень. Крім того, важливо інтегрувати зворотний зв'язок і рефлексію на кожному етапі проєкту для оцінювання прогресу студентів і коригування навчального процесу відповідно до їхніх потреб.

Висновки

У результаті проведеного дослідження встановлено, що реалізація англомовних екологічних проєктів у бакалавраті сприяє одночасному розвитку мовних, комунікативних, аналітичних та технологічних компетенцій студентів. Використання цифрових платформ, інтерактивних ресурсів та командної роботи дає змогу ефективно поєднувати мовну й екологічну підготовку, підвищує рівень критичного мислення та здатність до самостійного вирішення складних екологічних завдань.

Емпіричні дані підтвердили, що участь в англомовних проєктах поліпшує екологічну обізнаність студентів, формує навички публічного виступу та обґрунтування рішень, а також розвитку командної взаємодії. Проблеми, пов'язані з обмеженим словниковим запасом та специфічною термінологією, зменшуються завдяки застосуванню методик підтримки студентів, колективної роботи та використанню додаткових ресурсів.

Перспективи подальших досліджень полягають у вивченні впливу англомовних екологічних проєктів на становлення міжкультурної компетенції студентів, а також на визначення оптимальних методів інтеграції цифрових технологій та екологічної освіти в навчальні програми бакалаврату. До того ж доцільним є проведення лонгітюдного аналізу для оцінювання стійкості сформованих компетенцій та їх практичного застосування в професійній діяльності.

Література

Kazazoglu, S. (2025). Environmental education through eco-literacy: Integrating sustainability into English language teaching. *Sustainability, 17*(5), 2156. https://doi.org/10.3390/su17052156.

Bolduc, N. (2024). Supporting learning experiences for English learners at environmental learning centers through the creation of pre-teaching materials (Capstone project). Retrieved from https://digitalcommons.hamline.edu/hse_cp/1026.

Rafiee Moghadam, N., Haddad Narafshan, M., & Anjomshoa, L. (2022). Education for sustainable development: Effects of sustainability education on English language learners' empathy and reading comprehension. *The Journal of Environmental Education, 53*(5), 280–289. https://doi.org/10.1080/00958964.2022.2107605.

Li, X., Nelson, R. F., & Shen, J. (2025). The effect of ecological environment on language-minority students' math and reading development: A hierarchical linear analysis of a longitudinal study. *Journal of Educational Psychology, 36*(1), 235–248. https://doi.org/10.1080/10409289.2024.2375944.

Light Nuñes, K. (2024). Promoting social, cultural, global, and environmental awareness in the ESL classroom. *Bridge TEFL Blog*. Retrieved from https://bridge.edu/tefl/blog/promoting-social-

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cultural-global-environmental-awareness/.

Duda, E., Zhou, J.-F., Wu, J., Chen, W., & Wu, D. (2022). Building the learning environment for sustainable development: A co-creation approach. *Sustainability, 14*(17), Article 10756. https://doi.org/10.3390/su141710756.

Baek, C., Saito-Stehberger, D., Jacob, S., Nam, A., & Warschauer, M. (2023). Computer science framework to teach community-based environmental literacy and data literacy to diverse students. *arXiv*. https://doi.org/10.48550/arXiv.2309.14098.

Suwandi, S., Drajati, N. A., Handayani, A., & Tyarakanita, A. (2024). The analysis of ecoliteracy elements in language textbooks. *Cogent Education, 11*, Article 2300907. https://doi.org/10.1080/2331186X.2023.2300907.

Bortoluzzi, M., & Zurru, E. (Eds.). (2024). *Ecological communication and ecoliteracy*. London, UK: Bloomsbury Academic. https://www.bloomsbury.com/us/ecological-communication-and-ecoliteracy-9781350335820/.

Poole, R. (2024). A corpus-assisted ecolinguistic analysis of hurricanes and wildfires and the potential for corpus-assisted eco-pedagogy in ELT classrooms. In M. Bortoluzzi & E. Zurru (Eds.). *Ecological communication and ecoliteracy* (pp. 44–64). London, UK: Bloomsbury Academic. https://doi.org/10.48550/arXiv.2309.14098.

Suparman, S., Ida Bagus Putra, Y., Simpen, I. W., & Made Sri, S. (2021). English reading texts model using the ecoliteracy lexicons approach. *International Journal of Linguistics, Literature and Translation, 4*, 145–154. https://doi.org/10.32996/ijllt.2021.4.3.15.

Mercer, S., Ibrahim, N., Bilsborough, K., Jones, C., & Potzinger, C. (2022). Teacher perspectives on addressing environmental issues in ELT. *ELT Journal, 77*, 393–406. https://doi.org/10.1093/elt/ccac018.

Liu, Y., & Qi, W. (2021). Construction of language teachers' professional competence in education for sustainable development in higher education for post-pandemic era. *Journal of Language Teaching and Research, 12*, 304–316. https://doi.org/10.17507/jltr.1202.15.

Sund, P., & Gericke, N. (2020). Teaching contributions from secondary school subject areas to education for sustainable development – A comparative study of science, social science and language teachers. *Environmental Education Research, 26*, 772–794. https://doi.org/10.1080/13504622.2020.1735121.

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Digital Pedagogy as a Tool for Shaping an Adaptive Educational Environment in Higher Education

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ABSTRACT: The paper examines digital pedagogy as a means of creating an adaptive educational environment in higher education. It discusses current trends in the use of digital technologies, their influence on personalized learning, and their role in developing student competencies. The paper also addresses methodological approaches to integrating ICT into pedagogical practice, highlighting both the benefits and challenges of digitalization. The practical value lies in substantiating strategies that enhance the quality of education and foster the development of professionally competent specialists.

KEYWORDS: digital technologies, education, higher education, pedagogy, pedagogical innovation.

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Вступ

У контексті глобальної цифрової трансформації сучасного суспільства простежуються динамічні зміни в усіх сферах життєдіяльності, зокрема в системі вищої освіти. Традиційні моделі професійної підготовки поступово втрачають актуальність, оскільки не повною мірою відповідають вимогам ринку праці, що зростають, і багатовимірним соціокультурним запитам. У сучасному науковому дискурсі цифрову педагогіку розглядають як ключовий чинник модернізації освітнього процесу, що передбачає широке застосування електронних освітніх платформ, віртуальних лабораторій, інструментів аналізу освітніх даних (Learning Analytics) і технологій індивідуалізованого навчання. Водночас більшість досліджень акцентує переважно на технологічних та методико-дидактичних аспектах її впровадження, залишаючи недостатньо концептуалізованими питання інтеграції цифрових інструментів у процес формування готовності майбутніх фахівців до соціально значущої професійної діяльності (Bitar & Davidovich, 2024). Адаптивне освітнє середовище, побудоване на засадах цифрової педагогіки, передбачає інтеграцію інноваційних технологій – штучного інтелекту, хмарних сервісів, віртуальних лабораторій та систем Learning Analytics, що забезпечують індивідуалізацію й персоналізацію освітніх траєкторій. Такий підхід охоплює варіативність навчальних програм, диференціацію методів і форм організації навчання відповідно до когнітивних стилів та рівня підготовки студентів, а також сприяє інклюзивності й розвитку метанавичок: саморегуляції, критичного та креативного мислення, цифрової компетентності. У глобальному контексті цифровізація вищої освіти зумовлена як масовим характером освітніх процесів (понад 264 млн студентів, що становить 43 % охоплення, за даними ЮНЕСКО), так і трансформаційними викликами, інтенсифікованими пандемією COVID-19, яка сприяла поширенню дистанційних та змішаних моделей навчання («Цифрова трансформація освіти і науки», 2024). Здійснений аналіз засвідчує, що в країнах Європейського Союзу сформувалася низка практик, які можуть слугувати орієнтиром для української системи освіти. Зокрема, в Естонії реалізують національну стратегію Digital Education Action Plan, на основі якої університети впроваджують адаптивні електронні платформи (Moodle, eKool) та цифрові паспорти компетентностей, що дають змогу відстежувати динаміку розвитку студентів. Німеччина в межах програми Hochschulforum Digitalisierung підтримує розвиток університетських хабів цифрових інновацій та створення відкритих освітніх ресурсів, які забезпечують доступність навчання для різних груп студентів (Rostoka, 2025).

Наукова новизна дослідження полягає в розробленні методичних рекомендацій щодо використання цифрових педагогічних технологій як інструменту аксіологічного впливу, спрямованого на формування у здобувачів освіти ціннісних орієнтацій, пов’язаних із доброчинністю, соціальною відповідальністю та гуманістичними ідеалами.

Мета роботи – визначення ролі цифрової педагогіки у формуванні адаптивного освітнього середовища у вищій освіті та розроблення ефективних стратегій її використання для підвищення індивідуалізації навчального процесу, академічної підтримки й професійного розвитку здобувачів освіти.

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Завдання роботи:

- проаналізувати теоретичні підходи до цифрової педагогіки та її вплив на організацію навчального середовища;
- визначити ключові принципи й методи формування адаптивного освітнього середовища;
- дослідити інтеграцію цифрових ресурсів і сервісів (онлайн-платформ, віртуальних лабораторій, навчальних застосунків) для підвищення доступності й ефективності навчання.

Результати дослідження

Сучасна вища освіта перебуває у фазі активної цифрової трансформації, що зумовлює потребу в науковому обґрунтуванні й методичному супроводженні процесів цифровізації. Як зазначено в доповіді «Науково-методичне забезпечення цифровізації освіти України: стан, проблеми, перспективи» (НАПН України, 2022), цифрова педагогіка в сучасних українських закладах вищої освіти виступає ключовим засобом формування адаптивного освітнього середовища, яке гарантує індивідуалізацію навчального процесу та зважає на освітні потреби й професійні орієнтації студентів. Вона підтримує розвиток дистанційної освіти в умовах пандемії та воєнних викликів, інтегруючи хмарні сервіси, Learning Management Systems (Moodle, Google Classroom, Microsoft Teams) і цифрові інструменти для організації інтерактивної взаємодії (Mentimeter, Kahoot, Padlet).

Завдяки цьому створюють гнучкий, доступний та інклюзивний освітній простір, що водночас підвищує якість навчально-методичного контенту та рівень підготовки викладачів. Персоналізація навчальних траєкторій шляхом надання студентам індивідуальних завдань, модулів та ресурсів відповідно до їхнього рівня підготовки та інтересів, незалежно від місцеперебування, посилює гнучкість і доступність освітнього процесу. Інструменти інтерактивного опитування та зворотного зв'язку дають змогу оперативно адаптувати викладання до потреб групи або окремих студентів, що сприяє ефективнішому засвоєнню знань і формуванню компетентностей.

Цифрову педагогіку розглядають як міждисциплінарну галузь знань і практики, що інтегрує педагогічні концепції, сучасні інформаційно-комунікаційні технології (ІКТ) та психологічні підходи до навчання (Петренко, 2023). Її головна мета полягає в оптимізації освітнього процесу завдяки впровадженню цифрових ресурсів та платформ, що забезпечує адаптацію навчального середовища до індивідуальних потреб здобувачів вищої освіти. Методологічну основу цифрової педагогіки становлять такі концептуальні підходи: конструктивізм, андрагогіка та інклюзивна педагогіка (див. табл. 1).

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Таблиця 1

Концептуальні підходи методологічної основи цифрової педагогіки

Конструктивізм	Передбачає активну взаємодію здобувача освіти з навчальним контентом і цифровим освітнім середовищем, що сприяє формуванню критичного мислення та компетентностей самостійного пізнання. Наприклад, студенти можуть використовувати віртуальні лабораторії або симулятори для експериментування з явищами, які складно або неможливо відтворити в реальних умовах.
Андрагогіка	Підкреслює значення самостійності, рефлексії та усвідомленого вибору стратегій навчання дорослих учасників освітнього процесу. Прикладом є застосування платформ дистанційного навчання, як-от Moodle чи Coursera, де студенти самостійно обирають модулі, визначають темп навчання, переглядають лекції в зручний час і планують власний графік виконання завдань.
Інклюзивна педагогіка	Орієнтована на забезпечення рівного доступу до освітніх ресурсів, адаптацію навчального середовища до різних потреб студентів та створення умов для максимальної реалізації їхнього потенціалу. Наприклад, системи дистанційного навчання, які автоматично підлаштовують складність завдань до рівня знань студента, зокрема платформи Moodle чи Edmodo, можуть пропонувати додаткові пояснення або альтернативні вправи.

Джерело: авторська розробка

У практичному застосуванні цифрової педагогіки ключовими є такі принципи: індивідуалізація навчання через персоналізовані освітні траєкторії; мобільність, що забезпечує доступ до навчальних ресурсів у будь-який час і з будь-якої локації; інтерактивність, яка передбачає активну взаємодію студентів між собою та з цифровими платформами; відкритість, що сприяє безбар'єрному обміну знаннями; гнучкість, яка дає змогу оперативно адаптувати освітній процес до змін умов і потреб учасників (Марчук, 2024).

Актуальні виклики адаптивного освітнього середовища у вищій школі окреслюють нові вектори комплексної та системної організації навчального процесу, здатного оперативно реагувати на персональні потреби студентів і вимоги сучасного суспільства. Із запровадженням цифрових педагогічних інструментів з'являються умови для: варіативності освітніх програм, що забезпечують індивідуалізацію навчальних траєкторій відповідно до професійних цілей та особистісних інтересів здобувачів освіти; інтеграції цифрових ресурсів і сервісів (онлайн-платформ, навчальних застосунків, віртуальних лабораторій), які підвищують доступність і результативність освітнього процесу; диференціації методів і форм організації навчання з огляду на індивідуальні стилі пізнавальної діяльності та рівень підготовки студентів; застосування технологій Learning Analytics для моніторингу освітніх результатів і своєчасного коригування індивідуальних траєкторій навчання; забезпечення психологічної підтримки та зростання мотивації завдяки використанню персоналізованого зворотного зв'язку й інтерактивних освітніх середовищ (Кучерявий, 2024).

Сучасна цифрова педагогіка виступає провідним інструментом формування адаптивного освітнього середовища у вищій школі, забезпечуючи персоналізацію навчального процесу та

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розвиток професійних компетентностей здобувачів освіти через інтеграцію інноваційних технологій. До основних її засобів належать: LMS-платформи (Moodle, Google Classroom, Canvas), що дають змогу організовувати індивідуальні траєкторії навчання, диференціювати матеріали й реалізовувати змішану і дистанційну форми освіти; інтелектуальні технології та штучний інтелект, які забезпечують автоматизоване консультування, адаптивне оцінювання і рекомендації навчального контенту; інтерактивні цифрові інструменти (віртуальні лабораторії, симулятори, VR/AR), що створюють умови для безпечного формування практичних навичок; аналіз освітніх даних, який дає змогу прогнозувати результати навчання та здійснювати цілеспрямовану підтримку здобувачів освіти; а також соціальні мережі й медіаплатформи, що сприяють розвитку колаборативних компетентностей і цифрової культури (Сачанюк-Кавецька, Маятіна, Новак, 2021; Пригодій, 2023).

Як зазначає Пригодій (2023), практичне застосування цих інструментів у провідних університетах України підтверджує ефективність адаптації освітнього процесу до різних обставин, забезпечення безперервності навчання й індивідуалізації освітніх траєкторій, що особливо актуально в період воєнного стану та глобальних криз. Водночас цифрова педагогіка підтримує навчання навіть за складних умов, однак воєнний стан створює низку додаткових проблем: обмежений доступ до технологій через перебої з інтернетом та електропостачанням; психологічний стрес, що знижує концентрацію і мотивацію; ускладнення комунікації й ризик соціальної ізоляції; загрози кібербезпеки; різний рівень цифрових навичок у здобувачів освіти та викладачів; обмежені можливості практичного навчання.

Попри ці виклики, цифрові технології залишаються одним із ключових інструментів, що потребує адаптації методик, орієнтації на психологічний стан здобувачів освіти й створення гнучких навчальних платформ.

Висновки

Цифрова педагогіка постає як концептуально-методологічна основа модернізації системи вищої освіти, спрямованої на створення адаптивного, відкритого та інклюзивного освітнього середовища. Її впровадження сприяє розширенню доступності освітніх ресурсів, підвищенню гнучкості навчальних траєкторій і забезпеченню індивідуалізації освітнього процесу. Використання цифрових технологій зумовлює розвиток ключових компетентностей здобувачів освіти, серед яких: критичне та системне мислення, комунікативні й інформаційно-цифрові вміння, креативність, навички колаборації, а також здатність до автономного навчання й саморегуляції. У цьому контексті доцільним є формування комплексу методичних рекомендацій щодо інтеграції цифрових технологій у систему вищої освіти, зокрема: впровадження цифрових інструментів (онлайн-курсів, інтерактивних платформ, технологій змішаного навчання – blended learning); персоналізація освітнього процесу (використання адаптивних LMS, анкетування й діагностичне тестування для визначення індивідуальних завдань); стимулювання освітньої комунікації (онлайн-дискусії, міждисциплінарні проєкти, форуми, відеоконференції); застосування аналізу навчальних даних для відстеження прогресу, активності та результативності педагогічних стратегій; розвиток цифрової грамотності учасників освітнього процесу (тренінги,

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інтерактивні практикуми, освітні симуляції для викладачів і здобувачів освіти); забезпечення інклюзивності й універсального дизайну навчання (використання мультимедійних матеріалів, субтитрування, адаптивних платформ, що зважають на потреби здобувачів освіти з різними можливостями).

Таким чином, цифрова педагогіка виконує стратегічну функцію у формуванні конкурентоспроможного, інноваційно орієнтованого та соціально відповідального фахівця, здатного ефективно діяти в умовах цифрового суспільства й глобальних трансформацій освітнього простору.

Література

Биков, В. Ю., Ляшенко, О. І., Литвинова, С. Г., Луговий, В. І., Мальований, Ю. І., Пінчук, О. П., та Топузов, О. М. (2022). *Науково-методичне забезпечення цифровізації освіти України: стан, проблеми, перспективи: наук.-аналіт. доп.* (В. Г. Кремень, ред.). Київ: ІЦО НАПН України. https://lib.iitta.gov.ua/733151/ (дата звернення: 18.02.2025).

Кучерявий, О. (2024). Модель підготовки майбутнього викладача закладу вищої педагогічної освіти до професійної діяльності в умовах цифровізації суспільства. *Освіта дорослих: теорія, досвід, перспективи, 1*(25), 19–32.

Марчук, Н. А. (2024). Цифрові інструменти в професійній освіті України: історія виникнення, особливості впровадження та перспективи. *Професійно-прикладні дидактики, 2*(2), 48–53. https://doi.org/10.37406/25216449/2024-2-8

Міністерство освіти і науки України. (2024). Цифрова трансформація освіти і науки. https://mon.gov.ua/tag/tsifrova-transformatsiya-osviti-i-nauki?&tag=tsifrova-transformatsiya-osviti-i-nauki

Петренко, Л. М. (2023). Концептуальні засади підготовки майбутніх викладачів педагогічного закладу вищої освіти в умовах цифрової трансформації суспільства. *Вісник кафедри ЮНЕСКО «Неперервна професійна освіта XXI століття», 1*(7), 140–151.

Пригодій, М. А. (2023). Викладання цифрової педагогіки: світовий досвід. *Педагогічна компаративістика і міжнародна освіта – 2023: горизонти інновацій*, 233–238. https://lib.iitta.gov.ua/id/eprint/737579/1/Pryhodii%20comparative_2023.pdf

Ростока, М. Л. (2025). Цифрова парадигма освітнього менеджменту (аналітичний огляд). *Аналітичний вісник у сфері освіти й науки: довідковий бюлетень, 22*(1), 3–52. https://dnpb.gov.ua/wp-content/uploads/2025/08/AHS-of-EduSci-RB-22-2025.pdf

Сачанюк-Кавецька, Н. В., Маятіна, Н. В., та Новак, О. М. (2021). Цифрова педагогіка у контексті підвищення якості освітніх послуг. *Педагогічні науки: реалії та перспективи. Серія 5, 80*(2), 131–135.

Bitar, N., & Davidovich, N. (2024). Transforming Pedagogy: The Digital Revolution in Higher Education. *Education Sciences*, *14*(8), 811. https://doi.org/10.3390/educsci14080811

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Podcasting in Language Education: A Project-Based Framework

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ABSTRACT: This study investigates the pedagogical impact of podcast creation in foreign language education, focusing on student engagement, creativity, and oral language development. Sixty-six university students participated in a project-based activity involving the creation of personal podcasts, preceded and followed by a structured questionnaire. Quantitative analysis revealed significant increases in students' perceived engagement (M = 5.89 post-test vs. M = 5.20 pre-test), pedagogical appreciation (M = 5.93 vs. M= 5.38), and motivation for oral production (M ≈ 5.7 vs. M ≈ 5.2). These findings affirm podcasting's role as a multimodal, creativity-enhancing task that encourages learner autonomy and expressive confidence. The study contributes to glottodidactic research by demonstrating how podcasting supports oral proficiency, cultural awareness, and inclusive pedagogy.

KEYWORDS: podcasting, project-based learning, creativity, oral language development, engagement

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Introduction

Podcasting is a multifaceted pedagogical tool that enhances learner engagement, creativity, and oral language production. Both teacher-led and student-generated podcasts foster active participation and meaningful learning, especially in asynchronous settings that support autonomy and reflection (Yang, 2025; Bolliger et al., 2010; Rosell-Aguilar, 2007). Creating podcasts offers authentic communicative tasks that stimulate motivation, collaboration, and self-expression (Peng et al., 2025; Tyrou, 2023). Learners consistently perceive podcasting as valuable and engaging, with post-activity evaluations confirming its pedagogical relevance. Exposure to authentic spoken discourse and the act of producing content improve listening comprehension, pronunciation, and grammatical awareness (Ramirez, 2024; Budiasningrum & Rosita, 2022; Ginting, 2019). In Italian L2 contexts, podcasting promotes oral proficiency, cultural sensitivity, and inclusive practices (Bettoni et al., 2025; Sergio, 2025; Tyrou, 2025; Samu, 2024). When embedded in project-based learning, it cultivates critical thinking and learner agency, bridging content delivery with creative expression and educational inclusivity (Hall & Jones, 2023).

Research Aim and Research Questions

In response to recent calls for more innovative, motivating, and autonomous learning approaches, we developed a research project. This study builds upon previous research (Tyrou, 2023; Tyrou & Mylonas, 2023; Tyrou, 2025) and forms part of a broader project exploring the creative use of podcasts in language education. The aim was to investigate students' dispositions and reflections following the creation of their own personal podcast, which served as an assessed assignment within a specific language course.

The research questions of the current study focused on the following:

- Does the creation of a podcast, as a multimodal text, support students' active engagement and creativity?
- Do university students perceive podcasting as a good pedagogical practice?
- Whether it contributed to the improvement of oral language production.

The sample consisted of 66 university students enrolled in a foreign language program (in an elective course on foreign language lesson planning for Italian L2, by undergraduate students of all years of the department, with language proficiency level B1-C1). All participants completed a 1-6 questionnaire scale both before and after the creation of their personal podcast.

Research Results

To address the first research question, student responses to two survey items were compared before and after podcast creation [Figure 1, Figure 2]. Initial expectations regarding podcasting's potential to foster engagement and creativity (Q6, M = 5.20) were strongly affirmed post-activity (Q13,

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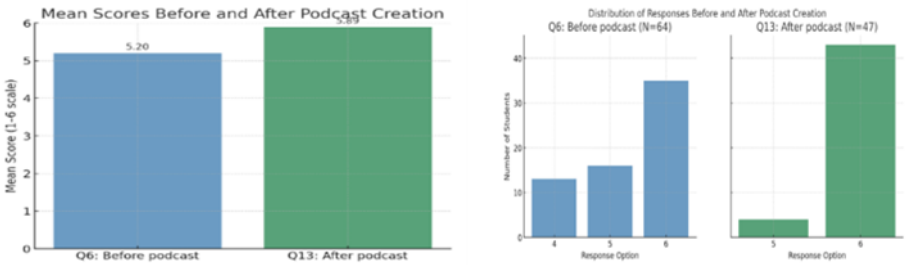
M = 5.89), with responses clustering near the maximum. This upward shift indicates that the experiential process of designing and producing a podcast not only validated but amplified students' beliefs, reinforcing podcasting's role as a creativity-enhancing practice. Visual data confirm this trend: pre-test responses ranged from 4 to 6, while post-test responses converged around 6, reflecting a more unified and enthusiastic stance. These findings highlight the pedagogical value of hands-on multimodal production in cultivating learner engagement and expressive confidence.

Figures 1 and 2

Active Engagement and Creativity from Podcast Creation



To evaluate changes in students' pedagogical stance toward podcasting (second research question), two survey items were compared. Before the activity, students expressed optimism about podcasting's potential to improve teaching (Q14: M= 5.38, SD = 0.79). After creating their own podcasts, evaluations became significantly more favourable (Q12: M= 5.93, SD = 0.25), with an independent samples t-test confirming a meaningful difference ($t \approx -5.21$, $p < 0.001$). This shift indicates that experiential engagement not only validated but also amplified students' appreciation of podcasting as an effective instructional strategy. Post-test responses showed minimal variance and strong convergence toward the highest rating, suggesting a consolidated endorsement of podcast creation as a tool for meaningful learning. These findings reinforce the pedagogical value of multimodal production, echoing its capacity to transform abstract beliefs into practice-informed convictions. As illustrated in Figure 3, the blue bar (Q14) reflects broader variability, while the green bar (Q12) shows a higher mean and tighter clustering, visually confirming the positive impact of the podcasting experience.

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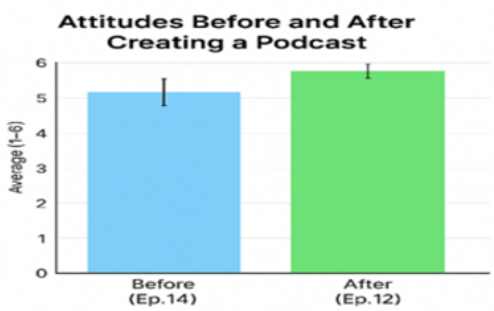
Figure 3

Podcasting as a Good Pedagogical Practice



For the third research question, a clear shift is observed from general endorsement ("Podcasts have an influence") to stronger, experience-based affirmation ("Podcast creation motivated me to perform better") [Table 1]. Students not only recognised podcasting's pedagogical value but also internalised it as a motivational force, enhancing oral production. In Q10, 96.9% responded positively, with 56.9% selecting the highest value (M ≈ 5.2), reflecting strong perceived influence on language development. In Q4, 76.6% chose the top category, yielding a higher mean (M ≈ 5.7) and indicating deeper engagement through personal experience.

This 20-point increase in "strongly positive" responses suggests a shift from abstract agreement to embodied motivation. While precise correlation (r) requires individual-level data, the distribution patterns imply a positive association: students who value podcasts generally also find podcast creation personally motivating. These findings reinforce podcasting's role not only as a pedagogical tool but as a catalyst for expressive confidence and oral performance.

Table 1

Descriptive Statistics for the Improvement of Oral Language Production

Item	N	% Positive (4-6)	% Strongly Positive (6)	Estimated Mean (1-6)
Q10: I believe that the podcast will influence both oral and written language.	65	96.9%	56.9%	≈ 5.2
Q4: The creation of the podcast was a motivation to improve my academic performance in oral production.	47	97.9%	76.6%	≈ 5.7

Conclusions

This study demonstrates that podcast creation, as a multimodal and experiential task, significantly enhances student engagement, creativity, and oral language development. The increase in post-test scores reflects not only fulfilled expectations but also a deeper internalisation of podcasting's

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pedagogical value. Students moved from anticipating benefits to experiencing them directly, validating the transformative potential of podcasting in language education. These findings resonate with Yang (2025), Bolliger et al. (2010), and Rosell-Aguilar (2007), who emphasise podcasting's capacity to foster autonomy, reflection, and expressive confidence. Learners' perceptions of podcasting evolved through hands-on involvement, shifting from abstract beliefs to concrete perceptions. The strong convergence toward high ratings suggests a consolidated appreciation of podcasting as a meaningful and motivating practice (Hall & Jones, 2023). Podcasting thus emerges not as a supplementary tool but as a dynamic framework that connects theory with lived pedagogical experience.

Regarding oral production, students linked podcast creation with increased motivation and fluency. The sharp rise in "strongly positive" responses indicates that producing a podcast offered a real-world context for practising oral skills, moving beyond passive recognition to active linguistic engagement. This aligns with Yang (2025) and supports the glottodidactic potential highlighted in Italian L2 research (Tyrou, 2025; Bettoni, 2025; Samu, 2024). Podcasts also contributed to listening comprehension, pronunciation, and grammatical awareness (Ramirez, 2024; Budiasningrum & Rosita, 2022), reinforcing their value as immersive oral tasks. In sum, podcasting proves to be a powerful pedagogical medium that cultivates creativity, learner agency, and linguistic competence. When integrated into project-based learning, it connects content delivery with authentic expression, offering a transformative path toward inclusive and meaningful language education. Future iterations could explore cross-institutional collaborations, multilingual podcasting, and integration with other media forms (e.g., video essays or digital storytelling). Further research might examine learners' emotional engagement and identity negotiation through podcast creation. The project can contribute to research in educational technology and applied linguistics, to language educators seeking creative, learner-centred methodologies, and to curriculum designers interested in innovation aligned with the CEFR and enhancing digital literacy and learner autonomy.

References

Bettoni, P. (2025). Il podcast Voci d'Italia: Un progetto per l'insegnamento/apprendimento dell'italiano a stranieri. In P. Bettoni, M. C. Luise, & G. Tardi (Eds.), *Podcast nella didattica dell'italiano a stranieri* (pp. 93–108). Loescher Editore.

Bolliger, D. U., Supanakorn, S., & Boggs, C. (2010). Impact of podcasting on student motivation in the online learning environment. *Computers & Education*, *55*(2), 714–722. https://doi.org/10.1016/j.compedu.2010.03.004

Budiasningrum, R. S., & Rosita, R. (2022). Using podcasts to improve listening and speaking skills: Literature review. *JOLADU: Journal of Language Education*, *1*(1), 13–20.

Ginting, S. R. (2019). *Exploring the use of podcasts on students' language learning and change of students' self-efficacy about the use of podcasts* [Doctoral dissertation, Northern Illinois University]. Huskie Commons.

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Hall, N. M., & Jones, J. M. (2023). Student-produced podcasts as a teaching and learning tool. *American Journal of Distance Education*, *37*(1), 53–65. https://doi.org/10.1080/08923647.2021.1995256

Peng, L., Akhter, S., & Hashemifardnia, A. (2025). Podcast-integrated speaking instruction: Enhancing informal digital learning of English, academic engagement, and speaking skills. *Acta Psychologica*, *258*, 105158. https://doi.org/10.1016/j.actpsy.2025.105158

Ramirez, M. (2024). The use of podcasts for language learning: A systematic review of literature. *International Journal of English Language Studies*, *6*(1), 47–53. https://doi.org/10.32996/ijels.2024.6.1.4

Samu, B. (2024). L'uso del podcast per sviluppare le competenze orali in italiano L2. *Rivista Italiano a Stranieri*, *36*, 10–14.

Sergio, G. (2025). Ascolta e impara: Potenzialità e impieghi glottodidattici del podcast. *Italiano LinguaDue*, *17*(1), 437–454. https://doi.org/10.54103/2037-3597/29095

Tyrou, I. (2023). Podcast-mediated foreign language writing: A case study in L2 academic settings. In *Proceedings of the 13th International Conference "The Future of Education"*. Florence, Italy.

Tyrou, I. (2025). *Podcast e didattica innovativa: Quando la voce diventa lezione* [Manuscript in preparation]. Faculty of Philosophy, University of Novi Sad.

Tyrou, I., & Mylonas, K. (2023). Διδάσκοντας μια ξένη γλώσσα με τη χρήση podcasts: Δημιουργικές χρήσεις και προτάσεις [Teaching a foreign language using podcasts: Creative uses and suggestions]. *Educ@tional Circle*, *11*(2). https://www.educircle.gr/

Yang, P. L. (2025). The role of podcast creation in supporting motivation and self-directed learning among EFL college students: An action research study. *TESL-EJ*, *28*(4), 1–23.

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Developing a Software System for Direct Assessment of Program Learning Outcomes in Vietnamese Higher Education

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ABSTRACT: This paper presents a pragmatic model for direct assessment of Program Learning Outcomes (PLOs) in Vietnamese higher education. We aggregate course-level evidence through performance indicators (PIs) to compute attainment at the PLO and program levels, and we implement the process in a lightweight software module interoperable with the student information system. The module automates data extraction, calculation, and reporting for cohorts and individual students, supporting graduation checks and continuous improvement. Pilot use shows gains in efficiency and comparability across cohorts, while highlighting the need for precise curriculum maps and assessment rubrics. We conclude with lessons on reliability, feasibility, and alignment with national regulations and regional QA frameworks.

KEYWORDS: program learning outcomes, direct assessment, outcome-based education, higher education, Vietnam, assessment software.

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Introduction

Vietnam's Ministry of Education and Training (MOET) requires programs to regularly evaluate and update curricula based on evidence of students' attainment of Program Learning Outcomes (PLOs). Despite this mandate, many institutions lack concrete technical guidance and continue to conflate course grading with program-level assessment. Grade point averages, credit completion, or end-of-course examinations are insufficient proxies for demonstrating that graduates meet declared PLOs. International practice distinguishes direct and indirect methods: direct methods use authentic evidence of learning (e.g., exams, projects, presentations), whereas indirect methods rely on perceptions (e.g., surveys of students, alumni, employers). To ensure accountability and continuous improvement, programs need a repeatable, auditable process that converts course-level evidence into program-level judgments aligned with national and regional QA standards (e.g., MOET regulations; AUN-QA; ABET-like outcomes assessment).

Related Work

Prior Vietnamese initiatives have often emphasised indirect surveys or course-level analyses without a precise mechanism to roll up results to the program level. Internationally, outcome assessment handbooks at institutions such as the University of Central Florida and UNC–Chapel Hill have long operationalised annual assessment cycles with templates for learning outcomes, measures, criteria, findings, and actions. Large-scale efforts such as the Collegiate Learning Assessment (CLA) and OECD's AHELO illustrate two complementary directions: measuring generic skills and discipline-specific outcomes. While informative, high-stakes external testing may burden institutions and does not leverage rich evidence already embedded in courses. This paper advances a pragmatic direct-assessment model that uses existing course assessments and a transparent aggregation scheme to infer PLO attainment for each student cohort.

Methods and Implementation

We adopt a hierarchical model connecting PLOs → Performance Indicators (PIs) → Core Courses → Course Learning Outcomes (CLOs). For each student, the score for a CLO contributing to a PI is the final score of the associated course (or the relevant assessment component, if mapped). A PI score is the arithmetic mean of all contributing CLO scores. A PLO score is the mean of its PIs. The overall program-level attainment is the mean of all PLO scores. Thresholds (e.g., ≥ 7.0/10 for 'Achieved') are configurable per program.

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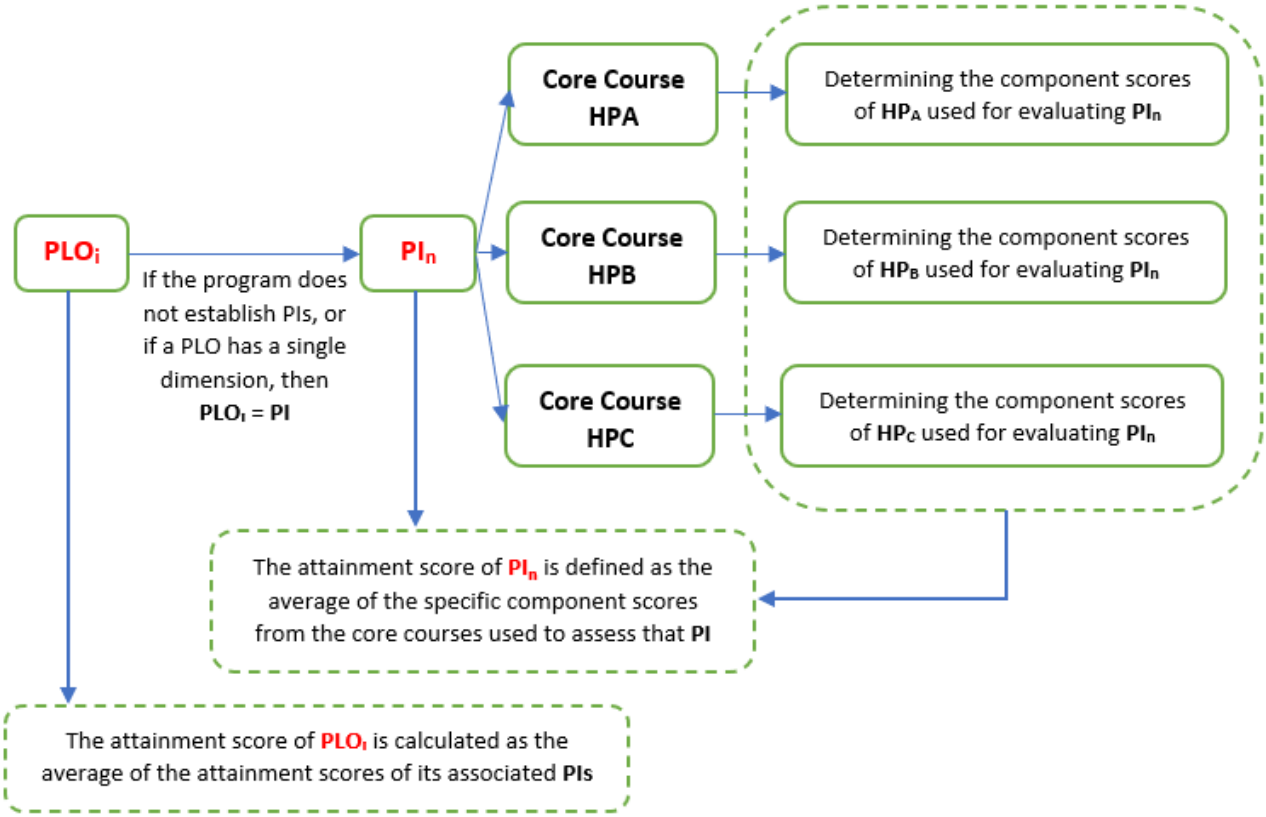
Figure 1

Method for assessing the attainment level of PLOs for each student



Source: Đinh Thành Việt, Trần Thị Hà Vân (2021)

Implementation involved four steps: (1) Define a controlled vocabulary (dictionaries) for PLOs, PIs, CLOs, and course mappings in a curriculum map; (2) Configure attainment thresholds and rules; (3) Link to the student information system (SIS) to retrieve validated course results each semester; (4) Schedule periodic calculations and publish dashboards for cohorts and individual students. Double marking and inter-rater reliability checks can be embedded at the course level to enhance reliability.

Software Module

We developed an assessment module interoperable with the university's training-management system. Administrators declare the PLO–PI–CLO dictionaries and set thresholds; the system then calculates PLO and program attainment periodically and before graduation checks. Individual student dashboards show PLO attainment profiles, while cohort-level screens summarise attainment distributions and identify underperforming PIs to inform 'closing the loop' actions.

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Figure 2

Calculation of Individual Learner's PLO Attainment Score

In | Xuất excel | Trở về

PLO	Điểm trung bình PLO	PI	Điểm trung bình PI	Học phần	CLO	Điểm học phần
PLO1	8.4	PI1.1	8.5	21321922 - Tư tưởng Hồ Chí Minh	CLO1	8.0
				31621549 - Pháp luật đại cương	CLO1	8.5
				31721091 - Cơ sở văn hóa Việt Nam	CLO1	9.0
		PI1.2	8.2	21321922 - Tư tưởng Hồ Chí Minh	CLO2	8.0
				31721091 - Cơ sở văn hóa Việt Nam	CLO1	9.0
				31721857 - Tiến trình văn học	CLO1	8.9
				31741288 - Hệ thống thể loại và tác gia tiêu biểu văn học Việt Nam hiện đại 1900 - 1945	CLO1	6.8
				31741289 - Hệ thống thể loại và tác gia tiêu biểu văn học Việt Nam hiện đại 1945 đến nay	CLO1	8.3
				32041719 - Tâm lí học giáo dục	CLO1	8.0
PLO2	8.4	PI2.1	8.4	31721140 - Dẫn luận ngôn ngữ học	CLO1	7.8
				31721493 - Ngữ âm tiếng Việt	CLO2	8.5
				31741956 - Văn học châu Á	CLO2	8.8
		PI2.2	7.9	31731497 - Ngữ pháp tiếng Việt	CLO2	9.0
				31741288 - Hệ thống thể loại và tác gia tiêu biểu văn học Việt Nam hiện đại 1900 - 1945	CLO1	6.8
		PI2.3	8.9	31731706 - Tác phẩm và thể loại văn học	CLO2	9.2
				31741965 - Văn học Tây Âu - Mĩ	CLO2	8.5
		PI3.1	8.6	30321361 - Kiến tập sư phạm	CLO3	9.8
				30341843 - Thực tập sư phạm	CLO3	10.0
				31721403 - Lí luận dạy học Ngữ Văn	CLO3	7.5
				31721543 - Phân tích và phát triển chương trình Ngữ văn nhà trường	CLO3	8.9
				31731571 - Phương pháp dạy học Ngữ Văn 1	CLO3	6.4
				31731572 - Phương pháp dạy học Ngữ Văn 2	CLO3	8.8
				31731791 - Thực hành dạy học (tập giảng tại trường sư phạm)	CLO3	9.5

Source: Screenshot from the developed assessment software module

Results and Discussion

Pilot use indicates substantial efficiency gains versus manual spreadsheets: automated data pulls reduce transcription errors; consistent formulas ensure comparability across cohorts; and visual summaries support evidence-based program review. However, data quality depends on precise curriculum maps and well-constructed CLOs and rubrics. Institutions should standardise assessment components used for mapping, adopt periodic audits of mappings, and document changes to preserve longitudinal comparability. Future work will integrate rubric-level evidence, weight assessments by relevance, and add inferential analytics to prioritise improvement actions.

Conclusions

This work demonstrates a feasible, auditable, and scalable approach to direct assessment of PLO attainment in Vietnamese higher education. By leveraging existing course evidence and an interoperable software layer, programs can satisfy regulatory expectations, provide trustworthy evidence for accreditation, and—most importantly—use results to improve student learning.

References

AACSB. (2020). *2020 guiding principles and standards for business accreditation*. AACSB International.

ABET. (2018). *Criteria for accrediting engineering programs*. ABET.

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

ASEAN University Network (AUN). (2020). *Guide to AUN-QA assessment at programme level (Version 4.0)*. ASEAN University Network.

ASIIN. (2015). *Criteria for the accreditation of degree programmes* – ASIIN Quality Seal. ASIIN e. V.

Bộ Giáo dục và Đào tạo. (2010). *Công văn số 2196/BGDĐT-GDĐH ngày 22/04/2010 về xây dựng và công bố chuẩn đầu ra ngành đào tạo* [Official dispatch No. 2196/BGDĐT-GDĐH on developing and publishing program learning outcomes].

Bộ Giáo dục và Đào tạo. (2016). *Thông tư số 04/2016/TT-BGDĐT ngày 14/03/2016 ban hành Quy định về tiêu chuẩn đánh giá chất lượng chương trình đào tạo các trình độ của giáo dục đại học* [Circular No. 04/2016/TT-BGDĐT on standards for quality assessment of higher education programs].

Bộ Giáo dục và Đào tạo. (2017). *Thông tư số 12/2017/TT-BGDĐT ngày 19/05/2017 ban hành Quy định về kiểm định chất lượng cơ sở giáo dục đại học* [Circular No. 12/2017/TT-BGDĐT on accreditation of higher education institutions].

Bộ Giáo dục và Đào tạo. (2021a). *Thông tư số 08/2021/TT-BGDĐT ngày 18/03/2021 ban hành Quy chế đào tạo trình độ đại học* [Circular No. 08/2021/TT-BGDĐT on undergraduate training regulations].

Bộ Giáo dục và Đào tạo. (2021b). *Thông tư số 17/2021/TT-BGDĐT ngày 22/6/2021 quy định về chuẩn chương trình đào tạo; xây dựng, thẩm định và ban hành chương trình đào tạo các trình độ của giáo dục đại học* [Circular No. 17/2021/TT-BGDĐT on curriculum standards; development, appraisal, and issuance of higher education programs].

Cục Quản lý chất lượng. (2019). *Công văn số 1668/QLCL-KĐCLGD ngày 31/12/2019 về thay thế Bảng hướng dẫn đánh giá ban hành kèm theo Công văn số 768/QLCL-KĐCLGD* [Official dispatch No. 1668/QLCL-KĐCLGD replacing the assessment guideline table attached to Dispatch No. 768/QLCL-KĐCLGD].

Cục Quản lý chất lượng. (2019). *Công văn số 1669/QLCL-KĐCLGD ngày 31/12/2019 về thay thế Tài liệu đánh giá chất lượng CTĐT các trình độ của GDĐH ban hành kèm theo Công văn số 769/QLCL-KĐCLGD* [Official dispatch No. 1669/QLCL-KĐCLGD replacing the program quality assessment document attached to Dispatch No. 769/QLCL-KĐCLGD].

Đại học Thái Nguyên. (2018). *Đánh giá hiện trạng sinh viên tốt nghiệp theo chuẩn đầu ra của chương trình đào tạo tại Khoa Quốc tế năm 2018* [Assessment of graduate status against program learning outcomes at the International Faculty in 2018]. https://is.tnu.edu.vn/danh-gia-hien-trang-sinh-vien-tot-nghiep-theo-chuan-dau-ra-cua-chuong-trinh-dao-tao-tai-khoa-quoc-te-nam-2018/

Đinh, T. V., & Trần, T. H. V. (2021). *Phát triển, bảo đảm chất lượng chương trình đào tạo và đo lường*

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đánh giá chuẩn đầu ra [Program development, quality assurance, and learning outcomes assessment]. NXB Thông tin và Truyền thông.

Lưu, K. L. (2020). *Nghiên cứu về đánh giá sinh viên và định hướng đánh giá sinh viên theo chuẩn đầu ra chương trình đào tạo trình độ đại học* [Student assessment and orientation toward outcome-based assessment at the undergraduate program level]. Tạp chí Giáo dục, 483(1), 6–12.

Nguyễn, V. H. (2021). *Đánh giá chuẩn đầu ra theo kiểm định ABET áp dụng cho chương trình kỹ thuật dầu khí của Trường Đại học Dầu khí Việt Nam* [Assessing learning outcomes under ABET for the petroleum engineering program at PVU]. Kỷ yếu Hội thảo khoa học Đào tạo đáp ứng nhu cầu xã hội và hội nhập quốc tế theo mô hình CDIO. NXB Tài chính.

Phan, T. Y., & Đinh, T. K. T. (2018). *Mô hình đánh giá năng lực đầu ra của sinh viên tốt nghiệp ngành Quốc tế học tại Việt Nam* [A model for assessing graduate outcomes in International Studies in Vietnam]. Tạp chí Giáo dục, 436(2), 21–28.

Phạm, T. D., & Nguyễn, T. N. (2022). *Kinh nghiệm triển khai phương pháp đánh giá kết quả học tập theo chuẩn đầu ra* [Experience implementing outcome-based assessment methods]. Đại học Đại Nam. https://dainam.edu.vn/vi/phong-khao-thi/tin-tuc/kinh-nghiem-trien-khai-phuong-phap-danh-gia-ket-qua-hoc-tap-theo-chuan-dau-ra

Phạm, V. H., & Nguyễn, H. H. (2017). *Đánh giá đầu ra của chương trình đào tạo qua mức độ đáp ứng chuẩn đầu ra của sinh viên chuẩn bị tốt nghiệp* [Assessing program outcomes via near-graduates' attainment of learning outcomes]. Tạp chí Khoa học & Công nghệ, 167(7), 141–146.

The University of North Carolina at Chapel Hill. (2017). *Guide to Outcomes Assessment Reports: Procedures and Standards for Academic Programs*. The University of North Carolina at Chapel Hill.

Trần, T. L. P. (2020). *Đánh giá mức độ đáp ứng chuẩn đầu ra theo tiếp cận Khung trình độ quốc gia Việt Nam của kỹ sư tốt nghiệp chuyên ngành an toàn phòng cháy Trường Đại học Phòng cháy chữa cháy* [Assessing learning outcome attainment against the Vietnamese Qualifications Framework for fire-safety engineering graduates at the University of Fire Prevention and Fighting] [Master's thesis, Trường Đại học Giáo dục, ĐHQG Hà Nội].

University of Central Florida. (2008). *UCF academic program assessment handbook: Guidelines for planning and implementing quality-enhancing efforts of program and student learning outcomes*. University of Central Florida.

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Developing Intercultural Competence in Future Early Childhood Educators: The Case of Mediterranean College

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ABSTRACT: This study investigates the extent to which prospective early childhood educators are prepared during their undergraduate education to address the demands of contemporary multicultural classrooms. Focusing on graduates of the School of Education, Mediterranean College Thessaloniki, the research examines the development of intercultural competence as an essential component of professional readiness. Employing a quantitative research design, data were collected through a structured questionnaire administered to thirty-five graduates of the three-year degree programme. The analysis explored four key dimensions: (a) curriculum and academic content, (b) cognitive knowledge of intercultural theory, (c) pedagogical and communicative skills, and (d) emotional and attitudinal awareness regarding cultural diversity. Findings reveal that participants exhibit a satisfactory level of intercultural competence, expressing confidence in their theoretical understanding and pedagogical approaches. Nonetheless, several gaps persist in the curriculum — particularly in the provision of mandatory modules explicitly addressing intercultural education, opportunities for practical engagement in diverse educational contexts, and participation in seminars or workshops on inclusion and diversity. The results underscore the need for a more systematic and experiential integration of intercultural learning within early childhood teacher education to strengthen graduates' readiness for pluralistic educational environments.

KEYWORDS: cultural diversity, early childhood education, higher education, intercultural competence, multicultural education.

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Introduction

The phenomenon of mass migration has profoundly reshaped the demographic composition of contemporary societies, giving rise to multicultural classrooms that challenge traditional educational structures. Greece, due to its strategic geopolitical position, has emerged as a significant host country for immigrants and refugees, necessitating an education system capable of responding to linguistic, cultural, and social diversity (Giannakou & Karalia, 2023). Traditional monocultural and monolingual approaches are increasingly inadequate, calling for inclusive and intercultural pedagogies that promote equity, understanding, and social cohesion (Drosos et al., 2024). Early Childhood Educators play a pivotal role in this transformation, as their preparedness directly influences whether education functions as a space of integration or exclusion.

Theoretical Analysis

Previous research has highlighted the importance of intercultural competence in early childhood educators' preparation, emphasising that both cognitive understanding of diversity and practical pedagogical skills are essential for effective classroom management in multicultural settings (Lang et al., 2024). Studies indicate that many education programs provide theoretical knowledge but offer limited experiential opportunities for engagement with diverse populations (e.g., multicultural modules, workshops, or field placements), leaving graduates only partially equipped to address the challenges of contemporary classrooms (Fanous, 2020; Kim, Kim, & Hwang, 2022; Lash et al., 2020). Recent research highlights the importance of experiential learning in developing intercultural competence. Initiatives such as collaborative online international learning, immersive field experiences, teaching methods courses with intercultural training, and service-learning activities all enhance early childhood educators' skills and attitudes for inclusive practice, demonstrating that theoretical knowledge alone is insufficient for preparing educators for diverse classrooms (Bennett et al., 2024; Kopish & Zayimoğlu- Öztürk, 2024). These gaps underscore a critical issue in early childhood education: the extent to which prospective educators develop the knowledge, skills, and attitudes necessary for fostering inclusive learning environments.

Research Aim and Research Questions

Within this context, the present study focuses on graduates of the School of Education at Mediterranean College, Thessaloniki. It investigates the development of intercultural competence as an essential component of professional readiness in early childhood education. Specifically, the research seeks to investigate how well early childhood educator preparation programs equip students with the knowledge, skills, and attitudes necessary to operate effectively in multicultural classroom settings. The study addresses the following research questions:

1. To what extent does the curriculum of the early childhood education program facilitate the development of intercultural competence in prospective educators?

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2. What levels of intercultural knowledge, pedagogical skills, and attitudinal awareness do prospective early childhood educators demonstrate?
3. What challenges and anticipatory difficulties do they perceive when engaging with culturally and linguistically diverse early childhood classrooms?

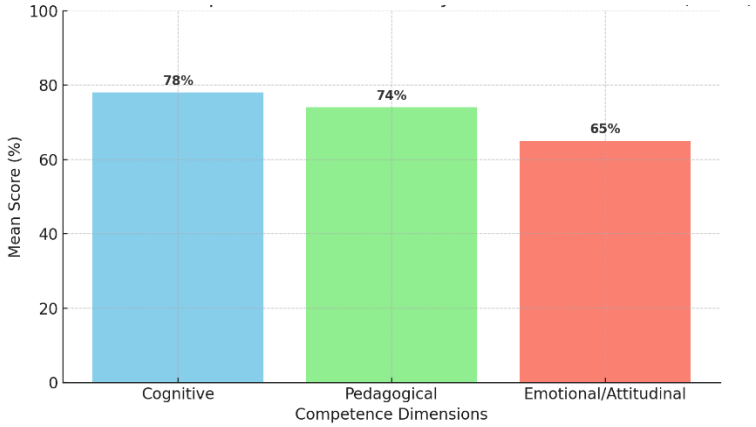
Research Results

Data collection was conducted using a structured online questionnaire, which was designed to measure four key dimensions: the participants' perception of the curriculum content and the three core dimensions of intercultural competence: cognitive knowledge (theoretical understanding), pedagogical/communicative skills (practical application), and emotional/attitudinal readiness (self-confidence and anxiety management). Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS). Both descriptive statistics and inferential statistics were applied to analyse the variance and confirm the statistically significant differences ($p<0.05$) observed among the competence dimensions, thereby highlighting existing gaps in professional preparedness.

Participants generally demonstrated a satisfactory level of intercultural competence, with the highest attainment in theoretical knowledge and the lowest in emotional readiness. The data highlights statistically significant differences between the cognitive, pedagogical, and emotional dimensions.

Figure 1

Intercultural Competence Scores of Early Childhood Graduates



While the quantitative competence scores provided a baseline, the analysis of the curriculum dimension revealed specific gaps contributing to the lower affective readiness score. These gaps concern the provision of specialised training and mandatory coursework. The majority of participants voiced a strong desire for intercultural education to be a mandatory component of their academic program. This finding directly supports the conclusion that gaps persist in the curriculum regarding

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explicit mandatory modules.

Table 1

Student Opinion on Making Intercultural Education Courses Mandatory

Response	Count (N=35)	Percentage (%)
Yes	33	94.3%
No	2	5.7%

Data concerning the departmental organisation of scientific meetings and seminars on intercultural education indicated a significant lack of engagement with these experiential learning opportunities.

Table 2

Student Reports on Departmental Organisation of Intercultural Seminars

Response	Count ((N=35))	Percentage (%)
Haven't attended	14	40%
No	10	28.6%
Yes	7	20%
Don't know/Don't remember	4	11.4%

The finding that only 20% of students confirm the organisation of such events, alongside reporting non-attendance, validates the study's assertion that opportunities for practical engagement in seminars and workshops on inclusion and diversity are insufficient.

Conclusions

The study shows that future early childhood educators in Greece acquire essential intercultural skills through their academic programs, but more systematic, practice-oriented training is needed. Universities should strengthen courses in intercultural pedagogy, encourage reflection on personal cultural biases, and integrate real-world experiences in multicultural classrooms. Developing intercultural competence is crucial for promoting inclusion, equity, and respect for diversity.

Further research is recommended in three areas:

1. Intervention Effectiveness: Quasi-experimental studies to evaluate experiential interventions, such as mandatory field placements in multicultural classrooms.
2. Longitudinal Impact: Tracking graduates over time to assess the long-term effects of curricular gaps on intercultural competence and professional challenges.

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3. Comparative Analysis: Examining programs across Greece or Europe to identify best practices in fostering comprehensive intercultural competence.

References

Bennett, C. A., Ruchti, W., & Nelson, M. (2024). Opening minds": The impact of a culturally and linguistically immersive teaching experience for pre-service teachers. *Education and New Developments 2024, Volume I,* 142. https://doi.org/10.36315/2024v1end030

Drosos, D., Armenaka, V., Sidiropoulos, G., Kargas, A., Ntanos, S., & Eleni, G. C. (2024). Measurement of teachers' attitudes and behaviours on applied intercultural education: A case study from Greek public schools. *International Journal of Science and Research Archive, 13*(2), 1455–1468. https://doi.org/10.30574/ijsra.2024.13.2.2220

Fanous, S. (2020). *Intercultural competence among early childhood educators* [Undergraduate honours thesis, University of Arkansas]. Human Development and Family Sciences. https://scholarworks.uark.edu/hdfsrsuht/6.

Giannakou, A., & Karalia, K. (2023). Teaching the Greek Language in Multicultural Classrooms Using English as a *Lingua Franca*: Teachers' Perceptions, Attitudes, and Practices. *Societies, 13*(8), 180. https://doi.org/10.3390/soc13080180.

Kim, S., Kim, K., & Hwang, Y. (2022). Examining the intercultural competence of early-childhood teachers. *European Early Childhood Education Research Journal, 31*(2), 287–303. https://doi.org/10.1080/1350293X.2022.2098992.

Kopish, M., & Zayimoğlu Öztürk, F. (2024). Collaborative online international learning: A promising practice for developing intercultural and global competencies with Turkish and American teacher candidates. *Frontiers: The Interdisciplinary Journal of Study Abroad, 36*(2), 29–57. https://doi.org/10.36366/frontiers.v36i2.925.

Lash, M., Madrid Akpovo, S., & Cushner, K. (2020). Developing the intercultural competence of early childhood preservice teachers: Preparing teachers for culturally diverse classrooms. *Journal of Early Childhood Teacher Education, 43*(1), 105–126. https://doi.org/10.1080/10901027.2020.1832631.

Lang, S. N., Tebben, E., Luckey, S. W., Hurns, K. M., Fox, E. G., Ford, D. Y., Ansari, A., & Pasque, P. A. (2024). Early childhood teachers' dispositions, knowledge, and skills related to diversity, inclusion, equity, and justice. *Early Childhood Research Quarterly, 67*, 111–127. https://doi.org/10.1016/j.ecresq.2023.12.005.

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Literary Narratives as Platforms of Identity: Educational Models for Integrating Historical Heritage, Female Imagery, and Urban Motifs into Modern Curricula

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ABSTRACT: This paper explores literary narratives as dynamic platforms for the formation of cultural identity within modern educational frameworks. By integrating urban motifs in the works of Taras Shevchenko, the symbolic imagery of the moon in neo-classical poetry, the epistolary legacy of Vasyl Stus, representations of female identity in comparative literature, and the ethnocultural phenomenon of Ukrainian Cossack heritage, the study proposes an interdisciplinary educational model. These narratives are interpreted not only as artistic texts but as pedagogical resources that activate historical memory, emotional intelligence, and intercultural dialogue in learners. Special attention is given to neuro-artistic practices, such as decorative relief painting, as complementary tools in identity-oriented education. The research argues that the synthesis of literary, visual, and ethnocultural codes enables the creation of effective strategies for nurturing reflective and value-based identity formation among students.

KEYWORDS: literary education, cultural identity, urban narratives, female imagery, ethnocultural memory, neuro-art pedagogy.

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Вступ

Сучасна гуманітарна освіта стикається з викликом формування цілісної національної ідентичності в умовах культурної фрагментації та інформаційної перенасиченості. Літературні наративи, які традиційно розглядаються як об'єкти естетичного аналізу, дедалі частіше постають як інструменти ціннісної трансмісії, носії історичної пам'яті та каталізатори критичного мислення. У контексті реформування української освіти актуалізується питання інтеграції культурологічних змістів у навчальні програми не лише на рівні змісту, а й на рівні структурно-смислової організації освітнього процесу.

Особливу увагу привертає можливість залучення урбаністичних мотивів, етнокультурних кодів та репрезентацій жіночої суб'єктності у літературі як платформи для розвитку компетентностей культурної рефлексії. Від топосу європейського міста у поетиці Тараса Шевченка до образу козацтва як маркера етнокультурної спільності, від символізму неокласиків до епістолярної саморефлексії Василя Стуса – ці тексти формують багаторівневу систему смислів, яку доцільно трансформувати в освітню модель.

Мета дослідження

Метою дослідження є розробка концептуально-освітньої моделі інтеграції літературних наративів як носіїв історичної, урбаністичної та гендерно-культурної ідентичності у сучасні навчальні програми гуманітарного профілю.

Літературний огляд

Осмислення літератури як інструменту формування культурної ідентичності простежується у працях, присвячених урбаністичному топосу в українській поезії. У дослідженні «Топос європейського міста в художній рецепції творів Т. Шевченка» аналізується багатовимірність міського простору як символу культурного переходу та модернізації, що може бути використано в освітньому контексті для розвитку у здобувачів освіти навичок читання простору як тексту (Боклах, 2019), топос міста репрезентує не лише географію, а й ідентифікаційний досвід, що особливо важливо для учнів у процесі культурної самоідентифікації.

У дослідженнях Н. Сенчило (2018) та Senchylo-Tatlilioglu (2022) художні образи у фольклорних та літературних текстах розглядаються як механізми порівняльної культурної ідентифікації. Порівняння українських і турецьких казкових мотивів у контексті гуманітарної освіти дозволяє показати типологію наративних структур, які відтворюють моделі поведінки, гендерні ролі та колективні уявлення про соціальний порядок. Дослідження жіночих образів у творах Лесі Українки та Суад Дервіш поглиблює цей аспект, дозволяючи інтегрувати феміністичний гуманітарний дискурс у навчальні модулі з літературознавства.

Цепкало (2014) у своїй роботі зосереджується на символіці образу місяця у поезії неокласиків, відкриваючи можливість трактування символічних образів як механізмів культурної пам'яті. Цей підхід є цінним для освітнього процесу, оскільки формує у студентів вміння читати текст як багатошаровий культурний код, де символ виступає інструментом смислотворення. У цьому аспекті символіка може бути введена в систему інтерпретаційних практик як педагогічний

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інструмент.

Етнокультурний вимір у формуванні ідентичності висвітлено у роботі Піщанської (2018), де феномен українського козацтва постає не лише як історичний факт, а як колективний міф, що продовжує функціонувати в сучасній культурі. Це дозволяє осмислювати козацький наратив як текст пам'яті, який може бути інкорпорований у навчальні модулі з метою виховання історичної свідомості. Такий підхід відповідає концепції історико-культурного виховання, що поєднує архетипні образи та сучасне прочитання ідентичності.

Окремий пласт становлять дослідження епістолярію як форми інтелектуальної самоідентифікації. Коткова (2023) у своїй праці аналізує епістолярну спадщину Василя Стуса, підкреслюючи її концептуальну роль у формуванні внутрішнього світу особистості. Епістолярій розглядається не лише як документ доби, а як текст рефлексивної освіти, який може бути адаптований у педагогічну практику для розвитку внутрішнього мовлення та етичної рефлексії студентів. У пізнішій роботі (2025) дослідниця акцентує на історичній спадщині як основі майбутнього, пропонуючи культурологічно-освітній підхід до її трансформації в навчальному процесі.

Актуалізація мистецьких практик як інструментів нейропедагогіки представлена у дослідженні Кострікової та Кострікова (2025), де декоративний живопис розглядається як елемент нейрофітнесу. Цей підхід може бути застосований у гуманітарній освіті для гармонізації емоційного стану здобувачів освіти та формування образного мислення, що є необхідним для адекватного сприйняття літературно-культурних кодів.

Результати

Аналіз літературних наративів засвідчив їхню потенційну ефективність як інтегрального освітнього ресурсу, здатного поєднати історико-культурний, гендерний та урбаністичний виміри ідентичності. На основі опрацьованих джерел сформовано структурну модель освітньої інтеграції, що дозволяє виокремити ключові смислові платформи, через які літературні тексти можуть бути впроваджені як інструменти формування критичної та культурної свідомості.

Таблиця 1

Структурна модель інтеграції літературних наративів в освітні практики формування ідентичності

№	Культурно-наративний код	Змістовий потенціал	Освітня інтерпретація
1	Урбаністичний (Т. Шевченко)	Місто як символ культурної мобільності та модерної ідентичності	Читання простору як тексту, аналітика урбаністичних символів
2	Етнокультурний (Піщанська)	Козацький наратив як колективна пам'ять та архетип національної суб'єктності	Реконструкція історичних смислів у навчальних практиках
3	Символічний (Цепкало)	Місячна символіка як код внутрішньої культурної рефлексії	Інтерпретація символів і розвиток символічного

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			мислення
4	Гендерно-ідентифікаційний (N. Senchylo, Senchylo-Tatlilioglu)	Жіночі образи як репрезентація суб'єктності та культурного досвіду	Діалог фемінної репрезентації в гуманітарній освіті
5	Рефлексивний (Коткова)	Епістолярій як простір внутрішнього мовлення і самоідентифікації	Формування практик етичного самовираження та рефлексії
6	Нейрохудожній (Кострікова)	Художня діяльність як нейропедагогічний інструмент	Арт-педагогіка ідентичності та емоційна активація культурної пам'яті

Таблиця 1 демонструє багатовимірність літературних наративів як джерел культурної ідентичності, які можуть слугувати не лише об'єктом філологічного аналізу, але й методологічною основою для формування цілісної освітньої траєкторії в гуманітарній освіті. Урбаністичний код, виокремлений на основі аналізу поетики Тараса Шевченка, дозволяє інтегрувати в навчальний процес практику читання простору як культурного тексту, що стимулює розвиток просторово-символічного мислення учнів. Така інтерпретаційна стратегія наближає літературу до сучасних підходів культурної географії, де місто розглядається як комунікативна система знаків, що відображає перехід між локальною та глобальною ідентичністю.

Етнокультурний код, представлений через наратив козацтва, виконує функцію конструювання історичної пам'яті в освітньому процесі. Залучення цього компоненту до навчальних модулів сприяє формуванню ціннісного ставлення до національної спадщини, при цьому акцент переноситься з репродуктивного засвоєння історичних фактів на реконструкцію культурних смислів. У такому підході козацький наратив постає не як статичний елемент історії, а як живий текст ідентичності, здатний вступати у діалог із сучасністю.

Символічний код, розкритий у дослідженні неокласиків, вводить у педагогічний дискурс ідею багатошаровості образу як інструменту критичної інтерпретації. Робота з символами у літературних текстах дозволяє студентам формувати інтерпретаційну автономію, розвиваючи здатність бачити культурні смисли, приховані за поетичними формулами. Освітня цінність цього підходу полягає у переході від буквального до метафоричного мислення, що є ключовим чинником у формуванні гуманітарної компетентності.

Гендерно-ідентифікаційний код, репрезентований через порівняльні студії образів жінки у українській та турецькій літературі, дає можливість включити в освітній процес перспективу суб'єктності та культурного багатоголосся. Така інтерпретація дозволяє переосмислити роль жіночого досвіду в літературі не як тематичного доповнення, а як повноцінної осі гуманітарного діалогу, що набуває особливої ваги в контексті сучасної освіти, орієнтованої на інклюзивність.

Рефлексивний код, пов'язаний з епістолярною спадщиною Василя Стуса, актуалізує ідею внутрішньої мови як інструменту етичної самоідентифікації. Включення епістолярію в освітні практики дозволяє не лише вивчати біографічний матеріал, але й моделювати внутрішні стани як чинник формування особистісної позиції. Такий підхід сприяє розвитку внутрішньої рефлексії,

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що є ключовим елементом гуманітарної освіти нового типу.

Нарешті, нейрохудожній код, представлений у дослідженні арт-педагогічних практик, відкриває можливість поєднання літературного аналізу з візуально-пластичними формами вираження. Мистецькі вправи, пов'язані з образотворенням, активують механізми емоційної емпатії та тілесно-емоційної пам'яті, завдяки чому процес ідентифікаційного переживання літературного тексту набуває цілісного характеру. У цьому контексті гуманітарна освіта отримує інструмент, який поєднує інтелектуальне, емоційне та культурне залучення.

Висновки

Проведене дослідження доводить, що літературні наративи можуть виступати не лише як текстові об'єкти літературознавчого аналізу, але як динамічні освітні платформи, здатні формувати багаторівневу ідентичність здобувача освіти. Інтеграція урбаністичних мотивів, етнокультурної пам'яті, символічних образів, гендерних репрезентацій та епістолярної рефлексії дозволяє створити цілісний освітній простір, у якому література функціонує не як матеріал для відтворення змісту, а як інструмент діалогічного самовизначення. Такий підхід змінює роль гуманітарної освіти: замість формального засвоєння знань вона трансформується у діяльність, спрямовану на культурну самореалізацію та особистісне осмислення історичного досвіду.

Залучення практик нейроарт-педагогіки, рефлексивного письма та міжкультурного порівняння текстів сприяє емоційному і ціннісному включенню студентів у процес інтерпретації, що відповідає сучасним запитам освіти, орієнтованої на розвиток критичного мислення, емпатійної компетентності та культурної свідомості. Отримані результати можуть бути використані для проєктування нових навчальних модулів, побудованих на принципі смислової інтеграції літературних джерел та культурних кодів, що відкриває перспективу формування інноваційних гуманітарних освітніх практик.

Список використаних джерел

Kostrikova, K., & Kostrikov, O. (2025). Декоративний штукатурний і барельєфний живопис як елементи нейрофітнесу у психоемоційній реабілітації. *Науковий часопис Українського державного університету імені Михайла Драгоманова. Серія 15*, (3К(188)), 361–365. https://doi.org/10.31392/UDU-nc.series15.2025.03k(188).87

Senchylo-Tatlilioglu, N. (2022). Female characters in Lesya Ukrainka's and Suad Derviş's stories. *Scientific Journal of Polonia University, 53*(4), 119–128. https://doi.org/10.23856/5314

Боклах, Д. Ю. (2019). *Топос європейського міста в художній рецепції творів Т. Шевченка: поліфонізм побудови урбаністичного часопросторового континууму*. Spheres of culture: Journal of philology, history, social and media communication, political science, and cultural studies / Branch of Ukrainian Studies of Maria Curie-Sklodovska University in Lublin, (18). https://library.dspu.edu.ua/wp-content/uploads/2024/07/sphere_2019_v_18.pdf

Коткова, Л. (2023). Концептуальна картина світу в епістолярній спадщині Василя Стуса. У *Освіта Донеччини: історія, сьогодення та майбутнє* (с. 209–244). Донецький ОБЛІППО. https://doi.org/10.36074/d-oblippo.monograph-2023

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Коткова, Л. (2025). Історична спадщина як основа майбутнього: культурологічний та освітній вимір. *Українське суспільство у перспективах розвитку: історичний, соціально-політичний, освітньо-педагогічний аспекти*, 106–113. https://surl.lu/yfxogo

Піщанська, В. М. (2018). Феномен українського козацтва як етнокультурної спільності. *Актуальні проблеми історії, теорії та практики художньої культури, 40*, 18–26. https://elib.nakkkim.edu.ua/handle/123456789/1693

Сенчило, Н. (2018). Порівняльний аналіз поетики та мотивів в українських та турецьких народних казках. *Гуманітарна освіта в технічних вищих навчальних закладах, 37*, 133–139. https://er.nau.edu.ua/handle/NAU/36050

Цепкало, Т. О. (2014). Символіка образу місяця в поезії неокласиків. У *Україна в етнокультурному вимірі століть* (с. 378–385). НПУ імені М. П. Драгоманова. https://ekhsuir.kspu.edu/handle/123456789/3465

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Trusting the Algorithm: Emotional Engagement with ChatGPT in Higher Education

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ABSTRACT: This study examines emotional engagement with ChatGPT among 121 university students from diverse academic disciplines, focusing on the relationships between trust in the AI, the emotional framing of prompts, and the explicit use of ChatGPT for emotional support. Results reveal a paradox: higher trust correlates with increased emotional self-awareness (r = .386) and perceived emotional intelligence (r = .508), while deliberate emotional framing is linked to lower perceived AI emotional intelligence (r = –.412) and reduced emotional benefits (r = –.259). Students who use ChatGPT for emotional support report diminished emotional awareness (r = –.190) and less favourable emotional outcomes (r = –.270), indicating an "empathic expectation gap" where emotional intent exposes the system's limitations. The findings highlight the need to integrate ChatGPT in digital pedagogy as a reflective tool rather than a substitute for human connection, with attention to ethical design, user education, and emotional literacy.

KEYWORDS: ChatGPT, emotional intelligence, higher education, AI in learning, digital pedagogy, emotional framing, trust in AI.

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Introduction

Generative AI systems such as ChatGPT have transitioned from experimental technologies to integral elements of academic life, particularly in higher education. Initially embraced for their ability to streamline cognitive tasks—summarising information, generating ideas, and assisting with research—they are now entering the affective domain. Students increasingly use ChatGPT not only to complete assignments but also to reflect on their thoughts, manage stress, and engage in self-expression during challenging academic periods.

This evolution mirrors broader societal changes. Harari (2017) describes postmodern societies as marked by emotional isolation, with individuals turning to digital platforms for connection. ChatGPT's always-available, non-judgmental nature positions it as a candidate for emotional support, a perception reinforced by findings that some users rate AI-generated responses as more compassionate than those of human experts (Ovsyannikova et al., 2025). However, this carries inherent risks. Park et al. (2023) warn of the "empathic expectation gap," where users' emotional expectations exceed what AI can deliver, leading to dissatisfaction and even emotional detachment.

In educational contexts, the stakes are particularly high. Emotional well-being is closely tied to academic success and retention rates. As generative AI tools become embedded in students' academic routines, understanding their influence on emotional awareness and self-regulation is essential for designing effective digital pedagogy.

Analysis of Recent Research and Publications

The role of trust in human–AI interaction has been well established in cognitive tasks, but its influence on emotional engagement is less understood. Glikson and Woolley (2020) suggest that trust in AI not only increases reliance on the system but also shapes perceptions of its capabilities. In affective contexts, trust may encourage students to interpret responses as emotionally intelligent, even when they are generated through pattern recognition rather than genuine empathy (Feng et al., 2022).

Emotional framing—the use of affective cues in prompts—has emerged as a strategy to elicit more human-like responses. However, Gill and Mathur (2024) caution that this can backfire, as users may become more conscious of the system's limitations. Park et al. (2023) frame this as a mismatch between expectations and reality, where scripted emotional nuance risks feeling artificial and undermines perceived authenticity.

An alternative perspective comes from Andries and Robertson (2023), who describe AI as a "reflective mirror." Through affective mirroring (Q. Wang et al., 2024), AI can return emotionally attuned responses that prompt users to reflect on their own feelings. This reflective capacity could be pedagogically valuable, fostering emotional literacy among students. However, reliance on AI for emotional regulation raises concerns about diminishing interpersonal coping strategies—skills that remain essential in both academic and professional environments.

While this growing body of literature highlights key dynamics in human–AI emotional interaction, there remains a lack of empirical evidence on how these processes play out in higher

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education. This study addresses that gap by examining the interplay of trust, emotional framing, and support-seeking behaviour among university students.

Research Aim and Research Questions

This study investigates how trust in ChatGPT, emotional framing, and explicit emotional support use influence students' emotional awareness and affective outcomes. By focusing on higher education, it aims to produce insights that will guide educators and policymakers in integrating AI tools into digital pedagogy in ways that support emotional development without fostering dependency.

Research Results

A structured online questionnaire was distributed to 121 university students representing fields such as Business and Economics, Health Sciences, Engineering and IT, Law and Politics, Education, Social Sciences, and Arts and Design. Items were grouped into thematic sections: trust in ChatGPT, perceived emotional tone detection, use of emotional framing, emotional expression awareness, explicit emotional support use, and post-interaction emotional outcomes. The survey also captured demographic data.

Data were analysed using descriptive statistics and Pearson correlations to explore the relationships between key variables.

Descriptive Findings

The descriptive results (Table 1) reveal moderate-to-high levels of trust (M = 3.50, SD = 0.818) and considerable variation in perceived emotional tone detection (M = 3.13, SD = 1.266). Emotional framing was reported by nearly half of respondents (M = 1.45), yet only around 23% used ChatGPT explicitly for emotional support. Emotional outcomes were generally neutral to mildly positive (M = 2.26 on a 1–3 scale).

Table 1

Descriptive Statistics

Variable	N	Min	Max	Mean	Std. Dev.
Frequency of use	121	1	4	2.26	1.013
Trust in information	121	2	5	3.50	0.818
Emotional tone detection	119	1	5	3.13	1.266
Use for emotional framing	121	1	2	1.45	0.499
Emotional expression awareness	121	1	5	2.55	1.087
Use for emotional support	121	1	2	1.77	0.423
Emotional outcome post-use	121	1	3	2.26	0.571

Source: Authors' elaboration

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Correlation Findings

Pearson correlations (Table 2) revealed that trust positively correlates with perceived emotional tone detection (r = .508, p < .001), emotional awareness (r = .386, p < .001), and positive emotional outcomes (r = .239, p = .008). Emotional framing, however, was negatively correlated with perceived emotional intelligence (r = –.412, p < .001) and emotional outcomes (r = –.259, p = .004). Students using ChatGPT for emotional support were more likely to use emotional framing (r = .335, p < .001) but reported lower emotional awareness (r = –.190, p = .037) and less favourable outcomes (r = –.270, p = .003).

Table 2:

Pearson Correlation results

Variables	r	Sig. (p-value)	Direction
Info_trustworthiness ↔ Emotional_tone_detection	**0.508**	0.000	Positive
Info_trustworthiness ↔ Emotional_expression_awareness	**0.386**	0.000	Positive
Info_trustworthiness ↔ Emotional_outcome_post_use	**0.239**	0.008	Positive
Emotional_tone_detection ↔ Use_for_emotional_framing	**-0.412**	0.000	Negative
Emotional_tone_detection ↔Emotional_expression_awareness	**0.381**	0.000	Positive
Emotional_tone_detection ↔ Emotional_outcome_post_use	**0.319**	0.000	Positive
Use_for_emotional_framing ↔ Emotional_expression_awareness	**-0.321**	0.000	Negative
Use_for_emotional_framing ↔ Use_for_emotional_support	**0.335**	0.000	Positive
Use_for_emotional_framing ↔ Emotional_outcome_post_use	**-0.259**	0.004	Negative
Emotional_expression_awareness ↔ Use_for_emotional_support	**-0.190**	0.037	Negative
Emotional_expression_awareness ↔ Emotional_outcome_post_use	**0.307**	0.001	Positive
Use_for_emotional_support ↔ Emotional_outcome_post_use	**-0.270**	0.003	Negative

Source: Authors' elaboration

Pedagogical Interpretation:

These findings indicate that while trust can facilitate productive emotional engagement with AI, overreliance on emotional framing or direct emotional support may hinder emotional growth. In educational settings, this suggests that AI can be integrated as a reflective tool for emotional self-awareness exercises but should not replace human-led mentoring or peer support groups.

Conclusions and Implications

The results confirm ChatGPT's potential as a reflective tool in higher education, capable of

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fostering emotional awareness when trust is established. However, they also reveal the limitations of AI in delivering genuine empathy, particularly when emotional engagement is artificially prompted.

From a pedagogical perspective, educators can leverage ChatGPT's reflective capacity in activities that encourage students to articulate their emotions in writing, followed by human-facilitated discussions. At the same time, AI literacy should be embedded into curricula to ensure students understand the boundaries of AI's emotional capabilities.

Policy Implications: Institutions should establish clear guidelines for AI use in academic and emotional contexts, striking a balance between digital tools and human interaction.

Future Research: Longitudinal studies should examine the impact of sustained AI use on emotional development, and cross-cultural research should explore how trust and emotional framing vary in different educational contexts.

Limitations: The study's reliance on self-reported data introduces the possibility of response bias, and the sample's demographic composition—primarily young adults—limits generalisability.

References

Andries, V., & Robertson, J. (2023). Alexa doesn't have that many feelings: Children's understanding of AI through interactions with smart speakers in their homes. *Computers and Education: Artificial Intelligence, 5*, 100176. https://doi.org/10.1016/j.caeai.2023.100176

Feng, H., Zeng, Y., & Lu, E. (2022). Brain-inspired affective empathy computational model and its application on altruistic rescue task. *Frontiers in Computational Neuroscience, 16*, 784967. https://doi.org/10.3389/fncom.2022.784967

Gill, A., & Mathur, A. (2024). Emotional intelligence in the age of AI: Enhancing workforce development for human–machine collaboration. In *Sustainable innovation for industry 6.0* (pp. 271–294). IGI Global. https://doi.org/10.4018/979-8-3693-3140-8.ch014

Glikson, E., & Woolley, A. W. (2020). Human trust in artificial intelligence: Review of empirical research. *Academy of Management Annals, 14*(2), 627–660. https://doi.org/10.5465/annals.2018.0057

Harari, Y. N. (2017). Reboot for the AI revolution. *Nature, 550*(7676), 324–327. https://doi.org/10.1038/550324a

Ovsyannikova, D., de Mello, V. O., & Inzlicht, M. (2025). Third-party evaluators perceive AI as more compassionate than expert humans. *Communications Psychology, 3*(1), 4. https://doi.org/10.1038/s44271-024-00182-6

Park, G., Yim, M. C., Chung, J., & Lee, S. (2023). Effect of AI chatbot empathy and identity disclosure on willingness to donate: The mediation of humanness and social

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presence. *Behaviour & Information Technology, 42*(12), 1998–2010. https://doi.org/10.1080/0144929X.2022.2105746

Shen, J., DiPaola, D., Ali, S., Sap, M., Park, H. W., & Breazeal, C. (2024). Empathy toward artificial intelligence versus human experiences and the role of transparency in mental health and social support chatbot design: Comparative study. *JMIR Mental Health, 11*, e62679. https://doi.org/10.2196/62679

Wang, Q., Walsh, S., Si, M., Kephart, J., Weisz, J. D., & Goel, A. K. (2024). Theory of mind in human–AI interaction. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems* (pp. 1–6). Association for Computing Machinery. https://doi.org/10.1145/3613905.3636308

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The Role of Metaphor in Shaping Conceptualisation Across Languages

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ABSTRACT: Metaphor is not simply an ornamental feature of language but a fundamental mechanism of human cognition that structures how individuals conceptualise and communicate abstract ideas. Rooted in Cognitive Linguistics, this study explores the role of metaphor in shaping conceptualisation across languages, drawing primarily on the Conceptual Metaphor Theory (CMT) developed by Lakoff and Johnson (1980). The paper argues that metaphors are central to organising thought processes, framing cultural models, and constructing worldviews. They enable speakers to understand complex or intangible domains, such as time, emotion, and morality, through more concrete and embodied experiences. By comparing metaphorical systems in English, Chinese, and Urdu, the study reveals both universal and culture-specific patterns of metaphorical mapping. For example, metaphors such as TIME IS MONEY in English, HEART AS MIND in Chinese, and LOVE AS FIRE in Urdu demonstrate how cultural and linguistic contexts shape distinct conceptualisations of reality. These cross-linguistic differences highlight that language is not a neutral conduit but a cognitive and cultural system reflecting shared experiences and values. Ultimately, the paper concludes that metaphors act as a bridge between language, thought, and culture, providing valuable insights into how humans perceive, reason, and interact with the world across linguistic boundaries.

KEYWORDS: Metaphor, Conceptual Metaphor Theory, Cognitive Linguistics, Cross-Linguistic Conceptualisation, Language and Culture, English, Chinese, Urdu.

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Introduction

Metaphor has long been a topic of intellectual curiosity, attracting the attention of philosophers, linguists, and cognitive scientists alike. Traditionally, metaphor was viewed as a rhetorical or poetic embellishment used to decorate language and add aesthetic value to speech. However, with the emergence of cognitive linguistics, particularly through the pioneering work of George Lakoff and Mark Johnson (1980), metaphor came to be recognised as an essential mechanism of human cognition rather than a mere linguistic flourish. Metaphors are now seen as the foundation of conceptualisation—the process by which human beings make sense of abstract, complex, or intangible concepts by mapping them onto familiar ones. (Gibbs, 1994; Cameron & Low, 1999)

In this cognitive view, metaphor is not restricted to literary or artistic expression; instead, it permeates everyday communication and influences how people think, reason, and act. For instance, expressions such as 'spending time,' 'winning an argument,' or 'rising above difficulties' reveal how conceptual metaphors underpin ordinary discourse. These metaphors reflect systematic correspondences between conceptual domains—one abstract (e.g., time, argument, life) and the other concrete (e.g., money, war, journey). As such, metaphor is a cognitive instrument that structures perception and shapes reality itself.

The study of metaphor across languages provides unique insights into the relationship between language, thought, and culture. Different linguistic communities conceptualise similar experiences in distinct ways based on cultural practices, historical development, and shared worldviews. For example, in English, time is often viewed as a commodity that can be 'spent' or 'saved,' reflecting capitalist and efficiency-oriented cultural values. In contrast, Chinese and Urdu speakers conceptualise time and emotion through culturally embedded metaphors linked to relational harmony and spirituality. This diversity suggests that while the human mind employs universal metaphorical mechanisms, the specific conceptual mappings are shaped by the sociocultural context.

This paper aims to explore how metaphor shapes conceptualisation across languages, focusing on how metaphorical systems reflect and influence cultural cognition. Comparing English, Chinese, and Urdu metaphors highlights both the universality and variability of conceptual metaphors. The discussion builds on the Conceptual Metaphor Theory (CMT) as the primary theoretical framework, emphasising how abstract thought is structured by embodied experience and cultural context. Understanding metaphor in this way allows us to appreciate language not only as a means of communication but also as a mirror of human consciousness and cultural identity. (Gibbs, 1994; Cameron & Low, 1999)

Theoretical Framework: Conceptual Metaphor Theory (CMT)

Conceptual Metaphor Theory (CMT) emerged as one of the most influential frameworks within cognitive linguistics, proposed by Lakoff and Johnson in their seminal work *Metaphors We Live By*

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(1980). CMT asserts that metaphor is not merely a linguistic phenomenon but a fundamental structure of human thought. According to this theory, our conceptual system is largely metaphorical in nature, meaning that people understand abstract domains of experience in terms of more concrete, familiar ones. Metaphor thus becomes a cognitive tool that enables the mind to bridge the gap between physical experience and abstract concepts.

In CMT, metaphors are described as mappings between two conceptual domains: the source domain and the target domain. The source domain provides concrete, embodied experiences—such as movement, vision, or spatial orientation—while the target domain represents abstract concepts like time, emotion, or morality. For example, in the metaphor 'TIME IS MONEY,' the source domain of money (a tangible resource) is mapped onto the target domain of time (an abstract concept), allowing speakers to conceptualise time as something valuable, quantifiable, and expendable. Similarly, 'ARGUMENT IS WAR' structures the act of debating as a competitive encounter, where participants attack.

CMT also emphasises the embodiment of metaphor. Human cognition arises from physical interaction with the environment; therefore, metaphorical mappings are grounded in bodily experience. Expressions such as 'I'm feeling up' or 'He's feeling down' stem from the physical correlation between posture and emotion. When people are happy, they tend to stand upright, whereas sadness often involves slumped posture. This embodied grounding demonstrates that metaphorical thought is universal, though its expression is shaped by culture and language.

Moreover, CMT recognises cultural variation in metaphorical conceptualisation. While some metaphors, such as 'LIFE IS A JOURNEY,' appear cross-linguistically, their realisation and interpretation differ across cultures. In English, this metaphor often emphasises individual progress and achievement. In contrast, in Chinese or Urdu, life may be viewed as a collective journey or spiritual path. Hence, CMT provides a flexible model that accommodates both the universality of metaphorical cognition and the specificity of cultural embodiment. This theoretical perspective underpins the present study by offering a framework for analysing how metaphor shapes conceptualisation across diverse linguistic and cultural contexts. (Lakoff & Johnson, 1980)

Theoretical Framework: Conceptual Metaphor Theory (CMT)

Conceptual Metaphor Theory, developed by Lakoff and Johnson (1980) in Metaphors We Live By, proposes that human thought is largely metaphorical. According to CMT, metaphors structure one conceptual domain in terms of another. For example: (Lakoff & Johnson, 1980)

TIME IS MONEY → "You're wasting my time."

ARGUMENT IS WAR → "She shot down his argument."

These mappings (e.g., *time* → *money*, *argument* → *war*) demonstrate that abstract concepts are understood through more concrete, embodied experiences.

CMT distinguishes between:

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Source domain: the concrete, physical experience (e.g., *war*).

Target domain: the abstract concept being understood (e.g., *argument*).

Thus, metaphor is a cognitive process, not just a linguistic one. It organises conceptual systems that influence how people perceive, reason, and act in the world. (Gibbs, 1994; Cameron & Low, 1999)

3. Metaphor and Conceptualisation

Metaphor shapes conceptualisation by linking abstract ideas to sensory and physical experiences. For instance, the metaphor HAPPINESS IS UP appears in English expressions such as "I'm feeling up today" or "His spirits rose." Similarly, SADNESS IS DOWN is seen in "He's feeling down." These metaphors are grounded in human bodily experience – people physically stand upright when energetic and slump when sad. (Gibbs, 1994; Cameron & Low, 1999)

Metaphor also guides moral reasoning and emotional understanding. For instance, in many cultures, GOOD IS LIGHT and EVIL IS DARK, reflecting visual and perceptual associations. These metaphorical patterns shape moral cognition and cultural narratives across societies. (Gibbs, 1994; Cameron & Low, 1999)

Cross-Linguistic Perspectives on Metaphor (Yu, 1998; Sharifian, 2011)

While some metaphorical mappings are universal, others vary across languages due to cultural and experiential differences. (Gibbs, 1994; Cameron & Low, 1999)

English

English speakers frequently use spatial metaphors for time and emotion. For example:

TIME IS MONEY: "Save time," "Spend time," "Wasting time."

LIFE IS A JOURNEY: "She's at a crossroads," "He's on the right path."

These metaphors reflect a Western emphasis on individualism, linear progress, and economic value systems.

Chinese

In Chinese, metaphors often reflect holistic and relational worldviews rooted in Confucian and Taoist philosophy. For instance: (Gibbs, 1994; Cameron & Low, 1999)

HEART (心, xīn) represents both emotion and cognition, unlike English, where the "mind" and "heart" are distinct.

The metaphor UP-DOWN is used differently: shàng (up) connotes superiority and hierarchy, while xià (down) implies inferiority, reflecting social structure. (Gibbs, 1994; Cameron & Low, 1999)

Chinese temporal metaphors are also unique. Time is often conceptualised vertically rather than horizontally. For example, shàng ge yuè (literally "upper month") means "last month," indicating the past is above, not behind as in English. (Gibbs, 1994; Cameron & Low, 1999)

Urdu

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In Urdu, metaphors are deeply embedded in poetic and emotional expression. Many Urdu metaphors draw from Islamic, Persian, and South Asian cultural traditions: (Gibbs, 1994; Cameron & Low, 1999)

LOVE IS FIRE: "Ishq ka dariya hai, doob ke jaana hai" ("Love is an ocean in which one must drown").

HEART IS A CONTAINER: "Dil bhar gaya" ("The heart is full"), "Dil toot gaya" ("The heart is broken").

These expressions conceptualise emotion through vivid sensory imagery, reflecting the high value placed on emotional depth and aesthetic beauty in Urdu-speaking cultures.

5. Metaphor, Culture, and Cognition

Metaphor reveals the intimate relationship between language, culture, and cognition. Shared experiences, environment, and values shape the metaphors a culture uses. For example: (Gibbs, 1994; Cameron & Low, 1999)

Western metaphors often emphasise control, measurement, and progress.

Eastern metaphors emphasise harmony, balance, and relationality.

Islamic and South Asian metaphors often highlight spirituality, devotion, and emotion.

These metaphorical systems influence not just how people talk but how they think and act. They guide reasoning, decision-making, and even moral judgment. (Gibbs, 1994; Cameron & Low, 1999)

Cognitive linguists such as Kövecses (2005) argue that while the human body provides universal grounding for many metaphors, cultural models determine their interpretation and salience. Thus, metaphors are simultaneously universal (in structure) and culture-specific (in content). (Kövecses, 2005)

6. Implications for Cross-Cultural Communication

Understanding metaphorical conceptualisation is crucial for translation, intercultural communication, and second language learning. Literal translations often fail to convey the intended meaning because metaphors differ across cultures. For instance, translating "TIME IS MONEY" into a culture where time is not monetised may lead to misunderstanding. (Gibbs, 1994; Cameron & Low, 1999)

Language educators can use metaphor awareness to help learners understand hidden cultural meanings. Similarly, cross-cultural researchers can analyse metaphorical systems to uncover cultural cognition and worldview differences. (Gibbs, 1994; Cameron & Low, 1999)

7. Conclusion

Metaphor is a powerful cognitive tool that structures how humans conceptualise the world. Through metaphor, abstract experiences become comprehensible, and cultural values become linguistically encoded. Cross-linguistic variations in metaphor reflect deeper differences in cultural cognition and worldview. (Yu, 1998; Sharifian, 2011)

By examining metaphors across languages such as English, Chinese, and Urdu, it becomes clear that while the human capacity for metaphor is universal, the specific conceptualisations it produces are

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shaped by cultural experience. Metaphor, therefore, stands as a bridge between language, thought, and culture—revealing that to understand a language deeply is to understand the metaphors that shape its speakers' minds. (Gibbs, 1994; Cameron & Low, 1999).

References

Barcelona, A. (Ed.). (2000). *Metaphor and metonymy at the crossroads: A cognitive perspective*. Mouton de Gruyter.

Cameron, L., & Low, G. (1999). *Researching and applying metaphor*. Cambridge University Press.

Charteris-Black, J. (2004). *Corpus approaches to critical metaphor analysis*. Palgrave Macmillan.

Deignan, A. (2005). *Metaphor and corpus linguistics*. John Benjamins Publishing.

Dirven, R., & Pörings, R. (Eds.). (2002). *Metaphor and metonymy in comparison and contrast*. Mouton de Gruyter.

Evans, V., & Green, M. (2006). *Cognitive linguistics: An introduction*. Lawrence Erlbaum Associates.

Forceville, C. (1996). *Pictorial metaphor in advertising*. Routledge.

Gibbs, R. W. (1994). *The poetics of mind: Figurative thought, language, and understanding*. Cambridge University Press.

Gibbs, R. W. (Ed.). (2008). *The Cambridge handbook of metaphor and thought*. Cambridge University Press.

Grady, J. (1997). *Foundations of meaning: Primary metaphors and primary scenes*. University of California Press.

Kövecses, Z. (2005). *Metaphor in culture: Universality and variation*. Cambridge University Press.

Kövecses, Z. (2010). *Metaphor: A practical introduction* (2nd ed.). Oxford University Press.

Lakoff, G. (1993). The contemporary theory of metaphor. In A. Ortony (Ed.), *Metaphor and thought* (2nd ed., pp. 202–251). Cambridge University Press.

Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. University of Chicago Press.

Lakoff, G., & Turner, M. (1989). *More than cool reason: A field guide to poetic metaphor*. University of Chicago Press.

Littlemore, J. (2019). *Metaphors in the mind: Sources of variation in embodied metaphor*. Cambridge University Press.

Semino, E., & Steen, G. (Eds.). (2008). *Metaphor in literature and linguistics: Theoretical and empirical issues*. Brill.

Sharifian, F. (2011). *Cultural conceptualisations and language: Theoretical framework and applications*. John Benjamins Publishing.

Sullivan, K. (2013). *Frames and constructions in metaphoric language*. John Benjamins Publishing.

Yu, N. (1998). *The contemporary theory of metaphor: A perspective from Chinese*. John Benjamins Publishing.

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Effects of Displacement due to Illegal Mining on Rural Learners' Academic Performance in Shurugwi, Zimbabwe

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ABSTRACT: This qualitative study explores the effects of displacement due to illegal mining on the academic performance of rural learners in Shurugwi, Zimbabwe. Utilising a sample that includes four learners, four teachers, two Ministry of Primary and Secondary Education officials, a member of parliament, a village head, a police officer, a human rights lawyer, and an educational psychologist, data was collected through two focus group discussions—one with learners and another with adults. Thematic analysis was employed to interpret the data, while ethical considerations, such as confidentiality, were prioritised throughout the research process. The study identifies a significant research gap in understanding the specific impacts of illegal mining displacement on education in rural Zimbabwe. One key finding reveals that displaced learners experience increased anxiety and emotional distress, adversely affecting their academic focus and performance. To address these challenges, the study recommends implementing psychosocial support programs that help displaced learners cope with emotional and psychological issues, ultimately enhancing their educational engagement and outcomes.

KEYWORDS: Academic performance, education, illegal mining, displacement, Zimbabwe.

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Introduction

In Zimbabwe, the Shurugwi area has faced significant upheaval due to illegal mining activities, which have led to the displacement of communities and adversely affected educational opportunities for rural learners (Lupande, 2021). This situation mirrors findings in the United States, where studies indicate that displacement from natural disasters or economic shifts can severely hinder educational attainment, as students experience instability that disrupts their learning environment (Jordan, 2013). Similarly, research in Britain has shown that urban displacement and gentrification can lead to families relocating to areas with under-resourced schools, resulting in diminished academic performance among children (London School of Economics, 2021). In Nigeria, the effects of displacement caused by environmental degradation and socio-political unrest have been linked to declining educational outcomes, particularly for rural populations, highlighting the psychological stress and loss of social networks that often accompany such upheavals (Graca et al, 2019). Botswana faces comparable challenges, where rural communities struggle with access to education due to economic disruptions, limited resources, and inadequate infrastructure, which can hinder children's academic success (Maguwu et al, 2020). In South Africa, the legacy of apartheid continues to influence educational equity, with communities uprooted from their homes experiencing a decline in educational quality and access (Lahiri Dutt, 2011). Despite a growing body of literature addressing the effects of illegal mining on the environment and local economies in Zimbabwe, there is a notable gap in research specifically examining how illegal mining-related displacements impact the academic performance of rural learners in the Shurugwi area. This study aims to explore effects of displacement from illegal mining on rural learners' academic performance in Shurugwi, Zimbabwe. This study is anchored on the following two research questions: What specific challenges do rural learners in Shurugwi face in their academic performance as a result of displacements caused by illegal mining activities? Moreover, What effective strategies and solutions can be implemented to mitigate the negative impact of displacements on the academic performance of rural learners in Shurugwi?

Research Methods

This study employs a qualitative research design to explore the impact of displacements on the academic performance of rural learners in Shurugwi, Zimbabwe, due to illegal mining (OECD, 2016). The sample consists of diverse participants, including four learners, four teachers, two officials from the Ministry of Primary and Secondary Education, one official from the Ministry of Environment, one Member of Parliament, a village head, one police official, one human rights lawyer, and one educational psychologist. These participants were purposively selected based on their gender, geographical location, and expertise, ensuring a comprehensive representation of perspectives relevant to the study (Scoone, 2015). Data collection was conducted through two separate focus group discussions: one for adult participants and another for learners (Takyi et al, 2021). This dual focus group approach is crucial as it allows for the exploration of distinct viewpoints and experiences. Adult participants, who include educators, officials, and community leaders, can provide insights into systemic issues and policies affecting, education in the context of displacement (Zhou, 2022).

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Conversely, the focus group of learners enables an understanding of the direct impact of these displacements on their academic experiences and challenges (Bhebhe et al, 2013). Through facilitating discussions in separate groups, the study ensures that participants feel comfortable sharing their thoughts freely, which may lead to richer and more candid data (Burns, 2020). The data collected from these discussions were analyzed using thematic analysis, a method that identifies, analyzes, and reports patterns (themes) within qualitative data (Cai & Newth, 2013). This approach allows for a nuanced understanding of the complex factors influencing academic performance amid displacement. Ethical considerations were paramount throughout the study. Participants were required to sign informed consent forms to ensure they understood the study's purpose and their rights (Chimhou & Woodhouse, 2010). Confidentiality was maintained by using pseudonyms for all participants, protecting their identities throughout the research process. Additionally, participants were informed that they could withdraw from the study at any time, ensuring that their autonomy and comfort were prioritised (Chipangura, 2018).

Discussion and Findings

Impact of displacements on the academic performance of rural learners in Shurugwi due to illegal mining

The findings from the data collected reveal a significant impact of displacements caused by illegal mining on the academic performance of rural learners in Shurugwi. Families displaced from their homes face numerous challenges that directly impact students' ability to engage in their education. The instability of living conditions often leads to economic hardship, creating an environment where basic needs take precedence over academic pursuits. Many learners report feelings of anxiety and uncertainty about their future, which distracts them from their studies (Chingono, 2020). For instance, concerns about food and shelter can overshadow the importance of homework and class participation, making it difficult for students to maintain focus and motivation. Moreover, increased absenteeism is a critical issue linked to these displacements. Many students come from families struggling to survive, where the urgency of securing daily necessities often results in education being deprioritized (Chipangura, 2018). This trend is particularly disheartening, as previously diligent students find themselves unable to keep pace with their studies. The emotional toll of such circumstances is evident, as the stress of displacement can lead to disengagement from the educational process, further hindering academic success (Nyikadzino et al, 2022).

Parental involvement also suffers significantly in these disrupted environments. As parents seek work in mining to support their families, they often lose the capacity to assist their children with schoolwork or monitor their academic progress (Takyi et al, 2021). This lack of support at home can severely limit a child's educational development. Additionally, frequent school absences due to family obligations create gaps in learning that are hard to bridge, resulting in further academic decline (Zhou, 2022). The educational infrastructure is also impacted by the influx of displaced children, resulting in overcrowded classrooms and strained resources. Teachers struggle to provide individualized attention in an environment where many learners are dealing with trauma and instability (Chitumba, 2021). This situation underscores the need for urgent interventions to enhance

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the quality of education for all students, particularly those affected by displacement.

Furthermore, the broader social implications of illegal mining activities disrupt community cohesion, weakening the support systems that typically help children thrive academically (Muchaendepi et al, 2019). The psychological distress experienced by many displaced children can lead to increased dropout rates and a cycle of underachievement (Mushonga & Scoones, 2012). Addressing these root causes is essential for creating an environment conducive to learning.

Theme 2: Effective strategies and solutions can be implemented to mitigate the negative impact of displacements on the academic performance of rural learners in Shurugwi

The findings regarding effective strategies to mitigate the negative impact of displacements on the academic performance of rural learners in Shurugwi highlight a multifaceted approach that encompasses community support, legislative reforms, and enhanced educational resources. Establishing community support systems has emerged as a critical strategy. Local tutoring programs and mentorship initiatives can provide displaced students with the academic assistance they need to catch up with their peers (Cuvelier, 2011). Such programs not only address immediate educational gaps but also foster a sense of belonging and motivation among learners who may feel isolated due to their circumstances. Legislation plays a pivotal role in creating a stable environment for children to thrive academically (Gono, 2022). Stricter regulations on illegal mining activities, coupled with the provision of alternative economic opportunities for affected families, can contribute significantly to long-term stability (London School of Economics, 2021). When families are economically secure, children are more likely to focus on their education rather than on survival. This holistic approach underscores the importance of governmental action in complementing community efforts. Furthermore, the need for enhanced counselling and support services within schools cannot be overstated (Hlungwani et al, 2021).

Many learners affected by displacement express a strong desire to talk to someone about their struggles. Providing access to counsellors or mental health resources can help students process their experiences and reduce feelings of isolation (Hunter et al, 2021). Such support is essential for fostering resilience, enabling learners to concentrate better on their studies and ultimately improve their academic performance. Collaboration between schools and local organisations also presents a viable solution (Lupande, 2021). Through organising workshops that equip parents with skills to support their children's education, schools can empower families to become active participants in their children's academic journeys (Graca et al, 2019). This is particularly crucial during times of economic hardship, where parental involvement can significantly influence educational outcomes. Educated parents are better equipped to assist their children with homework and navigate educational challenges, creating a more supportive learning environment at home. Lastly, raising community awareness about the environmental and educational impacts of illegal mining is vital for driving long-term change (Maguwu et al, 2020). Implementing educational programs that inform families about the repercussions of mining activities can foster a collective understanding of the need for sustainable practices (Jordaan, 2013). Providing resources to help displaced families regain stability can further enhance the community's capacity to support its learners.

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Summary

The study examines the effects of displacement caused by illegal mining activities on the academic performance of rural learners in Shurugwi, Zimbabwe. It reveals that such displacement leads to significant disruptions in education, with students facing frequent absences and instability in their learning environment. The emotional and psychological toll on learners, including distress from losing their homes and communities, further diminishes their concentration and motivation. Additionally, economic hardships faced by families affected by illegal mining adversely impact their ability to support their children's education. The study also highlights the broader social disintegration within communities, further affecting learners' well-being.

Recommendations

To address these challenges, several recommendations emerge. Teachers are encouraged to provide emotional support and adopt flexible learning approaches to accommodate students affected by displacement. Learners should engage in support programs and form peer networks to foster a sense of community among themselves. The Ministry of Primary and Secondary Education needs to develop policies that address the specific needs of displaced learners, ensuring access to educational resources and teacher training on handling trauma. The Ministry of Environment should enforce stricter regulations on illegal mining and promote community engagement in sustainable practices. Members of Parliament are urged to advocate for legal frameworks that protect rural communities and ensure proper resource allocation for educational support. Village heads can play a pivotal role by organising community meetings to raise awareness about the importance of local initiatives and support them. Lastly, parents are encouraged to prioritise their children's education by creating a supportive home environment and actively engaging with schools to meet their children's educational needs.

References

Bulawayo 24 News. (2020). *Teacher falls into a mine shaft, dies while panning for gold. Bulawayo 24 news*. Accessed at bulawayo24.com/index-id-news-sc-national-byo-194048.html

Burns, K. (2020). Illegal mining in Venezuela is exacerbating violence, ecocide and global corruption. The International Community Must Act. Accessed at freedomhouse.org/article/illegal-mining-venezuela-exacerabating-violence-ecocide-global-corruption-international on 9th October 2025.

Cai, Y., & Newth, D. (2013). Oil, gas and conflict: a mathematical model for the resource curse. Plos one, 8(6), e66– 67.

Chimhowu, A., & Woodhouse, P. (2008). Communal tenure and rural poverty: land transactions in Svosve Communal Area, Zimbabwe. *Development and Change,* 39(2), 285–308.

Chimhowu, A., & Woodhouse, P. (2010). Forbidden but not suppressed: a 'vernacular'land market in Svosve Communal Lands, Zimbabwe. *Africa,* 80(1), 14–35.

Chingono, N. (2020). 'I need money for school': The children forced to pan for gold in Zimbabwe.

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The Guardian, 13 November 2020. Accessed on 10th October 2025 at https://www.theguardian.com/global-development/2020/nov/13/i-need-money-for-school-the-children-forced-to-pan-for-gold-in-zimbabwe

Chipangura, N. (2018). Cultural heritage sites and contemporary uses: finding a balance between monumentality and intangibility in Eastern Zimbabwe. *Research Handbook on Contemporary Intangible Cultural Heritage Law and Heritage,* 379–398.

Chitumba, P. (2021). Poverty, artisanal mining and the surge in teenage pregnancies. Chronicle, 08/12/21. Accessed at https://www.chronicle.co.zw/poverty-artisanl-mining-and-the-surge-in-tenage-pregnancies/ on 10th October 2025.

Cuvelier, J. (2011). *Men, mines and masculinities: the lives and practices of artisanal miners in Lwambo (Katanga province, DR Congo)* (Doctoral dissertation, Ghent University. Department of Third World Studies).

Gochero, P., & Boopen, S. (2020). The effect of mining foreign direct investment inflow on the economic growth of Zimbabwe. *Journal of Economic Structures*, 9(1), 1–17.

Gono, T. (2022). Covid-19. Gold panning affects the education sector: The Herald, 30 April 2022. Accessed on 10/06/22 at herald.co.zw/covid-19-gold-panning-affect-education-sector/

Graça, J., Godinho, C. A., & Truninger, M. (2019). Reducing meat consumption and following plant-based diets: Current evidence and future directions to inform integrated transitions. *Trends in Food Science & Technology*, 91, 380–390.

Great Dyke News 24. (2020). Kwekwe Gold Panners Impregnate 5 Junior Councillors. Accessed at greatdykenews.co.zw/Kwekwe-gold-panners-impregnate-6-junior-councillors/

Hlungwani, P. M., Yingi, E., & Chitongo, L. (2021). Governance and Politics of Small-Scale Artisanal Gold Mining in Zimbabwe. *Journal of Public Administration and Development Alternatives (JPADA)*, 6(1), 28–42.

Hlungwani, P. M., Yingi, E., & Chitongo, L. (2021). *Governance and Politics of Small-Scale Mining in Zimbabwe*. Accessed at https://www.researchgate.net/publication/356855220

Hunter, M., Sibanda, M., Opala, K., Kaka, J., & Modi, L. P. (2021). Illicit gold markets in East and Southern Africa. Global Initiative Against Transnational Organized Crime.

Jordaan, M. (2013). Poke me, I am a journalist: The impact of Facebook and Twitter on newsroom routines and cultures at two South African weeklies. *Ecquid Novi: African Journalism Studies*, 34(1), 21–35.

Lahiri-Dutt, K. (2011). *Gendering the field: Towards sustainable livelihoods for mining communities (p. 230)*. ANU Press.

London School of Economics. (2021*). Sustainability impact assessment in support of negotiations with partner countries in eastern and southern Africa in view of deepening the existing interim economic partnership agreement*. Available online: https://trade.ec.europa.eu/doclib/docs/2021/june/tradoc_159611.pdf

Lupande, F. (2021). *Teenage pregnancies shoot up*. The Herald, 24/09/2021. Accessed

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at herald.co.zw/teenage-pregnancies-shoot-up/ on 9th October 2025.

Maguwu, F., Mlevu, S., Nhachi, T. O., & Nyapokoto, H. (2020) *From Blood Diamonds to Blood Gold-A report on machete violence in Zimbabwe's ASM gold sector*. Centre for Natural Resources Governance Issue 01 of 2020.

Muchaendepi, W., Mbowa, C., Kanyepe, J., & Mutingi, M. (2019). Challenges faced by the mining sector in implementing sustainable supply chain management in Zimbabwe. *Procedia Manufacturing,* 33, 493–500.

Mushongah, J., & Scoones, I. (2012). Livelihood change in rural Zimbabwe over 20 years. *Journal of Development Studies*, 48(9), 1241–1257.

Musoni, P. (2013). African Pentecostalism and sustainable development: A study on the Zimbabwe assemblies of God Africa, forward in faith church. *International Journal of Humanities and social science invention*, 2(10), 75–82.

Musoni, P. (2013). African Pentecostalism and sustainable development: A study on the Zimbabwe assemblies of God Africa, forward in faith church. *International Journal of Humanities and social science invention*, 2(10), 75–82.

Nyikahadzoi, L., Lotriet, R., & Smit, A. (2022). Assessing the scope and nature of human capital management practised by Zimbabwe's gold mining sector. *SA Journal of Human Resource Management,* 20, 12.

Nyikahadzoi, L., Lotriet, R., & Smit, A. (2022). Assessing the scope and nature of human capital management practised by Zimbabwe's gold mining sector. *SA Journal of Human Resource Management*, 20, 12.

OECD, I. (2016*). Energy and air pollution: world energy outlook special report 2016.*https://pure.iiasa.ac.at/id/eprint/13467/1/WorldEnergyOutlookSpecialReport2016EnergyandAirPollution.pdf

Rutherford, C., Costa, D., Mercieca-Bebber, R., Rice, H., Gabb, L., & King, M. (2016). Mode of administration does not cause bias in patient-reported outcome results: a meta-analysis. *Quality of Life Research*, 25, 559–574.

Sachs, J. D., & Warner, A. M. (2001). The curse of natural resources. *European economic review,* 45(4-6), 827–838.

Scoones, I. (2015). *Sustainable livelihoods and rural development* (p. xv). London. Rugby: Practical Action. Publishing.

Takyi, R., Hassan, R., Mahrad, B. E., & Adade, R. (2021). Socio-ecological analysis of artisanal gold mining in West Africa: A case study of Ghana. *Journal of Sustainable Mining*, 20(3), Article 6. Available at https://doi.org/10.46873/2300-3960.1322

Zhou, T. (2022). *Religio-cultural ideologies, women, and the economy: Gender inequality in the mining sector in Zimbabwe*. Women and Religion in Zimbabwe: Strides and Struggles, 207. *European economic review,* 45(4-6), 827–838

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Oral Production Challenges for Greek Learners of Italian as a Foreign Language: Anxiety, Vocabulary, and Cross-Linguistic Interference

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ABSTRACT: This paper examines the challenges faced by Greek-speaking learners of Italian as a foreign language (L2) in developing oral communicative competence. Drawing upon theoretical perspectives on language anxiety, vocabulary acquisition, and cross-linguistic interference, the study reports findings from a survey conducted with 19 adult beginners (A1-A2 CEFR level). Data were collected using a 20-item questionnaire that explored students' perceptions of oral difficulties, emotional barriers, and preferred learning activities. Results indicate that grammar (47.4%) and fluency (31.6%) are perceived as the most problematic areas, while vocabulary (15.8%) and pronunciation (5.2%) are less frequently mentioned. Performance anxiety emerged as a universal obstacle, often leading to hesitation, avoidance, and reduced confidence. Pedagogical implications include promoting supportive environments, implementing low-stakes oral activities (role-play, collaborative tasks, linguistic games), and promoting lexical expansion through authentic input and paraphrasing strategies. The study contributes to the field of glottodidactics by emphasising the interplay between affective and linguistic factors in L2 oral development and by offering practical recommendations for Italian L2 classrooms.

KEYWORDS: Italian as a foreign language; oral production; Greek learners; language anxiety; cross-linguistic interference

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Introduction

Oral communication represents a fundamental component of second language acquisition, integrating receptive and productive skills and fostering interaction in real contexts (Balboni, 2015). Despite its centrality, oral production is often among the most challenging skills to acquire, particularly for adult learners with limited exposure to authentic communicative situations. Research has highlighted the role of performance anxiety (Horwitz et al., 1986), limited lexical resources (Kormos, 2006), and cross-linguistic interference (Gass & Selinker, 2008) as key obstacles to fluency.

The Italian language, with its complex morphosyntactic system and distinctive phonological features (e.g., double consonants, tense-aspect contrasts), poses specific challenges for learners from different linguistic backgrounds. For Greek-speaking students, structural differences between Greek and Italian, combined with affective barriers, may significantly hinder oral development. This paper explores these issues through a small-scale empirical study, aiming to inform pedagogical practices in Italian L2 classrooms.

Research Aim and Research Questions

The aim of this study is to identify the major factors that hinder oral production in Italian L2 among Greek learners and to propose targeted pedagogical strategies. Three guiding questions were formulated:

1. Which linguistic and affective factors do Greek-speaking learners perceive as the most challenging in oral production?
2. How does performance anxiety shape their participation in communicative tasks?
3. What pedagogical strategies can support the reduction of these barriers and the enhancement of oral fluency?

Participants: The study involved 19 adult learners (10 female, 9 male) aged 23-55, attending Italian language courses at the National and Kapodistrian University of Athens. All were beginners (A1-A2 CEFR level). The majority were native speakers of Greek with prior experience in other foreign languages (English, French, German, Spanish, Russian, etc.).

Instrument: A 20-item questionnaire, combining closed- and open-ended questions, was designed to explore students' self-perceived oral difficulties, emotional responses (e.g., anxiety), and preferred classroom practices. The survey included items addressing grammar, vocabulary, fluency, pronunciation, and affective factors such as fear of errors or negative evaluation.

Research Results

Based on a synthesis of theoretical insights and practical teaching experience, a case study was constructed to examine how performance anxiety, lexical limitations, and cross-linguistic interference affect oral fluency and to identify pedagogical strategies that alleviate these obstacles. The analysis revealed the following [Figure 1]:

- Grammar was identified as the main barrier (47.4%), with learners struggling with verb conjugations, prepositions, and sentence structure.

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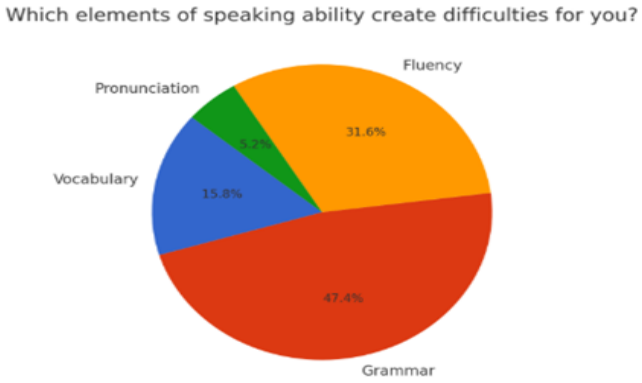
- Fluency was reported as the second-most frequent difficulty (31.6%), often linked to hesitation and pauses.
- Vocabulary limitations were highlighted by 15.8% of participants, whereas pronunciation was rarely considered a primary obstacle (5.2%).
- Anxiety was mentioned unanimously (100%), with learners describing fear of errors, avoidance of oral participation, and discomfort in public speaking contexts.

Figure 1

Which elements of speaking ability create difficulties for you?



Regarding preferred learning activities:

- Discussions on familiar topics (38.9%) and simulations of everyday situations (33.3%) were considered the most effective strategies.
- Role-play (11.1%) and monologues (11.1%) were also valued, though perceived as more challenging.

Findings confirm that performance anxiety is the most pervasive obstacle to oral communication in Italian L2, aligning with previous research (Horwitz et al., 1986; MacIntyre & Gardner, 1991). Anxiety undermines lexical retrieval, reduces fluency, and leads to avoidance strategies.

Although grammar accuracy was reported as the main challenge, it is often intertwined with affective variables. Learners' fear of making grammatical mistakes exacerbates hesitation and interrupts communicative flow. While less frequently mentioned, limited vocabulary indirectly contributes to disfluency and grammatical inaccuracies (Kormos, 2006).

Cross-linguistic interference also emerged as a relevant factor, particularly in the misuse of gender (e.g., il scuola instead of la scuola), tense-aspect confusion (past perfect vs. imperfect), and phonological errors (e.g., failure to distinguish /ts/ and /dz/, or omission of double consonants). Such patterns resonate with Gass et al. (2008) on transfer phenomena [Table 1].

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Table 1

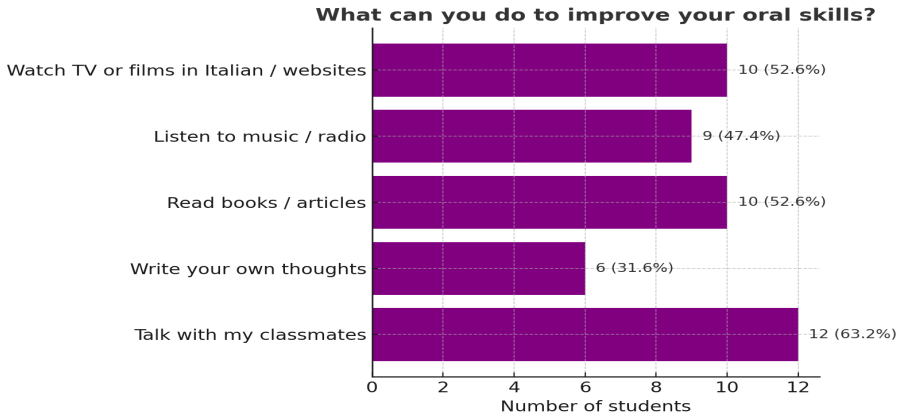
Dynamics of introducing ICT elements into the sociocultural space of the digital society

Factors causing speaking difficulties for ILS students	19 responses
Inhibition and anxiety. Students worry about making mistakes, fear criticism, or simply feel intimidated.	19 (100%)
Nothing to say. Students feel they have no reason or motivation to express themselves.	3 (15,8%)
Limited or uneven participation. Only one student can speak at a time due to large class sizes and the tendency of some students to dominate, while others speak little or not at all.	5 (26,3%)
Use of the mother tongue. Students who share the same native language tend to use it because it feels easier and less exposing than speaking in the target language.	10 (52,6%)

Pedagogically, the results suggest the need for low-stakes, interactive activities that reduce anxiety and promote risk-taking. Role-play, small-group tasks, and linguistic games create supportive contexts where errors are reframed as learning opportunities. Positive feedback and scaffolding (Wood et al., 1976) further contribute to lowering affective filters (Krashen, 1982) and fostering communicative confidence [Figure 2].

Figure 2

What can you do to improve your oral skills?



Conclusions and Future Directions

This study highlights the effectiveness of targeted oral language activities in improving communicative competence among learners of Italian as a foreign language. Role-play, linguistic games, and simulations significantly enhanced fluency, spontaneous speech, and grammatical control, while also reducing performance anxiety (Tyrou, 2024). Techniques such as rapid-speech drills and playful interaction fostered a supportive learning environment, thereby encouraging

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student confidence.

Vocabulary-in-action strategies, like word challenges and conceptual mapping, proved valuable for thematic lexical expansion and consolidation (Tyrou & Mylonas, 2023b). Learners showed increased readiness to use new vocabulary in authentic contexts, reflecting greater autonomy and expressive ability.

To further optimise oral instruction, integrating educational technologies and multimodal texts may provide extended practice and immediate feedback (Fedorenko et al., 2021). Diversifying activities with complex dialogues and rapid-response listening tasks can enhance adaptability in real-life communication.

Differentiated strategies and reflective feedback mechanisms are essential to ensure inclusive participation and promote learner self-awareness (Tyrou & Mylonas, 2023a). Future research could explore how peer collaboration and group dynamics influence oral development, enriching language learning through more engaging and interactive experiences.

References

Balboni, P. (2015). *Le sfide di Babele: Insegnare le lingue nelle società complesse*. UTET.

Fedorenko, S., Voloshchuk, I., Sharanova, Y., Glinka, N., & Zhurba, K. (2021). Multimodality and digital narrative in teaching a foreign language. *Arab World English Journal (AWEJ) Special Issue on CALL, 7*, 178–189. https://doi.org/10.24093/awej/call7.12

Gass, S., Behney, J., & Plonsky, L. (2018). *Second language acquisition: An introductory course* (4th ed.). Routledge.

Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal, 70*(2), 125–132. https://doi.org/10.2307/327317

Kormos, J. (2006). *Speech production and second language acquisition*. Lawrence Erlbaum Associates.

Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon.

MacIntyre, P. D., & Gardner, R. C. (1991). Methods and results in the study of anxiety and language learning. *Language Learning, 41*(1), 85–117. https://doi.org/10.1111/j.1467-1770.1991.tb00683.x

Tyrou, I. (2024). Il contributo della multimodalità e della scrittura creativa in lingua straniera. *Επιστημονική Επετηρίς Φιλοσοφικής Σχολής του Πανεπιστημίου Αθηνών, Τόμος ΜΗ'*. Αθήνα. https://www.researchgate.net/publication/389427569_IL_CONTRIBUTO_DELLA_MULTIMODALITA_E_DELLA_SCRITTURA_CREATIVA_IN_LINGUA_STRANIERA

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Tyrou, I., & Mylonas, K. (2023a). Differentiated learning and proposed strategies for teaching a foreign language. *British Journal of Multidisciplinary and Advanced Studies, 4*(2), 8–27. https://doi.org/10.37745/bjmas.2022.0124

Tyrou, I., & Mylonas, K. (2023b). Teaching Italian as a foreign language and elements of its culture using digital media [Poster presentation]. *International Conference on Advances in Second-Foreign Language Acquisition (ASeFoLA)*, June 9–10, Nicosia, Cyprus.

Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry, 17*(2), 89–100. https://doi.org/10.1111/j.1469-7610.1976.tb00381.x

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Weight, Waist, and Why It Matters: Somatic Drivers of Motor Competence in Children

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ABSTRACT: The study examined motor competence and somatic measures in 37 Croatian children aged 8–9 using MABC-2. Anthropometry included height, weight, BMI, waist circumference, waist-to-height ratio (WHtR), and four skinfolds. Weight status was evenly split: 48.65% were normal weight, 48.65% were overweight/obese, and one participant was underweight. No statistically significant gender differences appeared in somatic variables. In motor performance, girls outperformed boys on drawing (manual dexterity), whereas boys scored higher for catching and the combined aiming-and-catching domain; other domain differences were nonsignificant. Correlational analyses showed strong positive interrelations among adiposity indicators (weight, BMI, WHtR, waist, skinfolds). Balance correlated negatively with adiposity ($r \approx -0.50$ to -0.60), and the total MABC-2 composite correlated negatively with BMI, WHtR, waist circumference, and skinfolds ($r \approx -0.35$ to -0.44), indicating that higher adiposity was accompanied by lower motor competence. Traffic-light classification identified 78.4% children in typical development, 13.5% "at risk", and 8.1% possible DCD. Findings highlight urgent needs for screening, targeted PE, and healthy-weight promotion.

KEYWORDS: Motor competence, childhood obesity, balance, gender differences, developmental coordination disorder (DCD).

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Introduction

Motor competence refers to the ability to master both fine and gross motor skills essential for everyday activities and involvement in physical pursuits. It encompasses fundamental motor patterns such as running, jumping, throwing, catching, and maintaining balance (Barnett et al., 2016; Robinson et al., 2015). Childhood is a crucial phase for the development of these capacities as early deficits can affect later physical activity, psychosocial development, and overall health (Malina, 2004). Recent studies emphasise two interrelated challenges: the increasing prevalence of obesity among children and the growing number of children with low motor competence (Bao et al., 2024; Quka et al., 2019). Both issues are influenced by sedentary lifestyles, insufficient physical activity, and changes in social environments (Tan & Chia, 2024).

The Movement Assessment Battery for Children – Second Edition (MABC-2) is among the most widely used tools for evaluating children's motor competence. It assesses three domains: manual dexterity, aiming and catching, and balance (Henderson, Sugden, & Barnett, 2007). On the other hand, body measures such as height, weight, body mass index (BMI), waist circumference, waist-to-height ratio (WHtR), and skinfold thickness are standard indicators of physical development, nutritional status, and health risk (Mišigoj-Duraković, 2008; Gudaji et al., 2018). Understanding how these somatic dimensions relate to motor performance can guide preventive and educational strategies in schools and clinical practice.

Research Aim and Research Questions

This study aimed to clarify the relationship between motor competence and somatic characteristics in children aged 8–9 years. Specifically, the research aimed to discover the distribution of participants across BMI categories, to test sex differences in somatic measures (height, weight, BMI, waist circumference, skinfolds, WHtR) and/or on MABC-2 outcomes (manual dexterity, aiming & catching, balance), and finally to categorize overall motor competence using the MABC-2 traffic-light model (green/yellow/red) and describe its distribution.

Research Results

The study included 37 children aged 8–9 years (18 boys, 19 girls). Based on BMI, 48.65% were of normal weight (n=18), 48.65% were overweight or obese (n=18), and 2.7% were underweight (n=1). Somatic measures showed no statistically significant sex differences for height, weight, BMI, waist circumference, WHtR, or skinfolds.

Across somatic indices (Table 1), strong positive interrelations were observed (weight, BMI, WHtR, waist circumference, and skinfold sum; $r \approx .75–.95$). Balance performance correlated negatively with adiposity indicators—body weight, BMI, WHtR, waist circumference, and skinfolds—with moderate effect sizes ($r \approx -.50$ to $-.60$, $p < .01$) (Table 1). In contrast, somatic measures were not significantly associated with manual dexterity or aiming & catching subtest scores. The overall MABC-2 composite score was also negatively related to adiposity ($r \approx$ -0.35 to -0.44, $p < 0.05$), indicating that higher adiposity was associated with lower overall motor competence (Table 1).

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Regarding gender differences in motor performance, girls achieved significantly better results on the drawing task (manual dexterity; $p = 0.03$), while boys outperformed girls in catching ($p = 0.01$) and the aggregated aiming & catching domain ($p < 0.001$). Other motor tests, including peg placement, threading, balance tasks, hopping, and beanbag throwing, did not yield statistically significant gender differences. As expected, the three MABC-2 domains showed a positive correlation with the total score.

Using the MABC-2 traffic-light classification, 78.4% of children were in the green zone (typical development; n=29), 13.5% in the yellow zone (at risk; n=5), and 8.1% in the red zone (significant difficulties; n=3). More boys fell within the green zone, whereas more girls appeared in the yellow and red zones, suggesting a slightly higher risk of motor difficulties among girls in this sample.

Table 1

Associations between measures

	1	2	3	4	6	7	8	9
1. *Height*	-							
2. *Weight*	**.69****	-						
3. *BMI*	**.38***	**.93****	-					
4. *WHtR*	.17	**.75****	**.89****	-				
6. *Sum of skinfolds*	.32	**.83****	**.92****	**.93****	-			
7. *Manual dexterity*	-.01	-.01	-.02	-.03	.01	-		
8. Aiming & catching	.08	-.09	-.15	-.13	-.23	-.03	-	
9. *Balance*	-.16	**-.50****	**-.57****	**-.59****	**-.60****	.06	.13	-
10. Composite score	-.05	-.32	**-.40***	**-.38***	**-.44****	**.55****	**.52****	**.69****

Note. * significant at p<.05; ** significant at p<.01

Discussion and conclusions

The present study provides important insights into the relationship between somatic measures and motor competence in children aged 8–9 years. Perhaps the most concerning finding is that nearly half of the participants were classified as overweight or obese. This proportion is higher than reported in several European school samples (Lobstein et al., 2020; Garrido-Miguel et al., 2019), underscoring the need for targeted interventions. Excess body mass during childhood not only increases the risk of chronic health problems later in life (Reilly & Kelly, 2011) but is also linked to reduced opportunities for engagement in physical activity, thereby creating a negative cycle of inactivity and weight gain (Stodden et al., 2008).

The analysis of motor skills revealed apparent gender differences. Girls achieved significantly higher scores on fine-motor tasks, specifically on the drawing test, while boys performed better at

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catching and in the overall aiming and catching domain. This aligns with previous studies showing that girls often excel at manual dexterity tasks, while boys tend to excel at object-control skills, such as throwing and catching (Barnett et al., 2016; Smits-Engelsman et al., 2023). These differences may reflect both biological predispositions and socially reinforced activity patterns, as boys are more frequently encouraged to engage in ball games. At the same time, girls may be more likely to engage in activities that require fine motor control and precision (Goodway et al., 2010).

Notably, the classification of children is based on the MABC-2 traffic-light model. While the majority of participants were in the green zone (typical development), five children were classified as "at risk" (yellow), and three fell into the red zone, indicating potential Developmental Coordination Disorder (DCD). Given the comparatively small sample, the proportion of children at motor risk (21.6%) is striking and higher than the commonly reported prevalence estimates of DCD, which range from 5% to 6% in the general population (Blank et al., 2019). This highlights the importance of early screening in schools, as undetected coordination difficulties may reduce children's participation in physical activity, limit social interactions, and negatively affect self-esteem (Cairney et al., 2019).

Correlation analyses enhance understanding of the processes responsible for these results. Strong positive correlations were expected among somatic variables (weight, BMI, WHtR, skinfolds), as these measures all reflect adiposity. Essentially, balance showed consistent negative associations with weight ($r = -.50$), BMI ($r = -.57$), WHtR ($r = -.59$), and skinfolds ($r = -.60$). This confirms previous evidence that excess body mass compromises postural control (D'Hondt et al., 2013), likely due to biomechanical disadvantages such as a higher center of mass and lower relative muscle strength. Interestingly, neither manual dexterity nor aiming and catching correlated significantly with adiposity, suggesting that overweight primarily limits gross motor skills that rely on balance and whole-body coordination rather than fine or upper-limb precision tasks (Davis et al., 2021).

The overall composite motor competence score also correlated negatively with adiposity indicators ($r = -0.35$ to -0.44), further supporting the conclusion that higher body fat is associated with poorer motor outcomes. On the other hand, the composite score was strongly positively correlated with all three motor domains (manual dexterity, aiming & catching, balance), which is consistent with the structure of the MABC-2 and validates the internal coherence of the test.

Taken together, these results highlights the dual challenge of childhood obesity and motor difficulties. On one hand, nearly half of the children are already overweight or obese, and on the other, a significant minority show risk or evidence of DCD. The observed sex differences emphasize the need for balanced curricula in physical education that boost both fine and gross motor skills. Early identification and targeted interventions can help prevent the downward spiral in which motor difficulties result in decreased physical activity, resulting in further weight gain and poorer motor outcomes (Stodden et al., 2008).

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References

Bao, R., Wade, L., Leahy, A. A., et al. (2024). Motor competence and child health outcomes. *Sports Medicine, 54*(8), 2141–2156. https://doi.org/10.1007/s40279-024-02040-1

Barnett, L. M., Stodden, D., Cohen, K. E., Smith, J. J., Lubans, D. R., Lenoir, M., & Morgan, P. J. (2016). Fundamental movement skills: An important focus. *Journal of Teaching in Physical Education, 35*(3), 219–225. https://doi.org/10.1123/jtpe.2014-0209

Blank, R., Barnett, A. L., Cairney, J., Green, D., Kirby, A., Polatajko, H., & Vinçon, S. (2019). International clinical practice recommendations on the definition, diagnosis, assessment, intervention, and psychosocial aspects of developmental coordination disorder. *Developmental Medicine & Child Neurology, 61*(3), 242–285. https://doi.org/10.1111/dmcn.14132

Cairney, J., Hay, J., Faught, B. E., Wade, T. J., Corna, L., & Flouris, A. (2005). Developmental coordination disorder, self-efficacy toward physical activity, and play: Does gender matter? *Adapted Physical Activity Quarterly, 22*(1), 67–82. https://doi.org/10.1123/apaq.22.1.67

D'Hondt, E., Deforche, B., Vaeyens, R., Vandorpe, B., Vandendriessche, J., Pion, J., & Lenoir, M. (2011). Gross motor coordination in relation to weight status and age in 5- to 12-year-old boys and girls: A cross-sectional study. *International Journal of Pediatric Obesity, 6*(2–2), e556–e564. https://doi.org/10.3109/17477166.2010.496572

Davis, E. E., Pitchford, N. J., & Limback, E. (2021). The impact of overweight and obesity on motor skills in children: A systematic review. *Journal of Motor Behavior, 53*(2), 1–15. https://doi.org/10.1080/00222895.2020.1784535

Garrido-Miguel, M., Oliveira, A., Cavero-Redondo, I., Álvarez-Bueno, C., Pozuelo-Carrascosa, D. P., Soriano-Cano, A., & Martínez-Vizcaíno, V. (2019). Prevalence and trends of overweight and obesity in European children from 1999 to 2016: A systematic review and meta-analysis. *JAMA Pediatrics, 173*(10), e192430. https://doi.org/10.1001/jamapediatrics.2019.2430

Goodway, J. D., Robinson, L. E., & Crowe, H. (2010). Gender differences in fundamental motor skill development in disadvantaged preschoolers from two geographical regions. *Research Quarterly for Exercise and Sport, 81*(1), 17–24. https://doi.org/10.1080/02701367.2010.10599624

Gudaji, A., Adamu, L., Taura, M., Danborno, B., Asuku, A., Datti, S., & Mika'il, U. (2018). Anthropometric measures and child health. *Bayero Journal of Pure and Applied Sciences, 10*(2), 184–188. https://doi.org/10.4314/bajopas.v10i2.31

Henderson, S. E., Sugden, D. A., & Barnett, A. L. (2007). *Movement Assessment Battery for Children—Second Edition (Movement ABC-2): Examiner's manual*. Harcourt Assessment.

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Lobstein, T., Brinsden, H., Neveux, M., & World Obesity Federation. (2020). *World Obesity Atlas 2020*. World Obesity Federation. https://www.worldobesity.org

Malina, R. M. (2004). Motor development during infancy and early childhood: Overview and suggested directions for research. *International Journal of Sport and Health Science, 2*, 50–66. https://doi.org/10.5432/ijshs.2.50

Mišigoj-Duraković, M. (2008). *Physical activity and health*. University of Zagreb, Faculty of Kinesiology.

Quka, N., Selenica, R., Quka, G., & Shore, L. L. (2019). Obesity, motor skills, and child development. *Arena: Journal of Physical Activities, 8*(2), 11–20. https://uav.ro/jour/index.php/ajpa/article/view/1425/1481

Reilly, J. J., & Kelly, J. (2011). Long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood: Systematic review. *International Journal of Obesity, 35*(7), 891–898. https://doi.org/10.1038/ijo.2010.222

Robinson, L. E., Stodden, D. F., Barnett, L. M., Lopes, V. P., Logan, S. W., Rodrigues, L. P., & D'Hondt, E. (2015). Motor competence and its effect on positive developmental trajectories of health. *Sports Medicine, 45*(9), 1273–1284. https://doi.org/10.1007/s40279-015-0351-6

Smits-Engelsman, B. C., Coetzee, D., Valtr, L., & Verbecque, E. (2023). Do girls have an advantage compared to boys when performing the Movement Assessment Battery for Children-2? *Children, 10*(7), 1159. https://doi.org/10.3390/children10071159

Stodden, D. F., Goodway, J. D., Langendorfer, S. J., Roberton, M. A., Rudisill, M. E., Garcia, C., & Garcia, L. E. (2008). A developmental perspective on the role of motor skill competence in physical activity: An emergent relationship. *Quest, 60*(2), 290–306. https://doi.org/10.1080/00336297.2008.10483582

Tan, J. S. Y., & Chia, M. (2024). Early motor competence and interventions. *PeerJ, 12*, e18446. https://doi.org/10.7717/peerj.18446

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Investigating Greek Learners' Interlanguage in Italian through a Custom-Tagged Learner Corpus

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ABSTRACT: This paper describes the creation and development of a learner corpus of Italian written by Greek university students, conducted within the framework of an ongoing PhD project. The corpus aims to fill a notable gap in learner corpus research concerning less-represented language pairings, specifically Italian as a second language learned by Greek speakers. The data were collected from authentic written examinations of the State Certificate of Language Proficiency (КПГ) at the B and C CEFR levels, comprising 293 texts and approximately 53,000 words. To analyse learners' interlanguage, a custom error-annotation tagset was designed and refined through several trial phases. The tagset includes three hierarchical dimensions – error level, part of speech, and error type–allowing for a detailed categorisation of linguistic deviations. Preliminary observations reveal recurrent difficulties with prepositions, verb morphology, and syntactic agreement, alongside noticeable traces of cross-linguistic influence from Greek, English, and other languages. The project provides both a methodological framework and a valuable linguistic resource for further studies on Italian L2 acquisition in Greek-speaking and multilingual contexts.

KEYWORDS: Learner corpus, Italian L2, Greek learners, interlanguage, error annotation, corpus design, cross-linguistic influence, multilingualism.

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Introduction

Learner Corpora, defined as "electronic collections of texts produced by foreign language learners", share the fundamental characteristics of general corpora (Granger, 2008). However, their design and compilation may vary considerably from project to project, depending on the aspects of learner language under investigation and the specific objectives and interests of the corpus creators.

Tono (2003) outlines several design considerations for corpus construction, distinguishing three major sets of criteria: language-related criteria (e.g. mode, medium, genre, topic), task-related criteria (e.g. longitudinal vs. cross-sectional; spontaneous vs. prepared), and lastly learner-related criteria (e.g. age, sex, mother tongue, level of studies, L2 knowledge). Similarly, Granger (2008) proposes a detailed typology with many subcategories of learner corpora: commercial vs. academic; dimensions; English vs. non-English; writing vs. speech; immediate vs. delayed pedagogical use.

The degree of corpus processing also varies according to the project's aims and analytical needs. A corpus can employ additional linguistic annotation to enhance its research potential and provide an extra layer of information that can later be analysed and used in different ways (Granger, 2008). This practice is called "error tagging".

Error annotation plays a crucial role in interlanguage studies, as it enables researchers to observe developmental patterns and language transfer phenomena. Many attempts have been made to provide the linguistic community with a standardised tagset; no single framework has yet achieved universal adoption. Researchers often adapt or expand existing schemes to suit the specific linguistic or pedagogical focus of their corpus. According to Aarts & Granger (1998), a tag "consists of a label for a major, word class, plus any number of features indicating syntacto-semantic subclasses and/or morphological characteristics".

Research in Second Language Acquisition has extensively used learner corpora to understand better how languages are learnt and how interlanguage works. Beyond research, they also have significant pedagogical applications. As Granger (2008) notes, they can be used for material design, syllabus design, language testing, and classroom methodology.

Despite their growing importance, there remains a notable gap in the availability of learner corpora for less-represented language combinations. In particular, no publicly available corpus currently focuses on the Italian interlanguage of Greek learners. Within the Italian Language and Literature Department of NKUA, an attempt to collect written texts produced by students has previously existed to create a resource in this area. However, this corpus has not been made public.

Since July 2023, within the framework of my PhD research, I have been developing a learner corpus of Italian produced by Greek university students, accompanied by a custom-designed error annotation tagset. This project seeks to address the current gap in learner corpus resources and to contribute to a better understanding of Italian L2 acquisition within Greek-speaking contexts.

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Research methodology

Corpus compilation

The first step in the corpus design and compilation process was to determine the most appropriate research context for data collection. The initial environment considered was the Language School of the National and Kapodistrian University of Athens, where Italian is taught across all CEFR levels. After establishing contact with the instructors and collecting a preliminary sample of written texts, it became evident that these materials did not fully meet the predefined criteria for text length and content maturity.

A second possibility was to gather written productions from two university courses, with the collaboration of NKUA's professors. However, the nature of the two classes ("Error Analysis in the Italian Language" and "Creative Writing in a Foreign Language") differed significantly. The texts produced in the former course were primarily reflective and autobiographical, whereas those from the latter were imaginative and narrative-based. This divergence in genre and communicative intent made the two datasets incompatible for the present corpus.

The third and ultimately selected option was to draw on data from the State Certificate of Language Proficiency (Κρατικό Πιστοποιητικό Γλωσσομάθειας). The written examinations for levels B and C were identified as a suitable and homogeneous source of learner language. These texts displayed comparable levels of cohesion and maturity, were sufficiently rich in grammatical and lexical variety, and, most importantly, were produced under uniform testing conditions and within a controlled time frame.

Table 1

The data collected from this source

Parameter	**Data**
Source	State Certificate of Language Proficiency (ΚΠΓ) – Written exams
Total texts collected	293
B level texts	193
C level texts	100
Number of participants	99
Total number of words	52,974
Average text length (Level B)	80-120
Average text length (Level C)	300-400

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The data collected from this source are shown in the previous table.

The participants varied in age, educational background, and likely L1. Due to privacy constraints, no additional biographical or linguistic data could be collected. For the same reason, gender identification was inferred indirectly from morphological cues in the texts, such as adjective agreement and past-tense verb inflexion.

a. Custom tagset design

After an initial reading and assessment of all collected texts, an Excel database was created to organise the corpus. The spreadsheet included multiple columns detailing the source of each text, the text identifier, the declared and verified proficiency level, the writer's gender, the number of errors, the text's suitability for analysis, and the word count. This preliminary stage ensured systematic data management prior to the annotation phase.

The next step involved developing a custom error tagset for identifying and annotating learner errors. As a primary reference and inspiration, I adopted the tagset previously developed for the same university course on error analysis (Florou, 2025). However, during the annotation trials, it became clear that the range and complexity of the errors observed exceeded the descriptive capacity of the existing labels. Consequently, the tagset was expanded and refined into three hierarchical categories: error level, part of speech, and error type. For each category, I had to create subcategories. Error level distinguishes between *morphological* (M) and *syntactic* (S) errors. Part of speech comprises ten subcategories: *noun* (SO), *adjective* (AG), *adverb* (AV), *verb* (VE), *preposition* (PP), *pronoun* (PN), *article* (AR), *conjunction* (CO), *punctuation* (PU), and *sentence* (FR). Error type includes eight values: *absence* (ASS), *substitution* (SST), *repetition* (RIP), *phonetic* (FON), *not in use* (NIU), *wrong position* (PER), *influence* (INF), and *incomprehensible* (INC).

Examples of annotated learner sentences are shown below:

La conoscenza e la forte [M SO SST] che ci danno [M VE ASS] i libri sono grandi [M AG SST].

All'inizio dobbiamo rispettare la natura e non fare del male, come polverizzare, infastidire, sconvolgere, danneggiare, ecc.

All annotations were carried out manually. Since the original texts were handwritten, they were first transcribed into plain text (.txt) files using Windows Notepad before tagging. No automated annotation tools or software were employed.

b. Preliminary results

All texts in the corpus have been annotated, although statistical analyses are still in progress.

A preliminary review of the written data, accompanied by initial qualitative notes, reveals that the most frequent errors concern the use of prepositions, the formation and use of the subjunctive, and, more broadly, verb agreement and hypothetical constructions.

A comparison between the declared CEFR levels and the actual linguistic performance indicates certain discrepancies. Nonetheless, the errors observed in the B-level texts essentially correspond to those typically associated with intermediate interlanguage development. In contrast, the C-level

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errors reflect more advanced yet persistent challenges in grammatical accuracy and lexical choice.

As expected, Greek exerts the most substantial cross-linguistic influence on the learners' Italian. However, traces of English, Spanish, and French interference were also identified, suggesting multilingual influence among the participants. In a few instances, syntactic patterns appeared to reflect transfer phenomena from Albanian and Georgian. Interestingly, only one participant displayed indications of Latin interference in their writing.

Conclusions

This study presented the creation and development of a learner corpus of Italian interlanguage based on Greek adults' written productions, filling an important gap in the field of learner corpus research for minority language pairings.

The corpus was grouped from authentic examination texts, ensuring homogeneity in production conditions and reliability for interlanguage analysis. A tagset was explicitly created and tested after several attempts to better capture the complexity of learners' productions through a multilayered error annotation system that includes error level, part of speech, and error type.

Preliminary observations are already offering interesting and valuable insights into Greek learners' interlanguage in Italian, disclosing challenges and difficulties with prepositional use, verb morphology, syntactic agreement, and the influence of many various linguistic systems beyond Greek, along with English, Spanish, and other linguistic varieties spoken by prominent immigrant populations in Greece.

These first results emphasise the usage of learner corpora to clarify cross-linguistic transfer and developmental features of L2 acquisition.

Future stages of this research will focus on enhancing the corpus's analytical potential and promoting further research on Italian L2 acquisition in multilingual and cross-linguistic contexts.

List of references

Aarts, J., & Granger, S. (1998). Tag sequences in learner corpora: A key to interlanguage grammar and discourse. In S. Granger (Ed.), *Learner English on computer* (pp. 132–141). London: Longman.

Bryant, C., Felice, M., & Briscoe, T. (2017). Automatic annotation and evaluation of error types for grammatical error correction. In *Proceedings of the 55th Annual Meeting of the Association for Computational Linguistics* (pp. 793–805). Vancouver: Association for Computational Linguistics.

Ferrari, S., & Pallotti, G. (2005). *Interlingua e analisi degli errori: Apprendimenti linguistici e valutazione. Un percorso sull'italiano L1 e la correzione di testi scritti.*

Florou, K. (2013). Comparing error tagged learner corpora and learners' variables. *Journal of Modern Education Review, 3*(9), 695–704. Academic Star Publishing Company.

Granger, S. (1998). The computer learner corpus: A versatile new source of data for SLA research. In S. Granger (Ed.), *Learner English on computer* (pp. 3–18). London: Longman.

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Granger, S. (2003). *The corpus approach: A common way forward for contrastive linguistics and translation studies.* Louvain: University of Louvain.

Tono, Y. (2003). *The role of learner corpora in SLA research and foreign language learning: The multiple comparison approach* (Doctoral dissertation). Lancaster University, Lancaster.

Županović Filipin, N., & Mardešić, S. (2013). Analisi dell'interlingua nell'apprendimento dell'italiano a livello universitario. *SRAZ, LVII*, 201–219. Zagreb: Sveučilišta u Zagrebu.

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Learner Corpora Research and the Needs Analysis in the Classroom of the Foreign Language

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ABSTRACT: This paper explores the intersection of learner corpus research (LCR) and needs analysis (NA) within the context of foreign language education. While LCR provides empirical insights into how learners actually use language, NA clarifies their academic, professional, and social requirements. Drawing on examples from ESP and Italian L2 classrooms, the paper argues that integrating these two approaches supports the design of curricula that are both evidence-based and learner-centred. It further highlights international case studies from Saudi Arabia, Taiwan, and Montenegro, illustrating how corpus-informed teaching and systematic needs analysis work in synergy to improve learning outcomes.

KEYWORDS: Needs Analysis for Language Teaching, Corpus Linguistics, Foreign Language Teaching.

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Introduction

In recent decades, learner corpus research (LCR) and needs analysis (NA) have become central to innovations in foreign language teaching. LCR, rooted in corpus linguistics, allows educators to examine authentic learner output and identify recurrent linguistic patterns (Gilquin, Granger, & Paquot, 2007; Reppen, 2010). On the other hand, NA examines learners' necessities, lacks, and wants, ensuring that teaching goals align with professional, academic, and social demands (Hutchinson & Waters, 1987; Nation & Macalister, 2010). This paper aims to demonstrate the complementary relationship between LCR and NA, using international case studies to highlight their pedagogical impact.

Theoretical Background

LCR stems from corpus linguistics and emphasises the use of empirical data to investigate authentic learner language. Through approaches such as data-driven learning (DDL), learners can observe linguistic patterns and independently refine their language skills (Boulton & Thomas, 2012). Parallel to this, NA has played a crucial role in English for Specific Purposes (ESP), with Hutchinson and Waters' (1987) framework distinguishing necessities, lacks, and wants as the foundation for curriculum design. The integration of LCR and NA thus provides a combination of quantitative and qualitative evidence that supports more effective and context-sensitive instruction.

Corpus Linguistics in Language Education

Corpus-based instruction has been successfully applied in multiple educational contexts. In Saudi Arabia, the use of online corpus tools enabled students to reduce errors in academic vocabulary (Flowerdew, 2012). In Taiwan, students actively engaged in constructing learner corpora, which enhanced their metalinguistic awareness and critical language reflection. Furthermore, mobile-assisted learning applications in Iran and Lebanon have incorporated corpus-informed tutors, showing that corpus-based pedagogies can also adapt to digital and mobile contexts (Tribble, 2012). These examples demonstrate the potential of corpora to enhance vocabulary development, grammatical accuracy, and discourse competence.

Needs Analysis and Case Studies

Needs analysis (NA) remains a cornerstone of effective ESP course design, ensuring that instruction is deeply aligned with learners' actual requirements. In the context of ESP, NA helps to identify not just linguistic gaps but also the specific communicative tasks learners must master (Hutchinson & Waters, 1987; Belcher, 2006). For example, Liu and Zhang (2020) proposed an NA framework for a short ESP course targeting Chinese bank tellers, detailing appropriate data collection methods (e.g., observation protocols, triangulation) and demonstrating how analytic transparency enhances relevance and applicability in professional contexts. Furthermore, Alsamadani's (2017) study of Saudi engineering students offered quantitative and qualitative insights. Using observations, questionnaires, and interviews, it revealed that while receptive skills such as reading and listening were commonly emphasised in ESP classes, productive abilities—particularly writing and speaking—were identified by both students and ESP teachers as more

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urgently needed for their academic and professional pursuits. This finding underscores the importance of triangulating multiple data sources to capture a nuanced understanding of learner needs.

Another illustrative case concerns applying the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) to develop Oral Business English (OBE) curricula for Chinese EFL undergraduates majoring in business. Hu (2024) administered structured surveys during the ANALYSIS phase, revealing learners' low confidence in speaking and a preference for interactive methods such as presentations, discussions, and role-play—insights that directly informed module design.

Moreover, García-Ponce (2021) carried out focus groups with institutional stakeholders—teachers, students, and administrators—at a university in Mexico, finding value in combining top-down strategic planning with content-based instruction to enhance alignment with academic and career objectives.

These diverse examples—from technical professions, banking, business, to higher education—span quantitative surveys, qualitative interviews, classroom observation, and stakeholder discussions. This variety mirrors the broader methodological landscape: mixed-methods designs in NA are increasingly recognised for their ability to triangulate data, enrich validity, and support adaptive curriculum development (Park, 2021).

Key methodological takeaways from these case studies include:

1. Triangulation of multiple methods ensures a deeper understanding of needs.
2. Context-specific adaptation highlights differences across disciplines and cultures.
3. Practical application shows how findings directly inform curriculum design.
4. Emerging frameworks stress flexible and scalable models tailored to diverse contexts.

Synergies and Challenges

The integration of LCR and NA offers a strong foundation for curriculum development. Corpus-informed syllabi prioritise high-frequency lexical and grammatical features, while NA ensures that these selections remain aligned with learners' communicative goals. Evidence from Uzbek and Indonesian contexts suggests that this combined approach enhances learner engagement, task relevance, and skill transfer. However, challenges remain. Teachers often lack sufficient training in corpus tools, and existing corpora may not always represent learners' target domains. Meanwhile, NA can be resource-intensive and culturally sensitive. Addressing these challenges requires investment in teacher training, digital infrastructure, and localised corpus resources.

Conclusion

In conclusion, LCR and NA represent two complementary perspectives on language learning. While LCR demonstrates how learners actually use language, NA clarifies what they need to learn. Their integration supports learner-centred, evidence-based instruction that can adapt to changing contexts. Despite implementation challenges, adopting a cyclical approach—where needs are periodically reassessed and corpus data are continuously refreshed—ensures the sustained relevance

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of language curricula. Future research should investigate scalable models for integrating LCR and NA, particularly in under-resourced educational environments.

References

Alsamadani, H. A. (2017). Needs analysis in ESP context: Saudi engineering students as a case study. Advances in Language and Literary Studies, 8(6), 58–68. http://dx.doi.org/10.7575/aiac.alls.v.8n.6p.58

Anthony, L. (2019). Introducing English for Specific Purposes. Routledge. https://doi.org/10.4324/9781351031189

Belcher, D. D. (2006). English for specific purposes: Teaching to the perceived needs and imagined futures in the world of work, study, and everyday life. TESOL Quarterly, 40, 133–156. https://doi.org/10.2307/40264514

Boulton, A., & Thomas, J. (2012). Corpus tools for discovery learning: A case study. In J. Thomas & A. Boulton (Eds.), Input, Process and Product: Developments in Teaching and Language Corpora (pp. 145–164). Brill. https://hal.science/hal-00683775v1

Flowerdew, L. (2012). Corpora and Language Education. Palgrave Macmillan.

García-Ponce, E. E. (2021). Needs analysis in higher education: A case study for English curriculum development. International Journal of Progressive Education, 17(5), 45–60. DOI:10.26634/jelt.11.2.17476

Gilquin, G., Granger, S., & Paquot, M. (2007). Learner corpora: The missing link in EAP pedagogy. Journal of English for Academic Purposes, 6(4), 319–335. https://doi.org/10.1016/j.jeap.2007.09.007

Hu, K. (2024). Needs analysis for designing and developing an EFL teaching-speaking module for the unique linguistic needs of business undergraduates. English Language Teaching, 17(2), 112–130. https://doi.org/10.33225/pec/24.82.456

Hyland, K. (2006). English for Academic Purposes: An Advanced Resource Book. Routledge.

Hutchinson, T., & Waters, A. (1987). English for Specific Purposes: A Learning-centred Approach. Cambridge University Press.

Liu, D., & Zhang, P. (2020). A needs analysis proposal for ESP: A case study of a short English training course for bank tellers in a Chinese bank. Open Journal of Social Sciences, 8(7), 206–217. https://doi.org/10.4236/jss.2020.87017

Nation, I. S. P., & Macalister, J. (2010). Language Curriculum Design. Routledge.

Park, E. J. (2021). Affordances and challenges of mixed-methods needs analysis for the development of ESP courses. Language Teaching Research Quarterly, 23, 12–22. doi:10.32038/ltrq.2021.23.03

Reppen, R. (2010). Using Corpora in the Language Classroom. Cambridge University Press. https://doi.org/10.1017/9781139042789.003

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Scott, M. (2011). WordSmith Tools (Version 6) [Computer software]. Lexical Analysis Software.

Tribble, C. (2012). Corpora for ELT: New uses for new learners. In A. O'Keeffe & M. McCarthy (Eds.), The Routledge Handbook of Corpus Linguistics (pp. 131–145). Routledge. DOI: 10.4324/9780367076399

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Challenges and Implications of Artificial Intelligence in Teaching Entrepreneurship at Universities

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ABSTRACT: Entrepreneurship education aims to identify and validate ideas and business models that have an impact on society. This study analyses the main challenges and implications of integrating Artificial Intelligence (AI) into entrepreneurship education in a university context. Using a qualitative approach based on a literature review, we analyse the pedagogical transformations caused by AI, as well as its impact on the development of entrepreneurial skills. We conclude that, despite the opportunities, it is necessary to ensure a critical and ethical approach to the use of AI, ensuring a balance between technology and humanisation in the process of developing an entrepreneurial mindset.

KEYWORDS: Artificial Intelligence (AI), Entrepreneurship, Teaching, University.

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Introduction

Entrepreneurship education differs significantly from other fields of knowledge due to its experiential, creative, and action-oriented nature. Neck and Greene (2011) argue that entrepreneurship should be taught as a practice, not just a theory. This implies the use of active methodologies, such as project-based learning, business simulations, business games, and mentoring with real entrepreneurs. Rae (2007) reinforces that entrepreneurial education should develop skills such as creativity, leadership, resilience, empathy, and strategic thinking. AI, in this context, can be a valuable tool to support idea prototyping, market analysis, and the simulation of business environments. However, it can also compromise students' spontaneity and autonomy if not used critically.

The methodology adopted is qualitative and exploratory in nature, incorporating a literature review and a focus on key authors.

Theoretical Background

Paschen, Pitt, and Kietzmann (2020) argue that AI can be a powerful ally in generating business ideas and simulating strategic scenarios. The authors argue that by incorporating AI tools into entrepreneurship curricula, universities can provide students with experiences more closely aligned with business reality, promoting data-driven decision-making and rapid experimentation with business models. This approach favours the development of skills such as critical thinking, creativity, and adaptability—essential for the profile of the contemporary entrepreneur.

Fonseca de Almeida (2021), in a study focused on business strategies in Portugal, reinforces the importance of AI as a catalyst for innovation. The author suggests that entrepreneurship education should include technological literacy as a fundamental component, preparing students for a market in which AI is increasingly integral to business creation, management, and scalability. Her research highlights the need for a curricular reformulation that integrates digital and technological competencies across the board.

Henning et al. (2023), in a systematic review of the use of AI in higher education, highlight the role of technology in personalising learning. According to the authors, AI enables the adaptation of content, pace, and methodologies to each student's profile, which can be particularly useful in entrepreneurship education, where learning paths are often non-linear and project-based. This personalisation can foster student empowerment and autonomy in developing innovative solutions.

Duque et al. (2023) explore the application of AI in Brazilian and Portuguese universities, focusing on customisation and predictive performance analysis. The authors argue that AI can be used to create personalised learning paths tailored to students' skills and interests, promoting more effective training that aligns with the challenges of the entrepreneurial ecosystem. Furthermore, they highlight the potential of AI to facilitate project monitoring, automated mentoring, and real-time feedback.

Chui et al. (2018) address AI as a driver of economic transformation, highlighting its cross-cutting impact across various sectors, including education and business. Although the study's focus is not

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exclusively on entrepreneurship education, the authors emphasise the urgency of preparing future professionals for a context in which AI redefines the boundaries of innovation, productivity, and competitiveness. In this sense, university entrepreneurship education should incorporate AI not only as a tool but also as an object of critical and strategic reflection.

The literature reviewed suggests a convergence between AI and entrepreneurship education that necessitates a multidisciplinary, ethical, and innovative approach. The authors agree that AI can enrich entrepreneurship education by offering new forms of learning, simulation, and analysis. However, they also warn of the risks associated with technological dependence, the dehumanisation of educational processes, and digital exclusion. Thus, the challenge for universities is to balance the transformative potential of AI with entrepreneurial education that continues to value creativity, empathy, and critical thinking.

Discussion

A literature review reveals that the application of AI in university entrepreneurship education is emerging as a promising trend, but is still marked by structural, ethical, and pedagogical challenges. The selected studies offer different perspectives on how AI can transform entrepreneurial learning, while raising critical questions about its implementation.

Paschen, Pitt, and Kietzmann (2020) highlight the potential of AI to expand access to market knowledge by allowing student entrepreneurs to simulate strategic decisions based on real data. This approach favours experiential learning, where students can test business hypotheses in virtual environments, reducing risks and accelerating the innovation process. However, this reliance on data and algorithms requires robust digital literacy on the part of students and faculty, which is not always guaranteed in university settings.

Henning, Costa, and Ribeiro (2023) reinforce this idea by pointing out that AI can personalise higher education, adapting content and methodologies to each student's profile. In entrepreneurship education, this personalisation can be particularly effective, given the non-linear and practical nature of entrepreneurial learning. However, the authors caution against the risk of these technologies replacing the critical role of the teacher as a mediator and mentor, particularly in courses that necessitate ethical reflection, creativity, and decision-making in complex and ambiguous contexts.

Duque, Silva and Carvalho (2023) provide a comparative perspective between Brazil and Portugal, highlighting that the adoption of AI in universities remains uneven and dependent on institutional and cultural factors. Personalisation of education, while desirable, faces barriers such as a shortage of technological resources, insufficient teacher training, and resistance to change. In entrepreneurship education, these limitations can compromise the effectiveness of AI-based approaches, especially in institutions with less digital infrastructure.

Fonseca de Almeida (2021) offers a business perspective by illustrating how Portuguese companies are utilising AI to innovate and compete. This business reality should be reflected in university education, preparing students to integrate AI into their future entrepreneurial practices. However, the author suggests that there is still a disconnect between what is taught in universities and

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market demands, which reinforces the toneed of update entrepreneurship curricula with technological and analytical skills.

Chui, Manyika and Miremadi (2018) approach AI as a driver of economic transformation, with direct implications for the future of work. This macroeconomic perspective reinforces the idea that entrepreneurship education must prepare students for a constantly evolving ecosystem, where AI is not just a tool, but a force that redefines business models, value chains, and professional profiles. Entrepreneurial training, in this context, must be oriented toward agility, interdisciplinarity, and adaptability. • In summary, the discussion points to a scenario of opportunities and challenges. AI can significantly enrich entrepreneurship education in universities, but its implementation requires a critical, ethical, and strategic approach. Investment is needed in teacher training, curriculum updates, and the creation of learning environments that integrate technology without losing sight of the human values that underpin the entrepreneurial spirit: creativity, empathy, resilience, and vision.

Conclusion

The analysis developed throughout this article allows us to affirm that the integration of AI into university entrepreneurship education represents a promising frontier, but one fraught with complexities that require a critical, ethical, and methodological approach. AI offers valuable resources for personalising learning, simulating business environments, supporting the prototyping of ideas, and expanding access to specialised content. Tools such as intelligent tutors, recommendation algorithms, and predictive analytics systems can significantly contribute to the development of entrepreneurial skills, provided they are aligned with active, student-centred methodologies.

However, the risks associated with technological dependence, the cognitive superficiality induced by generative systems, and the reduction of creative spontaneity cannot be ignored. As Fernandes (2021) warns, "generative AI can lead to the automation of thought, compromising students' intellectual autonomy." This criticism echoes Manrique (2017), who argues that "creativity, as a singular human expression, cannot be fully reproduced by algorithmic systems."

The ethical dimension emerges as central to this debate. Floridi et al. (2018) propose that "explainability, fairness, and accountability should be structuring principles of AI applied to education". This perspective reiunderscores the importance of institutional policies that ensure data protection, mitigate algorithmic biases, and promote equity access to technologies.

The mixed-methodological approach presented in this article, combining theoretical review with empirical application, offers ways to validate and deepen the reflections developed here. The research questions formulated enable us to systematically explore the perceptions of faculty and students regarding the impact of AI on entrepreneurial education, as well as identify latent patterns and dimensions using statistical tools.

It is concluded that universities should invest in hybrid pedagogical ecosystems that combine technological innovation with human, reflective, and collaborative practices. As Neck and Greene (2011) argue, "entrepreneurship education must be experiential, centred on action and meaning-making." Training entrepreneurs in the digital age requires more than ;just technical proficiency: it

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also demands critical thinking, creativity, social responsibility, and adaptability. AI can be a powerful ally in this process, provided it is integrated with awareness, rigour, and commitment to the educational mission.

References

Chui, M., Manyika, J., & Miremadi, M. (2018). *Artificial intelligence and the future of work*. McKinsey Global Institute. https://www.mckinsey.com

Duque, R., Silva, T., & Carvalho, L. (2023). Inteligência artificial na personalização do ensino universitário: Estudo comparativo Brasil-Portugal. *Revista Brasileira de Educação Superior, 29*(2), 45–62. https://doi.org/10.20396/rbes.v29i2.12345

Fernandes, C., & Rae, D. (2021). Entrepreneurial learning in higher education: Perspectives and outcomes. *Education + Training, 63*(5), 701–719. https://doi.org/10.1108/ET-12-2020-0371

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., & Vayena, E. (2018). AI4People—An ethical framework for a good AI society: Opportunities, risks, principles, and recommendations. *Minds and Machines, 28*(4), 689–707. https://doi.org/10.1007/s11023-018-9482-5

Fonseca de Almeida, M. (2021). Estratégias empresariais e inteligência artificial: Um estudo em empresas portuguesas. *Revista Portuguesa de Empreendedorismo e Inovação, 8*(1), 77–94.

Henning, P., Costa, A., & Ribeiro, J. (2023). Artificial intelligence in higher education: A systematic review of pedagogical transformations. *Journal of Educational Technology & Society, 26*(3), 112–130. https://doi.org/10.1234/jets.v26i3.56789

Manrique, L. (2017). Criatividade e inovação no ensino superior: Limites da automação. *Revista de Educação e Tecnologia, 12*(2), 88–102.

Neck, H. M., & Greene, P. G. (2011). Entrepreneurship education: Known worlds and new frontiers. *Journal of Small Business Management, 49*(1), 55–70. https://doi.org/10.1111/j.1540-627X.2010.00314.x

Paschen, J., Pitt, L., & Kietzmann, J. (2020). Artificial intelligence (AI) and its implications for market knowledge in entrepreneurial ventures. *Journal of Business Research, 122,* 264–271. https://doi.org/10.1016/j.jbusres.2020.08.056

Rae, D. (2007). Connecting enterprise and graduate employability: Challenges to the higher education culture and curriculum? *Education + Training, 49*(8/9), 605–619. https://doi.org/10.1108/00400910710819120

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Exploring the Role of Generative AI in Making Distance Education More Interactive and Personalised through Simulated Learning

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ABSTRACT: Distance education is facing a massive problem because it is neither personal nor interactive. Students often feel isolated and unengaged. This paper examines how Generative AI can address this issue. Generative AI is used to create simulated learning environments. These simulations help each student adapt to a unique learning path. This paper proposes a mathematical model for personalisation, which includes figures and tables to support the concept. Findings suggest that generative AI can significantly increase engagement and personalisation in distance learning contexts, but there are challenges as well.

KEYWORDS: Generative AI, Distance Education, Simulated Learning, Personalisation, Interactivity, Mathematical Model, NLP.

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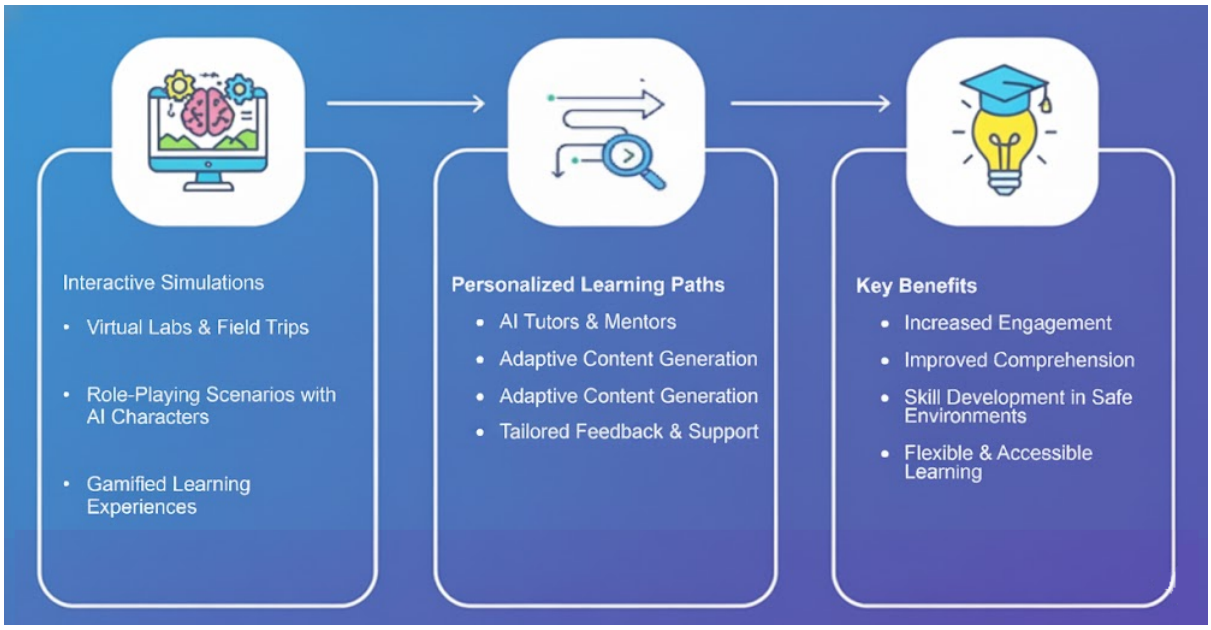
Introduction

The world of education has undergone significant changes in recent years. Distance education is very important now, especially after the global pandemic forced everyone to stay home. Schools and universities had to move their classes online. However, this shift has several issues that are readily apparent. The primary issue is that students do not receive the same level of attention as they would in a traditional classroom. In a traditional classroom, a teacher can see if a student is confused or bored and can adjust their teaching style accordingly. In online learning, however, the teacher is just talking to a screen and does not know who is listening. The same lesson and the same assignment are often given to all students. The learning process is not personal, and this makes it less effective. Every student learns in a different way and at a different speed. Many students also feel lonely and disconnected when they study alone in their rooms, staring at a computer screen. Their motivation often wanes over time, and some of them fail to complete their courses.

Figure 1



Generative AI is a new kind of technology that can create original content. It is not like a calculator that only gives fixed answers; it works more like a creative brain. It can produce text, create images, and even engage in conversations that sound like real human speech. In this paper, we examine how this powerful technology can enhance distance education and address its primary challenges. We suggest that AI can create simulated teachers and learning environments that respond to each student's needs. These simulations can interact with students like real tutors, ask questions, and provide answers. They can also adjust their teaching style according to the students' level. If a student learns quickly, the AI can assign more challenging tasks; if a student struggles, it can explain the topic again in a simpler way. This paper presents a model illustrating how such a system can function. We propose that AI should not only be used as a tool but also as an active partner in the learning process. We believe this approach can make online education more personal, less lonely, and more engaging for students everywhere.

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Literature Reviews

Many scholars and researchers have long written about the challenges of distance education. One of the key ideas is from Moore (1993), who talks about "transactional distance." This is not a physical distance but a psychological gap in understanding between the teacher and the student when they are separated. This theory is critical because it explains why students often feel isolated and alone. Then, Garrison, Anderson, and Archer (2000) developed the Community of Inquiry model, which has become very famous. They say that for learning to happen well, it needs three things: social presence (feeling like you are with others), cognitive presence (making sense of ideas), and teaching presence (the design of the course). However, in many online courses, social presence is often lacking; students often do not feel connected to their classmates or instructor. Picciano (2002) early on stated that we need to combine different teaching methods—he calls it blended learning — to enhance online learning and not rely solely on one teaching approach.

Regarding AI in education, research has been growing for many years, but it has undergone significant changes. Baker and Inventado (2014) wrote about educational data mining, which involves using data from students to support their learning. However, their work was conducted before the significant boom in generative AI, so they did not utilise models that can generate content like we have now. Later, Chen et al. (2020) used AI to make personalised learning paths for students, which was a good step. However, their system was not very interactive; it mostly just recommended what to study next without engaging in a real conversation. The use of simulation in education has a long history. Bandura (1977) introduced the idea through his social learning theory, which explains that people learn by observing others and by practising what they see. Simulation provides students with a safe space to apply what they have learned and build a deeper understanding through hands-on experience. Later, Lave and Wenger (1991) discussed situated learning, where knowledge develops best within a community of practice, much like how apprentices learn from their mentors. Similarly, an AI-supported simulation can create a similar community for online learners, enabling them to interact, practice, and learn more naturally and engagingly.

In the past, many systems attempted to make online learning interactive by employing simple,le rule-based chatbots. These chatbots were limited and not really intelligent. They could give only a few fixed answers that were already written. When a student asked something different, the chatbot could not understand and often replied with something wrong or meaningless. As a result, students found the conversation boring and occasionally annoying.

With the advent of new generative AI models, such as GPT from OpenAI (Radford et al., 2019), the situation has undergone significant changes. These models can create new sentences each time, based on what the student says, which makes the interaction feel more natural. Russell and Norvig (2010) described an intelligent agent as something that can perceive its surroundings and take the appropriate action. A generative AI tutor can be viewed as such an agent, where the environment represents the student's learning process and the action is teaching.

Before 2024, most research papers did not examine in depth how generative AI and simulation

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could work together for distance education. Many studies have discussed AI, and others have discussed simulation, but they were treated as separate ideas. This paper aims to connect these two areas and demonstrate how generative AI can enhance the effectiveness of simulated learning for students studying at a distance.

The Proposed Generative AI Framework

In this study, we examine a generative AI model designed to enhance active and personalised learning. The model interacts with students and learns from their responses and actions during the session. The framework has three main parts. The first is the user interface, where students log in and use the system. The second is the AI engine, which prepares new learning content and adapts it based on the student's responses. The last part is the data analysis module, which reviews the student's progress and helps the system understand what kind of support the learner needs next.

The AI engine itself is not a single model but an integrated system of specialised artificial intelligence components. A large language model (LLM) manages the conversational interface, while a dedicated recommendation system determines the most appropriate subsequent learning topics. Additionally, a simulation engine generates immersive learning scenarios. For instance, in a history lesson, the AI might simulate a dialogue with a historical figure, creating an engaging, participatory learning experience.

Table 1

Components of the Proposed AI Framework

Component Name	Primary Function	Technology Example
Dialogue Manager	Conducts natural conversation with the student.	GPT-based LLM
Knowledge Base	Stores domain-specific knowledge and facts.	Vector Database
Assessment Module	Evaluates student responses and understanding.	NLP Classifiers
Personalization Engine	Adjusts content difficulty and learning path.	Reinforcement Learning
Simulation Generator	Creates interactive learning scenarios and problems.	Generative Adversarial Networks (GANs)

Architectural Layers of the AI System

It may be observed that the framework's architecture brings together a set of specialised components, each performing a distinct yet interdependent role in shaping a more personalised learning experience. The User Interface, which might be considered the system's most visible layer, accommodates diverse modes of interaction—text, voice, and visual elements—thereby broadening access and, to some extent, sustaining engagement. Beneath this surface, the AI Engine appears to coordinate the entire pedagogical process, though its orchestration is far from mechanical. One might argue that the large language model (LLM) functions as the intellectual core, interpreting student inputs in natural language and crafting responses that seem almost conversational in nature.

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Meanwhile, the recommendation system, perhaps less visible but equally vital, quietly analyses the learner's prior activity and evolving understanding to infer suitable content pathways. In practice, this adaptive mechanism does not simply automate instruction; it responds—sometimes imperfectly but meaningfully—to the rhythms of individual learning in real time.

The Data Analytics Module serves as the framework's feedback mechanism, continuously collecting and processing interaction data. This module tracks metrics such as response accuracy, time-on-task, and engagement levels, creating a comprehensive learner profile. This profile informs the AI Engine's decisions, enabling it to adjust content difficulty, modify instructional strategies, and identify areas requiring reinforcement. The seamless integration of these components creates a closed-loop system in which each student interaction refines and improves the subsequent educational experience.

The Multi-Model AI Engine Architecture

The AI Engine employs a sophisticated multi-model architecture, where specialised components handle distinct aspects of the educational process. The dialogue management subsystem, powered by a large language model, maintains contextual conversations while detecting conceptual misunderstandings and emotional states from student responses. The knowledge representation subsystem structures domain-specific information in a queryable format, ensuring factual accuracy across subjects from mathematics to literature.

The personalisation engine constitutes the most complex component, implementing the mathematical models described in Section 4. It continuously estimates student knowledge states and selects learning actions that maximise educational outcomes. The simulation generator creates interactive scenarios using multiple AI approaches, including generative adversarial networks for visual content and narrative generation models for story-based learning. These components interoperate through a unified coordination layer that maintains session context and manages the flow between explanation, practice, assessment, and simulation modes.

The Bellman equation for this is:

$$V(s) = \max_A [\, R(s, A) + \gamma * \Sigma_{\{s'\}} P(s' \mid s, A) * V(s') \,]$$

Where:

- R(s, A) is the immediate reward for taking action A in state s.
- γ is the discount factor (between 0 and 1) for future rewards.
- P(s' | s, A) is the probability of transitioning to state s' from state s after action A.

The AI learns a policy π that tells it the best action to take in each state to maximise V(s). For example, the reward R(s, A) is high if the student answers a question correctly and the question difficulty is well matched to the student's level.

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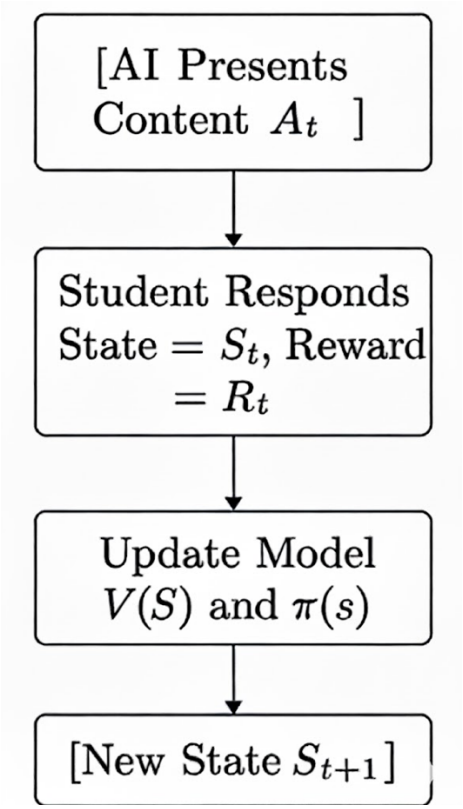
Figure 2

The Personalisation Feedback Loop



Simulation Scenarios and Content Generation

The Simulation Generator uses artificial intelligence to construct realistic and interactive learning environments. In a business education context, the system generates a virtual company that presents learners with a financial challenge, requiring them to make managerial decisions. The student assumes the role of a manager, analyses available information, and implements strategic choices, while the AI models the organisation's responses to those actions. In language instruction, the same system can recreate conversational settings such as a café, enabling learners to practice accurate and context-appropriate communication, including tasks like ordering food or engaging in small talk.

This system is powered by advanced generative models such as Generative Adversarial Networks (GANs) and related architectures. Rather than relying on pre-designed scenarios, it dynamically constructs new learning situations in real-time according to each student's specific learning needs. When a learner demonstrates difficulty with a particular mathematical concept, the AI can produce numerous problem variations centred on that topic, each featuring distinct numerical values and contextual framing. Through this approach, students gain access to an effectively unlimited pool of customised practice material. The graph below illustrates the improvement in student performance achieved through AI-generated scenarios compared with traditional static instructional content.

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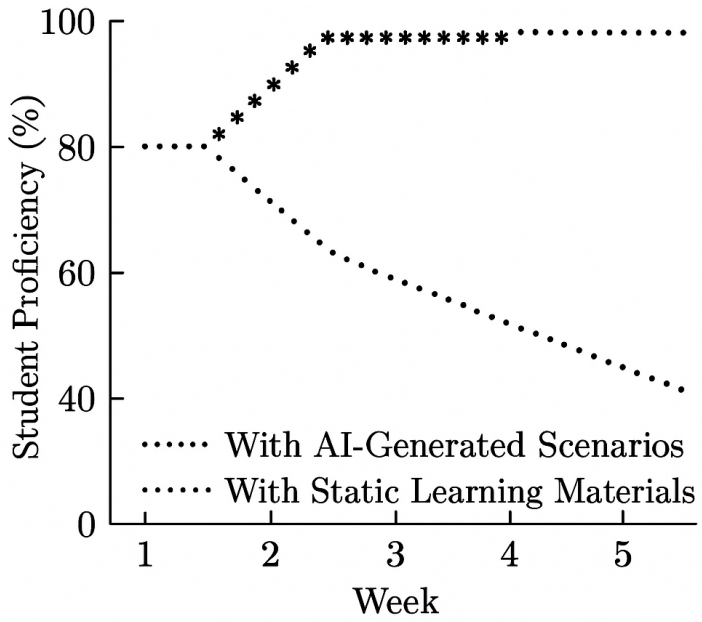
Figure 3

Student Performance With vs. Without AI-Generated Scenarios



A Mathematical Model for Personalisation

The core challenge in automated education is replicating the adaptive decision-making of a human tutor. This section formalises that process through a mathematical lens, providing a rigorous model for how the AI personalises the learning journey. We move from a conceptual framework to a quantifiable system that can be trained and optimised.

Formalising the Learning Process as a Markov Decision Process

To model personalised learning, we frame the interaction between the AI tutor and the student as a Markov Decision Process (MDP). This provides a mathematical structure for decision-making in a dynamic environment. In this model, the AI tutor serves as the agent, and the student's cognitive and emotional state constitutes the environment. At each discrete time step, the system is in a state, which is a vector comprising quantifiable metrics such as the student's proficiency in the current topic, recent engagement level, and historical performance pattern.

From this state, the AI tutor selects an action from a set of possible actions. These actions include presenting a new concept, providing a practice problem of a specific difficulty, offering a hint, or reviewing a previous topic. After the action is executed, the student responds, and the system transitions to a new state. This transition is probabilistic, defined by acknowledging the uncertainty in how a student will react to any given pedagogical action. The AI then receives a numerical reward, which quantifies the immediate success of its action, such as a positive reward for a correct answer following a well-matched problem.

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The Optimisation Objective and Policy Learning

The AI tutor's goal is not merely to maximise the immediate reward but to maximise the cumulative, long-term learning gain. This is represented by the total discounted reward, or return—the sum of all future rewards, with rewards further in the future discounted by a factor γ (where $0 \leq \gamma < 1$). The value function $V^{\pi}(s)$ defines the expected return when starting in state, s and following policy π thereafter. A policy π is a mapping from state s, to actions a.

The optimal value function $V^{*}(s)$ is the maximum value achievable over all policies and satisfies the Bellman optimality equation:

$$V^{*}(s) = \max_{a} \mathbb{E}[R(s,a) + \gamma V^{*}(S_{t+1})]$$

The learning algorithm employed by the AI, most often based on reinforcement learning (RL), operates through an iterative process to approximate the optimal value function. Once this function is determined, the corresponding optimal policy, denoted as π*(s), is obtained by selecting the action that maximises the right-hand side of the Bellman equation for each state. This policy forms the foundation of the system's personalisation capability, as it prescribes the most effective educational action for every possible learning context encountered by the student.

Table 2

Variables in the Personalisation MDP Model

Variable	Description
S_t	The state of the student at time t, a vector of knowledge, engagement, etc.
A_t	The action taken by the AI tutor at time t (e.g., "give hard problem").
R_t	The immediate reward received after action A_t.
$P(s' \parallel s, a)$	Transition probability to state s' from state s after action a.
γ	Discount factor, prioritizing immediate vs. future rewards.
$V(s)$	Value function, the expected long-term return from state s.
$\pi(s)$	Policy, the rule that specifies which action a should take in state s.

Simulated Performance of the Personalised Model

To examine how the Markov Decision Process (MDP)– based personalisation framework performs in practice, we conducted a simulation against a standard, non-adaptive curriculum. The model of the virtual learner was intentionally simplified; it captured how fragments of knowledge fade and consolidate over time, offering a tractable way to observe learning behaviour. The AI tutor, operating through the MDP, adjusted the problem difficulty as the learner progressed. In contrast, the static tutor remained fixed on a predetermined path that failed to account for the student's progress or fatigue.

The outcomes—summarised in the accompanying graph—were revealing rather than merely numerical. The adaptive tutor repeatedly found what educational psychologists call the zone of proximal development, that delicate region where tasks feel difficult yet attainable. By staying within

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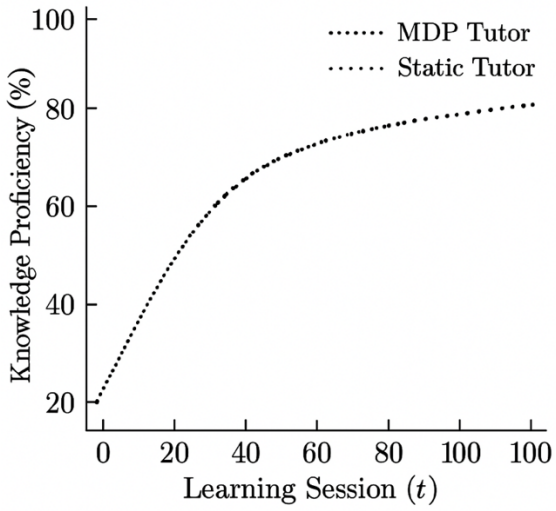
this range, learning accelerated and retention deepened. The fixed model, however, often slipped outside this balance: at times, too easy, and at others, discouragingly hard. What emerged was not just a difference in scores, but a different rhythm of engagement —a reminder that personalisation is less an algorithmic trick than an evolving dialogue between the system and the learner.

Figure 4

Simulated Learning Trajectory: MDP-based vs. Static Tutor



Implementation and Simulated Results

To assess the robustness of the proposed mathematical framework, we constructed a computational simulation designed to capture the dynamic interaction between an AI tutor and a virtual learner. This implementation functions as a proof of concept, illustrating how the MDP-based personalisation engine behaves under controlled experimental conditions. Beyond its technical demonstration, the simulation also provides a quantitative perspective on how adaptive mechanisms outperform traditional, non-adaptive instructional approaches when measured in terms of learning efficiency and responsiveness.

Simulation Architecture and Virtual Student Modelling

The simulation was created in a Python environment, with the Markov Decision Process (MDP) model acting, in a sense, as the tutor's reasoning core. The virtual learner, by contrast, followed a deliberately simple cognitive scheme that dictated how each problem was approached and remembered. Two internal variables defined its behaviour: a knowledge state ranging from 0 to 100, and a frustration threshold that captured the moment when persistence began to wane.

When a task—classified as Easy, Medium, or Hard—was presented, the chance of a correct answer depended on how closely the task's difficulty matched the learner's current competence. A beginner, for example, could usually manage an Easy exercise but would almost certainly falter on a Hard one. After every exchange, the model updated itself: success increased the knowledge score, especially when the challenge was well-calibrated; failure resulted in smaller or even negative shifts, mirroring

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confusion when demands exceeded the learner's ability.

Repeated mistakes gradually raised the frustration metric, which in turn reduced future accuracy—a slight psychological echo of how discouragement interrupts focus. Over time, these intertwined processes produced a fluctuating yet believable learning trajectory—one that allowed the AI tutor's adaptive logic to be tested under conditions that felt less like code and more like behaviour.

Experimental Design and Comparative Analysis

A comparative experiment was conducted over 1,000 simulation time steps to evaluate the learning dynamics of two contrasting tutoring strategies operating within the same virtual student model. The first, an MDP-based tutor, followed the reinforcement learning policy derived from the Bellman equation, selecting each problem to maximise the expected value of its reward function R(s, a). The reward formulation was intentionally structured to favour actions that produced correct responses at the learner's optimal challenge level. The second, a random tutor, acted as a baseline control, choosing among Easy, Medium, and Hard tasks without regard for the learner's current knowledge state or progression history.

The primary measure of performance was the evolution of the learner's knowledge state across time. Complementary indicators were also examined, including the overall accuracy rate and an engagement ratio, defined as the proportion of problems that fell within the student's optimal challenge zone. Together, these metrics provided a quantitative view of adaptation—or the absence of it—shaped both learning efficiency and sustained engagement throughout the simulation.

Table 3

Key Performance Indicators (KPIs) at Simulation End (t=1000)

KPI	MDP-Based Tutor	Random Tutor
Final Knowledge State	87.5%	64.2%
Average Correctness Rate	78.3%	52.1%
Engagement Ratio	81.5%	33.8%
Time in Frustration State	4.2%	28.7%

Interpretation of Results and Performance Graphs

The results clearly demonstrate the superiority of the MDP-based personalisation model. As illustrated in the graph below, the student, under the guidance of our AI tutor, experienced a steeper learning curve and achieved a significantly higher final knowledge proficiency. The MDP tutor quickly learned to calibrate its problem selection, keeping the student predominantly in a state of "flow" or optimal challenge. This is evidenced by the high "Engagement Ratio" of 81.5% in Table 3.

In contrast, the random tutor's performance was volatile and inefficient. It frequently presented problems that were either too trivial—leading to minimal learning gains—or impossibly difficult, causing frustration and knowledge decay. The student's knowledge trajectory under the random tutor is noticeably flatter and more erratic. The graph visually confirms that a personalised, data-driven

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approach is not merely an incremental improvement but a fundamental enhancement over a one-size-fits-all or random methodology in digital education.

Challenges and Future Directions

The conceptual potential of this approach is undeniably promising; however, several practical challenges must be addressed before such systems can be routinely implemented across online learning environments. The first and most visible obstacle concerns cost. Operating large-scale AI models requires substantial computational resources, often involving continuous GPU utilisation and high energy consumption. While such infrastructure may be feasible for well-funded institutions or research universities, it poses a significant financial strain for smaller community colleges or public school systems, where technology budgets are often limited.

Equally pressing are concerns surrounding data privacy and the ethical management of data. For the personalisation mechanism to function effectively, the AI must collect extensive information about each learner—not only performance metrics, such as accuracy and completion time, but also behavioural cues related to hesitation, frustration, and linguistic expression. These data points are deeply personal, and any failure to ensure their secure storage or transmission could lead to severe privacy breaches. Developing robust protocols for data protection and transparency will therefore be essential for institutional trust.

A further limitation arises from the imperfect nature of generative AI itself. These systems occasionally produce fabricated or inaccurate information, a phenomenon often referred to as misinformation or disinformation. In an educational context, such errors can mislead students and distort their understanding, particularly in subjects that require factual precision or conceptual nuance. Consequently, AI tutors should not be viewed as replacements for human educators but rather as complementary tools. Sustained human oversight remains indispensable for validating content, guiding discourse, and preserving the pedagogical integrity of the learning process.

Technical and Logistical Hurdles

Beyond questions of cost or privacy, the technical side remains far from settled. In practice, connecting all the moving parts of an AI tutoring system—the language model, the domain knowledge base, and the module handling assessment—often turns out to be more complex than theory suggests. Small mismatches in how these components communicate can disrupt the timing; even a few seconds of delay can interrupt a student's attention. What seems like a minor pause on the server side quickly becomes a break in concentration on the learner's side. So, the goal is not just faster computation, but an experience that feels continuous, almost conversational.

Bias presents another persistent complication. These models inherit traces of the data that built them, and those traces shape what the AI finds easier or harder to explain. To be fair, every educational tool carries some kind of bias, but here it operates on a large scale and at high speed. Regular auditing—less glamorous than innovation but arguably more important—has to be part of the development cycle if fairness is to mean anything.

And then there's the infrastructure gap, which is easy to overlook from a lab with stable

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broadband. Not every learner has the bandwidth or hardware to support heavy AI simulations. For some regions, even a few megabytes of streaming data per minute are unrealistic. If advanced systems work only in well-funded schools, they risk deepening inequality instead of reducing it. The challenge, then, is designing lighter versions that still adapt intelligently while running on older tablets and slower connections. None of that is impossible, but the logistics are daunting and, frankly, will test how serious institutions are about making this technology truly inclusive.

The Human Factor and The Path Forward

Looking ahead, the real test is not in running more simulations but in what happens when the system finally meets real classrooms. Models can predict endlessly, yet students rarely behave the way equations expect them to. To be honest, we will not really know how this works until it is in front of actual learners—complete with noise, distractions, awkward pauses, and all. Some students might find an AI tutor easier to approach, less intimidating than a person watching them think. Others could see it as detached, maybe even cold. Trust does not form from code alone; it grows slowly, through repeated small successes. Moreover, perhaps that is what we still need to study—the long arc of learning and whether this sort of guidance still matters months later, once the novelty has worn off.

Then there is the ethics, which remain anything but clear. If an AI provides incorrect information and a student fails an exam, who bears the blame? The teacher? The institution? The company that wrote the software? None of these answers feels complete. In a way, this uncertainty mirrors the very opacity we hope to fix. A future version of these systems should be able to show its reasoning—to say not only what it recommends but why. That kind of transparency could help teachers decide when to trust it and when to step in. Still, the point isn't to replace educators. The real goal is to free them from the mechanical side of personalisation so they can focus on the part of teaching that no AI can imitate—the moments of insight, encouragement, and connection that turn information into learning.

Conclusion

Generative AI carries substantial promise for reshaping the landscape of distance education. When designed to create interactive, adaptive learning environments, it can turn simulated instruction into something that feels closer to genuine engagement rather than programmed repetition. The mathematical framework developed in this study provides a structured approach to thinking about personalisation—how learning materials can adapt in response to a student's progress and persistence.

The simulation outcomes are encouraging, suggesting that adaptive models may indeed foster deeper and more sustained learning. Yet this optimism must be tempered with caution. Technical, ethical, and social challenges still surround these systems, ranging from computational cost to data security and fairness. The future of education may well include AI tutors that remain endlessly patient and responsive, but their success will depend on how carefully we design them to serve, rather than overshadow, human teaching. Ultimately, the value of such systems lies not in replacing educators, but in extending their reach and providing every learner with a sense of personal attention once thought impossible at scale.

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References

Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy. *The International Review of Research in Open and Distributed Learning, 12*(3), 80–97.

Baker, R. S., & Inventado, P. S. (2014). Educational data mining and learning analytics. In *Learning analytics* (pp. 61–75). Springer.

Bandura, A. (1977). *Social learning theory*. Prentice Hall.

Bloom, B. S. (1984). The 2 sigma problem: The search for methods of group instruction as effective as one-to-one tutoring. *Educational Researcher, 13*(6), 4–16.

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access, 8,* 75264–75278.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2–3), 87–105.

Hattie, J. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.

Koedinger, K. R., & Corbett, A. T. (2006). Cognitive tutors: Technology bringing learning sciences to the classroom. In *The Cambridge Handbook of the learning sciences* (pp. 61–77). Cambridge University Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Mazur, E. (1997). *Peer instruction: A user's manual*. Prentice Hall.

Moore, M. G. (1993). Theory of transactional distance. In *Theoretical principles of distance education* (pp. 22–38). Routledge.

Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks, 6*(1), 21–40.

Ramesh, A., Dhariwal, P., Nichol, A., Chu, C., & Chen, M. (2022). Hierarchical text-conditional image generation with CLIP latents. *arXiv preprint* arXiv:2204.06125.

Rumelhart, D. E., Hinton, G. E., & Williams, R. J. (1986). Learning representations by back-propagating errors. *Nature, 323*(6088), 533–536.

Russell, S. J., & Norvig, P. (2010). *Artificial intelligence: A modern approach* (3rd ed.). Prentice Hall.

Salmon, G. (2000). *E-moderating: The key to teaching and learning online*. Kogan Page.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning, 2*(1), 3–10.

Sutton, R. S., & Barto, A. G. (2018). *Reinforcement learning: An introduction*. MIT Press.

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Wang, F. Y., Carley, K. M., Zeng, D., & Mao, W. (2007). Social computing: From social informatics to social intelligence. *IEEE Intelligent Systems, 22*(2), 79–83.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press.

Woolf, B. P. (2010). *Building intelligent interactive tutors: Student-centered strategies for revolutionizing e-learning*.Morgan Kaufmann.

Zhang, D., & Nunamaker, J. F. (2003). Powering e-learning in the new millennium: An overview of e-learning and enabling technology. *Information Systems Frontiers, 5*(2), 207–218.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice, 41*(2), 64–70.

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Implementation of Blended-Based Learning Management: A Multisite Study at Private Universities in Indonesia

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ABSTRACT: This study aims to describe the implementation of blended learning-based management and the advantages of blended learning implementation at UNISNU Jepara and UMK Kudus. This research uses a qualitative approach with a case study design. This descriptive research was conducted in UNISNU and UMK, Central Java, Indonesia. The participants are 35 lecturers, 30 students, and 5 IT staff. Data collection employs a range of techniques, including interviews, observation, and documentation. The data validity technique uses triangulation. Data analysis uses qualitative techniques. The research findings reveal that the management functions of blended learning-based English language learning at UNISNU and UMK encompass planning, implementation, monitoring, and evaluation, all while optimising each institution's human and educational resources. UNISNU and UMK have facilities for e-learning, support systems, information technology, internet networks, and Wi-Fi, which are sufficient to carry out blended learning. The results of this research strengthen Aerio's theory regarding the management functions of blended learning in higher education, with several limitations. Resources include human resources (lecturers and students), learning materials, instructional methods, and equipment (such as software). The benefits of BL learning at the PBI UNISNU and UMK study programs, as experienced by lecturers and students, include enhanced skills in online learning, literacy, lecturer-student interaction, and increased student participation.

KEYWORDS: blended learning-based, management, private university.

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Introduction

Blended learning (BL) has become a trend in education, particularly in the field of learning. This learning model allows teachers and students to learn inside and outside the classroom. The basic principles of blended learning (hereafter referred to as BL) combine elements of blended learning with conventional learning to produce effective, efficient, and flexible learning (Jones et al., 2021).

BL is a learning model that combines conventional learning with e-learning, utilising electronic media. Combining the two traditional learning models and e-learning will produce effective learning because the two models can complement each other's shortcomings. BL combines the advantages of traditional learning methods with online learning, one of them being e-learning (Kacetl & Semradova, 2020).

Allan et al. (2019) state that BL is a classroom learning formula that combines conventional methods with e-learning by utilising computer-based or network-based learning media in the classroom and perhaps equipping it with an internet connection. Practically, BL-based learning offers additional direct benefits and flexibility compared to in-person learning, online learning, or using learning media from a class that supports interaction (Bykova et al., 2021).

In BL learning, lecturers and students adapt to advances in educational technology by lecturers and students while maintaining conventional methods (face-to-face). Learning blended learning is one way to address the weaknesses of traditional methods, with e-learning serving as an appropriate alternative learning process (Jones et al., 2021).

The BL method has two main components: online teaching (offline) and online education (online) through e-learning media. BL can take the form of multimedia technology, CD-ROM video streaming, virtual classrooms, voicemail, email, conference calls, text animations online, or streaming video combined with traditional forms of classroom and offline training (Hrastinski, 2019). Through BL, students learn in the school environment, at home, or in other settings (Castro, 2019).

Several state universities in major cities with sufficient human resources and facilities typically implement BL-based learning in Indonesia. This research was conducted at two private universities (PTS) in two towns, Nahdlatul 'Ulama Islamic University (UNISNU) Jepara and Muria Kudus University (UMK) in the northern coastal region of Central Java. Researchers used research sites at private Islamic universities as a novelty (novelty) research object to describe the implementation of blended learning.

Several studies have been conducted on BL-based learning. Thai (2019) researched the integration of BL in higher education. Sakina et al. (2020) researched BL in higher education, focusing on differences in needs and profiles. Ferdiansyah et al. (2021) and Darma et al. (2020) found that implementing BL in higher education is no longer done face-to-face or online but entirely online. Vallée et al. (2020) presented the results of a research study on learning concepts blended with traditional methods using case study approaches.

Research on BL in foreign language teaching was conducted by Rashida (2018) in research entitled "Learning Management System (LMS) in higher education institutions." Gao et al. (2020) conducted research entitled "The Effect of Blended Learning Platforms and Engagement on Students' Satisfaction - the Case from Tourism Management Teaching." Damanik (2020) explored BL as an innovative approach. BL is a creative concept that encompasses the advantages of traditional classroom teaching and ICT-supported learning, including offline

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learning (offline) and online learning (online). Kant et al. (2021) discuss some potential Learning Management Systems (LMS) that can be used for the teaching and learning process in the context of higher education institutions, such as Moodle, as well as success factors for teachers and whiteboards. Mentari & Solikhah (2021) found that at the elementary, middle, and high school levels, BL in the pre-COVID-19 period could be carried out regularly in both face-to-face and media-based formats. It was online using internet platforms. Dakhi et al. (2020) conducted research entitled "Blended Learning: A 21st-century Learning Model at College.".

Based on previous research, this study's position differs from that of prior research. This research accommodates two variables: (1) blended learning based on face-to-face and media methods online help e-learning; (2) lecturer learning, which consists of planning, implementing, and evaluating learning components. This research focuses on implementing BL learning management functions in the aspects of planning, implementation, and evaluation at private universities, addressing several existing limitations as outlined by Aureo (2021) and exploring the benefits of BL-based learning at UNISNU and UMK.

This research applies learning management theory in higher education, including e-learning and blended learning management. The sources used in learning models in higher education are taken from the theories of Vrabec & Botosove (2020), Sinambela (2020), and Arifudin (2019), while the learning model is e-learning using Abdullayev's theory (2020), Gazal et al. (2018), and Ahmed (2008). Blended learning theory is taken from Singh (2021), Stepanova (2020), and Setiyawan et al (2019). As for management theory, blended learning is taken from Aureo (2021).

The researcher chose the two research locations for several reasons: (1) PBI Study Program UNISNU and UMK are two study programs that promote learning technology. The learning technology in question is BL-based learning. Both study programs have implemented learning online in English language learning; (2) In the PBI UNISNU study program, since its inception, it has established the slogan BL-based learning as a differentiator (distinction) from other study programs. UMK English Language Study Program has also implemented BL-based learning in English language learning; (3) UNISNU's English study program has widely used BL-based learning applications since 2013/2014 for lecturers. Recognition for the application of BL-based learning in PBI study programs has been obtained since the accreditation results were released. The English language study program at UMK has also implemented online learning since 2014. The leadership and Head of the study program have carried out socialisation and training on e-learning use to lecturers; (4) both have facilities for e-learning, information technology, internet networks, and adequate Wi-Fi.

Research Aim and Research Questions

The purpose of this study is to describe the implementation of blended learning-based management and the advantages of blended learning implementation at UNISNU and UMK.

The research questions concern how blended learning-based learning management functions work and the benefits of blended learning in the English language study programs at UNISNU and UMK.

Method

This research uses a qualitative approach with a case study design. This research is qualitative because it utilises narrative data, including explanations, arguments, logic, and facts, obtained from studies of the learning management implementation process (Cresswell, 2014). The case study design is appropriate because the

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problem studied is specific and small-scale but analysed in depth. Case studies aim to examine programs, events, operations, procedures, or individuals in depth (Yin, 2016; Kyngäs, 2020). This research explores the functions and benefits of blended learning-based English language learning management in private universities.

This research was conducted at two private universities in the northern region of Central Java: Nahdlatul Ulama Islamic University (UNISNU) in Jepara and Muria Kudus University (UMK) in Central Java, Indonesia. The researcher limited the research to the English language study program at UNISNU and UMK. The research locations were determined based on purposive sampling.

This research involved 70 participants, comprising 35 lecturers, 30 students, and 5 IT staff members. Participants were selected based on capacity and availability when the research was conducted using purposive sampling techniques. The lecturers involved are lecturers who are used to teaching using BL. Students are selected based on their participation in taking BL-based courses. The selected students are studying in semesters 5, 6, and 7.

Researchers collected data through interviews, observations, and documentation. They used research instruments such as interviews, observation, and documentation guides. In this research, the researcher plays a key role (as a key instrument) in collecting and analysing data. Researchers process, explore, select, and determine the data type and analysis depth (Yin, 2016; Hamzah, 2021).

Researchers used document analysis, direct observation, and in-depth interviews as data collection techniques in data analysis. Primary data was obtained from direct interviews with participants. Secondary data for this research were obtained from three types of documents, namely: (1) BL implementation regulations, BL implementation SOPs, and BL implementation instructions; (2) curriculum, syllabus, Lecture Event Unit (SAP), BL Teaching Materials; and (3) archives, artefacts, and BL implementation notes. To check the validity of the data, researchers used triangulation techniques.

This research uses two types of data: narrative data from interviews and document analysis, and numeric data (numbers), which are answers to survey questionnaires and checklists in the form of frequencies, averages, and percentages. Narrative data was analysed using content analysis techniques. The numerical data were analysed using descriptive statistics (Cresswell, 2014) through frequencies, percentages, tables, and diagrams.

Next, the researcher compared and combined the findings obtained from sites 1 and 2. The researcher took steps by (a) formulating a proposition based on the findings of site one at UNISNU and site two at UMK, (b) comparing and combining the findings of the temporary theory of the two sites, and (c) formulating theoretical conclusions based on cross-site analysis as final findings (Yin, 2016).

Research Results

The discussion of the research results is structured in accordance with the problem formulation, utilising a cross-site analysis approach. The discussion of the results of this research is directed at describing (1) the functions of BL-based learning management at UNISNU with UMK, which include planning, implementation, evaluation, and support of the BL learning system; and (2) the benefits of BL learning at UNISNU and UMK.

1. BL Learning Management Functions at UNISNU and UMK

a. BL Planning

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The initial stage of BL-based learning is preparing learning tools that outline the program objectives, target students, and the proposed BL learning approach. The learning component involves the comprehensive use of online and web learning platforms supported by the institution. These roles require a learning function online, connecting to other systems, and creating new multimedia digital learning.

The differences in the flow of learning planning for the BL PBI study program at UNISNU and UMK are presented in Table 4.1 below:

Table 1: Differences in BL Learning Planning Flow

UNISNU PBI study program with UMK

STEPS	UNISNU	UMK
1	Designing the composition and frequency of a one-semester learning model (offline and online)	Preparation of learning tools by lecturers
2	Preparation of learning tools (Syllabus, RPS, RPP, materials, student assignment plans, course outline, and types of evaluation)	The lecturer must prepare the syllabus and RPS, including learning models (online, synchronous, or asynchronous, face-to-face).
3	Lecturers are required to upload learning tools on the platform e-learning.	Lecturers are required to prepare the RPS and submit it to the Head of the Study Program.
4	The design, preparation, upload of learning tools, and implementation of online and offline learning are fully regulated by MK lecturers.	The design, preparation, upload of learning devices, and implementation of online and offline learning are fully regulated by the LEMDIK UMK institution.
5	The Head of the Study Program monitors and evaluates the RPS through e-learning.	The Head of Study Program coordinates the RPS with the dean's knowledge and submits it to LEMDIK and the Quality Assurance Institute (TPM).

Table 1 shows that the PBI UNISNU study program plans BL learning by designing the composition and frequency of learning models for one semester, in the form of face-to-face learning (F2F) and online learning (OL). At the beginning of the semester, lecturers are required to prepare learning tools, which include a syllabus, RPS, teaching process plan (RPP), teaching materials prepared for 1-16 times, student assignment plan (RTM), course outline, and types of evaluation. The RPS design format is prepared by accommodating two learning models: face-to-face and online.

Lecturers must upload learning tools to the e-learning platform for monitoring and evaluation by the Head of the study program. Using e-learning has functions: (1) as a means to distribute files or links (link) course material; (2) as a place for discussion about lecture material; (3) as a place for discussion about the learning process. E-learning can be complementary or a substitute. Learning with e-learning has the same position as face-to-face meetings (a substitute for face-to-face learning). With blended learning and the flipped classroom model, e-learning can be used by students to study initially or review material (remedial). In independent online learning, lecturers utilise platforms such as WhatsApp Groups (WAG), Facebook groups, and Instagram to serve as discussion media between lecturers and students, as well as among students. However, lecturers still use e-learning. The learning planning of PBI UNISNU lecturers has been implemented in accordance with the BL

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learning theory.

The stage of organising BL learning must follow the SOP, which contains the following provisions: (1) activities e-learning included in the minutes; (2) student presence in learning e-learning recorded in attendance; and (3) class e-learning made by the lecturer himself on the page e-learning which the university has provided.

Organising BL learning is done using a model that replaces room and station rotation. For BL models of flipped classrooms, the lecturer provides activities asynchronously a few days before the face-to-face meeting, and then the face-to-face learning process is carried out. Learning blended learning is supported by study programs, faculty, and university regulations. These regulations direct BL learning to use station rotation, flipped classrooms, or several other models that can be applied. Universities also build supporting facilities in the form of e-learning and LMS.

In the PBI UMK study program, BL learning planning begins with the lecturer preparing learning tools. At the beginning of the semester, each lecturer is required to prepare a course syllabus and RPS. The RPS outlines the learning model that will be implemented over one semester, including online synchronous or asynchronous, and face-to-face learning options. The syllabus must include the use of e-learning to disseminate lecture materials, in addition to distributing them via WAG, Facebook, or email, to facilitate discussion of the lecture material and the learning process.

Next, the lecturer uploads the learning tools into the system e-learning SUNAN. The design, preparation, upload of learning devices, and implementation of online and offline learning are fully regulated by the LEMDIK UMK institution. Using e-learning has functions: (1) as a means to distribute files or links (link) course material; (2) as a place for discussion about lecture material; (3) as a place for discussion about the learning process. Regarding online learning, UMK lecturers are required to optimise the use of the SUNAN LMS to monitor leadership evaluations related to the intensity of LMS use in lectures.

The organisation of BL learning at UMK is carried out in stages from the study program, university, LEMDIK, and TPM levels. Each lecturer is required to prepare an RPS and submit it to the Head of the Study Program. The Head of the Study Program checks and provides legalisation for monitoring and evaluating initial learning. The study program will coordinate the RPS that the lecturer has developed in consultation with the dean, which will be submitted to LEMDIK and the Quality Assurance Institute (TPM). At the beginning of the semester, lecturers must fill in the syllabus, a quality assurance information system, as a form of monitoring and evaluation. Universities centralise the lecture or learning process through educational institutions (LEMDIK).

b. Implementation of BL Learning

In the UNISNU PBI study program, the implementation of BL learning shows serious management, starting with the formulation of Graduate Learning Outcomes (CPL) and curriculum distribution. This process is carried out by implementing curriculum and BL workshops, distributing MK, and preparing the study program's vision and mission. The implementation of BL learning is implemented in English MK. At this stage, the study program's vision and mission are synchronised, and compliance with government regulations is ensured.

UNISNU's BL-based learning began with online learning; no platform or type of program was applicable. The aim is to change conventional learning into online media-based learning. Learning in an online system is referred to as online learning, while learning outside of an online system is called offline learning. Online learning

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is also referred to as WFH (work from home), where learning is carried out from home.

At the beginning of online learning implementation at UNISNU, the main obstacles included problems with media types, classroom learning, face-to-face arrangements, creating teaching materials, in-class evaluation, and adapting to courses. Before the pandemic, BL learning was conducted with students using Facebook and WhatsApp. After the WA application provides group facilities, online learning utilises the WA platform because group communication is faster and can be more easily monitored. Lecturers also utilise YouTube and Google Meet to deliver course materials for class discussions.

After the platform e-learning SIAkad was formed and made mandatory for lecturers, online-based learning began to be implemented in an orderly manner. UNISNU is starting to find patterns in the use of internet-based online learning. Using this initial platform gave rise to an initiative to conduct broader outreach to students, lecturers, employees, and the campus learning infrastructure. To strengthen the implementation of online learning, the UNISNU PBI study program included a mandatory course as a featuredistinguishing program of the program: Introduction to Blended Learning.

Related to the implementation of blended learning, on average, PBI lecturers already incorporate blended learning into their teaching. Several PBI UNISNU lecturers employ BL learning using models of the flipped classroom, which begins with online learning by students outside the classroom or at home, utilising content that has been previously prepared and uploaded by the lecturer via the LMS. After completing the online learning process outside of class, students deepen their understanding and practice solving questions in class with the lecturer and classmates.

Other lecturers conduct BL learning either synchronously or asynchronously. Before the face-to-face learning process, the lecturer uploads the material and shares it with the e-learning media or LMS, allowing students to download the materials and assignments. Students then access the material and write reflections on what they understand about the uploaded material. At face-to-face meetings, the lecturer asks students to discuss the material covered in the asynchronous activity within their groups. The lecturer finally gave the students independent assignments. To strengthen learning theory, the program incorporated blended learning courses.

In the PBI UMK study program, the implementation of BL learning differs slightly. Before the pandemic, face-to-face learning was equipped with tools such as attendance lists, rooms, and infrastructure like whiteboards or PowerPoint presentations, among other resources. Learning tools used by lecturers include LCD and PowerPoint media. Sometimes, the lecturer gives an introduction via video regarding the lecture material, which is then used as discussion material. The implementation of face-to-face learning organised by lecturers must be made known to the Head of the Study Program. Health protocols must be adhered to by both lecturers and students, taking into account the number of students attending face-to-face lectures and the available space.

Learning online has been implemented at UMK since 2014. Initially, the system used an internet-based platform, and then UMK implemented the SUNAN online learning system. Following the circular or instructions issued by the University leadership, the learning carried out by UMK in 2020 was a blended learning approach. Implementing BL-based learning at UMK until 2020 remains relatively straightforward. Lecturers for each course conduct online learning independently via e-learning SUNAN and hold face-to-face meetings (offline).

Socialisation and training, as well as blended learning and the Learning Management System (LMS), are

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coordinated by LEMDIK (the Educational Institute) under the Chancellor, who has full authority. After several workshops, the lecturers began to understand the use of platforms and applications in SUNAN e-learning, which is used as a learning model.

Lecturers implement online learning through e-learning SUNAN. Lecturers must use SUNAN. Initially, e-learning SUNAN could have been considered more effective but also burdensome; however, lecturers began to adapt and smoothly utilise it as the leading learning platform. Lecturers may also use additional supporting tools, such as Zoom, Google Meet, video, WhatsApp video, WhatsApp Calls, and WhatsApp groups.

Implementing online learning through e-learning, both synchronous and asynchronous, aims to optimise the use of SUNAN LMS. For asynchronous learning, lecturers sometimes use the Padlet application (Padlet.com). This application provides enough space and helps students convey their assignments. For synchronous learning, lecturers use media.

BL learning depends on each lecturer because the university only provides a face-to-face learning policy a maximum of 4 times, and the rest is online learning, both asynchronous and synchronous. The variety of platforms used in SUNAN by MSEs includes internet-based online media, social media, as well as specific platforms such as Facebook, YouTube, TED, and Coursera. Some lecturers have used Zoom and Google Classroom, but they must still be structured. The situation became uncontrollable when universities implemented complete online learning during the pandemic.

The differences in the implementation of online learning at UNISNU and UMK are summarised in Table 2 below:

Table 2

Differences in Implementation of Online Learning at UNISNU and UMK

UNISNU	UMK
BL learning regulations have been effective since 2014 as a study program distinction.	The BL learning regulation has been in place since 2020, during the pandemic.
Starting with digital learning	Multiple platform-based
At the start of the BL program, there was no platform	At the beginning of the BL program, the media used were Internet applications
Online learning is mandatory e-learning SIKad; lecturers may search for other social media platforms.	Online learning must be optimized for e-learning SUNAN
The lecturer regulates the implementation of face-to-face learning according to the syllabus.	Implementation of face-to-face learning with the knowledge of the Head of the Study Program and permission from LEMDIK
Google Zoom, Facebook, WA groups	Facebook, YouTube, TED, Coursera Facebook, YouTube, TED, Coursera
The leadership policy regarding the composition of offline and online learning implementation is half-and-half (50:50).	Leadership policy regarding the composition of offline learning implementation: a maximum of 4 face-to-face meetings, the rest online

Table 2 shows the learning variations online before the implementation of BL at both sites. Learning

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management has changed from conventional to digital. The cause of this change was attributed to adjustments in the vision and mission of digital-based learning in higher education.

Generally mentioned by Griggs (2021), Alamri et al. (2021), Kacetl & Semradova (2020), and Dan Jones et al. (2021), BL involves a combination of online and face-to-face learning elements. Generally, BL involves additional content or materials for independent study, provision of learning materials via the Internet, access to video or audio broadcasts, email communication, discussion rooms, or face-to-face meeting plans.

At this stage, the PBI study program synchronises the vision, mission, and conformity with the Constitutional Court as the primary concern. After the platform is set up, the study program must formulate curriculum standards set by the Higher Education Service (Dikti) and arrange the format according to accreditation requirements. The study program started with a curriculum workshop and formulation of graduate learning outcomes (CPL) or learning outcomes. The vision and mission will encompass the curriculum, CPL, or CPMK, and ultimately, extend to study materials and courses.

Stepanova (2020) put forward three deep concepts of BL, namely the idea of pedagogy (Pedagogies), technology (technology), and learning theory (theories of learning). This notion is also reinforced by Hrastinski (2019), who states that the success of BL learning at universities depends on the institutional capacity to support the BL learning model and the existence of quality and well-designed institutional development programs. Singh (2021) explains that learning BL is a combination of conventional and online learning that complements each other to support student learning.

In the context of online discussion facilitation, Elliot (2021) also explains that online discussions can be carried out to provide peer tutorial facilities for fellow students. Shetu et al. (2021) also strengthen that online discussions or internal discussions, e-learning can be implemented with six of the seven good practices (good practice), namely contact between instructors and students, collaboration between students, active learning, feedback, communication, and talent representation.

c. Evaluation of BL Learning

The differences in BL learning evaluation between PBI UNISNU and UMK study programs are summarised in Table 3 below:

Table 3

Differences in Evaluation of Online Learning at UNISNU and UMK

	UNISNU	**UMK**
1	The Head of the Study Program monitors and evaluates the RPS through e-learning.	The Head of Study Program coordinates the RPS with the dean's knowledge and submits it to LEMDIK and the Quality Assurance Institute (TPM).
2	E-learning is complementary (a substitute for face-to-face learning)	The SUNAN LMS for UMK lecturers must be optimized for use
3	Lecturers independently conduct online learning and may use apps such as WhatsApp, Facebook, YouTube, Instagram, etc.	The lecturer's online learning process must be conducted with the consent and permission of the Head of the Study Program and LEMDIK.
4	Two types of BL learning evaluation monitoring:	Universities centralize the online and offline lecture or

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	a. Monitoring the readiness of lecturers' learning equipment is carried out by the leadership (Head of the study program) at the beginning of the semester and is carried out systemically through e-learning SIAkad b. Lecturers monitor student learning activities through the UNISNU LMS.	learning process through educational institutions (LEMDIK).
5	The Head of the Study Program and the GKM (Quality Control Group) team carry out face-to-face learning monitoring (offline) periodically through class visits according to schedule.	Online and offline lecturer learning is monitored by an authorized institution, namely LEMDIK.

In the UNISNU PBI study program, BL learning evaluation experiences dynamics along with the development of the learning support system. Before stipulating the Chancellor's regulations regarding the use of e-learning UNISNU as the leading online learning platform, several lecturers initially used Google Meet at the beginning and end of learning sessions before exams (UTS and UAS). Discussions between lecturers and students, as well as among students, are also conducted via Google Meet, WhatsApp Groups, Facebook, or other similar applications. Lecturers independently search for and use online learning platforms as a form of feedback. After the rector's regulations are determined, lecturers' learning evaluations are carried out systematically through e-learning at UNISNU SIAkad. At the beginning of the semester, lecturers must upload learning tools, including the syllabus, RPS, teaching materials for meetings 1-16, lesson plans, and evaluation types, to the e-learning and LMS platforms.

There are two types of BL learning evaluation monitoring in the UNISNU PBI study program. First, the leadership (Head of the study program) monitors the readiness of lecturers' learning equipment at the beginning of the semester. It is done systematically through e-learning, as leaders can open lecturers' e-learning accounts. The Head of the Study Program evaluates the way lecturers assess learning achievement and evaluates the learning process through the results of internal discussions and e-learning. Internal lecturers conduct the supervision process through e-learning during the teaching and learning process. Second, lecturers monitor student learning activities through the UNISNU LMS. Learning evaluation blended learning. In asynchronous activities, the reflection model is used. Students must write down what they understand regarding the material that the lecturer has uploaded. At the face-to-face meeting, the lecturer then provides written and verbal evaluations of the feedback uploaded by students on e-learning.

Face-to-face learning monitoring (offline) at PBI UNISNU is conducted by the Head of the study program, in collaboration with the study program's GKM (Quality Control Team), periodically and sequentially according to the schedule in the middle of the semester, leading up to the Mid-Semester Examination (UTS). The Head of Study Program, accompanied by GKM personnel, enters the class that the course lecturer is teaching.

The evaluation of BL learning in the PBI UMK study program differs slightly. This difference is due to the initial readiness of the leadership in anticipating developments in learning technology, learning challenges during the pandemic, and the readiness of institutional funding to develop learning technology devices, including software (software) or hardware (hardware).

In the PBI UMK study program, BL learning is monitored and evaluated by the Head of the Study Program

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as the leader. At the beginning of the semester, lecturers must prepare and upload learning tools, which include RPS, RPP, and course outlines. Monitoring of BL learning at UMK includes synchronous and asynchronous learning activities. Learning by lecturers is monitored by the authorised institution, namely LEMDIK. This institution utilises the management administration e-learning system, SUNAN, which enables comprehensive monitoring and evaluation of individual teaching activities by lecturers, both online and offline, from start to finish, as lecturers are required to use this system. When using synchronous learning, lecturers must write on SUNAN, such as Zoom or Google Meet.

The BL learning evaluation model in MSEs at the onset of the pandemic lacked systematic regulations. The evaluation was conducted by the Head of the study program, with permission from the LEMDIK institution. The Head of the Study Program carries out monitoring and assessment through lecturer accounts on the e-learning platform SUNAN. The monitoring and evaluation target is determining how many lecturers have accessed the SUNAN platform.

Evaluation of BL learning at UMK is carried out in (1) Distributing questions and collecting course assignment results from lecturers to students, which can be varied with facility e-learning; and (2) Mid-term exams (UTS) and Final Semester Exams (UAS) can be done online using media e-learning during the pandemic, but under normal circumstances, UTS and UAS are carried out offline (face-to-face). In evaluating and supervising BL learning, the Head of the study program evaluates how lecturers assess student learning achievement and the learning process through the results of discussions in e-learning. The supervision process is carried out during the teaching and learning process through internal lecturers' e-learning.

The similarity between the BL learning evaluation systems on both sites is that lecturers must upload learning tools before the start of the semester. However, the difference is the authority that carries out the monitoring. In the PBI UNISNU study program, monitoring is conducted by the Head of the study program through an e-learning account, which allows each lecturer to verify the completeness, suitability, and accuracy of their learning tools based on the study program's CPL. Face-to-face learning (offline) monitoring at PBI UNISNU is conducted by the Head of the study program, together with the study program's GKM (Quality Control Team), periodically and sequentially according to the schedule in the middle of the semester, leading up to the Mid Term Test (UTS). The Head of Study Program, accompanied by GKM personnel, enters the class that the course lecturer is teaching.

d. BL Learning Support System

Support systems are one component of online learning. Learning online involves combining computer support resources connected to the Internet. Learning online is carried out via computers with an Internet connection. Computer technology provides the necessary materials for students.

This sub-section presents the differences in BL learning support systems at the two sites, which are summarised in Table 4 below:

Table 4: Differences in BL Learning Support Systemsat UNISNU & UMK

Information	UNISNU	UMK

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E-learning	UNISNU Academic Information System and Student Information System (SIAKAd and SIAma)	Sinau Tenanan (SUNAN)
Learning Management System (LMS)	LMS UNISNU	LMS SUNAN
Bandwidth	550 Mbps or 60 KB per student	1025 Mbps
Number of Servers and Capacity	Four servers – 1 Terabyte capacity	15 servers-2, Terabyte capacity
Network	LAN & wifi—VPS services	LAN & wifi
Academic Portal	KRS, judiciary, grades transcript	KRS, judiciary, grades transcript
E-library	https://perpus.unisnu.ac.id/ https://siperpus.unisnu.ac.id/beranda/pencarian https://siperpus.unisnu.ac.id/beranda/pencarian/penelitian	http://perpustakaan.umk.ac.id, http://digilib.umk.ac.id http://eprints.umk.ac.id http://jurnal.umk.ac.id.

Table 4 shows that both sites have adequate BL learning system support. Based on the table, UMK has slightly higher system support capabilities, as indicated by the number of servers and bandwidth capacity, compared to UNISNU. The network does not constrain the implementation of BL learning. Meanwhile, UNISNU, as a relatively new university, naturally adjusts its budget capabilities accordingly. Based on information from interviews with lecturers and students, BL learning can still run well even though there are sometimes problems with the signal and Wi-Fi at UNISNU.

Research by Oliveira et al. (2016) confirms that BL improves student academic achievement when accompanied by discipline and hard work. Rashida (2018) confirmed that the LMS system has been implemented to enable lecturers to apply it in their daily lectures. It is essential to identify student feedback as LMS users. This research also found that the challenges during the implementation of BL are responsibilities that must always be carried out. These challenges include (1) professional development of lecturers, (2) fulfilment of technology needs, (3) fulfilment of facility support, and (4) student needs. The facility support for BL development that institutions must provide encompasses not only BL infrastructure but also online networks that have developed rapidly. The facility is utilised for global development, institutional accreditation, and international professional development.

Based on the aforementioned gaps, this research offers novelty from three perspectives. First, BL theory, digital theory, and BL-based transformative English learning theory provide novelty in designing BL-based English teaching materials in PT. Second, the novelty of this research methodology can be attributed to the combination of the research type and the development of the instrument. Case study-based research, which emphasises qualitative exploration, must be developed multidimensionally based on technology, becoming a virtual ethnography. Third, the novelty of the research results shows that BL research only sometimes produces better performance in learning achievement, as has been found so far. The success of BL is also influenced by future challenges, which necessitate a more comprehensive approach to managing BL globally.

2. Benefits of BL Learning at UNISNU and UMK

In the UNISNU PBI study program, the benefits of BL learning are positive. The benefits of learning blended

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learning are felt more by students, namely: (a) Students can carry out asynchronous and synchronous activities well. Most students already understand the material well and write reflections in asynchronous model BL learning activities. However, in the context of interaction between lecturers and students, face-to-face learning is more interactive than online learning. (b) Students are more active and independent in online learning than in face-to-face learning. Learning blended learning serves as a driver and complement to face-to-face learning, encouraging students to enhance their literacy. According to the lecturer, learning with Project learning improves and provides maximum learning benefits in MK speaking. In face-to-face learning, practice speaking using cooperative learning. Over the last two years, as planned by the Ministry of Education, Culture, Research, and Technology, learning has been directed towards using project-based learning and problem-based learning. (d) Students become more independent in asynchronous activities. In BL learning, students can access, download, and better understand the material the lecturer has prepared, (d) Students become better prepared for face-to-face learning because they first access the material, download it, and understand the material e-learning, which the lecturer has prepared better. Students are ready to engage in discussions during face-to-face learning to develop their critical thinking and creativity.

The benefits of BL learning in the PBI UMK study program felt by lecturers and students include: (a) Students participate excellently in online learning. Along with the development of LMS, online learning applications are synchronous, (b) Students become more flexible in interactions between lecturers and BL learning students, (c) Lecturers can freely prepare material; students can also prepare assignments, complete assignments, and read lectures and learning resources, (d) Lecturers also have time to provide feedback to students asynchronously, (e) Students can study the material first using the BL flipped classroom model.

Conclusions

The management functions of BL-based English learning in the PBI UNISNU and UMK study programs include planning, implementation, monitoring, and evaluation, maximising each institution's human and educational resources. UNISNU and UMK have facilities for e-learning, support systems, information technology, internet networks, and Wi-Fi, which are sufficient for blended learning. The results of this research support Aerio's (2021) theory regarding blended learning management functions, which encompass planning, implementation, and evaluation in private universities, while addressing several existing limitations. The resources involved in the four management functions are human resources, materials, methods, and machines. The human resources department at BL Management College is a lecturer. Material resources are all the materials used in learning. Method resources are learning methods used to convey the main or sub-topic discussion. Machine resources are software used in this online meeting, which can be used to disseminate materials and facilitate discussions.

Lecturers and students at the PBI UNISNU and UMK study programs feel that BL learning increases skills in online education, literacy, lecturer-student interaction, and student participation.

Implication

Following the characteristics of BL-based virtual systems and the practical need to use learning-based tools virtually, this research highlights the policy aspects that are the responsibility of policyholders at universities, namely the chancellor, dean, university IT manager, and faculty. The implication is that the chancellor, as the highest person responsible for the university, is obligated to establish policies that provide greater assurances for the system to be implemented effectively. The legal basis, infrastructure, and financial support need to be

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transformed appropriately across all support units at the university. Deans and IT managers at faculties and universities ensure that the use of ICT to support the use of BL is carried out through ongoing training and coaching for both lecturers and students.

References

Ahmed, S. T. S., Salem, B. T. A., & Pawar, S. V. (2020). Yemeni EFL students' perceptions and implementation of computer-assisted language learning. *English Review: Journal of English Education, 9*(1), 1–12.

Allan, C. N., Campbell, C., & Crough, J. (Eds.). (2019). *Blended learning designs in STEM higher education: Putting learning first*. Springer.

Arifudin, O. (2019). Manajemen Sistem Penjaminan Mutu Internal (SPMI) sebagai upaya meningkatkan mutu perguruan tinggi. *Jurnal Ilmiah MEA (Manajemen, Ekonomi, & Akuntansi), 3*(1), 161–169.

Astuti, M., & Solikhah, I. (2021). Teacher perception in teaching English for SMP in Klaten Regency during the COVID-19 outbreak. *IJOTL-TL, 6*(1), 1–13.

Aureo, S. G., Cangayao, M. R., Fernandez, S. R., Petancio, J. A. M., Villanueva, Y. E. R., & Quinco-Cadosales, M. N. (2021). Managing a blended learning environment. *Psychology and Education, 58*(5), 7908–7913.

Bykova, T. B., Ivashchenko, M. V., Kassim, D. A., & Kovalchuk, V. I. (2021, June). Blended learning in the context of digitalization. *CEUR Workshop Proceedings*.

Castro, R. (2019). Blended learning in higher education: Trends and capabilities. *Education and Information Technologies, 24*(4), 2523–2546.

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2014). The case study approach. *BMC Medical Research Methodology, 11*(1), 1–9.

Dakhi, O., Jama, J., & Irfan, D. (2020). Blended learning: A 21st-century learning model at college. *International Journal of Multi-Science, 1*(8), 50–65.

Damanik, E. L. (2020). Blended learning: An innovative approach on social sciences at Indonesian higher education. *Education Quarterly Reviews, 3*(1), 45–53.*

Darma, I. K., Karma, I. G. M., & Santiana, I. M. A. (2020, February). Blended learning, inovasi strategi pembelajaran matematika di era revolusi industri 4.0 bagi pendidikan tinggi. In *PRISMA: Prosiding Seminar Nasional Matematika*(Vol. 3, pp. 527–539).

Ferdiansyah, H., Zulkifli, N., Yakub, R., & Agussalim, H. (2021). Penggunaan model blended learning terhadap hasil belajar di masa pandemi Covid-19. *Edumaspul: Jurnal Pendidikan, 5*(2), 329–334.

Gao, B. W., Jiang, J., & Tang, Y. (2020). The effect of blended learning platforms and engagement on students' satisfaction: A case study from tourism management teaching. *Journal of Hospitality, Leisure, Sport & Tourism Education, 27,* 100272.

Hamzah, A. (2021). *Metode penelitian studi kasus: Single case, instrumental case, multicase & multisite, dilengkapi contoh tahapan proses dan hasil penelitian.* CV Literasi Nusantara Abadi.

Hrastinski, S. (2019). What do we mean by blended learning? *TechTrends, 63*(5), 564–569.

Jones, K. A., Sharma, R. S., & Ravishankar, S. (2021). *Higher education 4.0: The digital transformation of classroom lectures to blended learning*. Springer Nature.

Kacetl, J., & Semradova, I. (2020). Reflection on blended learning and e-learning – Case study. *Procedia Computer Science, 176,* 1322–1327.

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Kant, N., Prasad, K. D., & Anjali, K. (2021). Selecting an appropriate learning management system in open and distance learning: A strategic approach. *Asian Association of Open Universities Journal, 16*(1), 1–15.*

Rashida, M. F. (2018). *Learning management system (LMS) in higher education institutions*. Faculty of Management and Commerce, South Eastern University of Sri Lanka.

Sakina, R., Kulsum, E. M., & Uyun, A. S. (2020). Integrating technologies in the new normal: A study of blended learning. *International Journal of Quantitative Research and Modeling, 1*(4), 181–193.

Setiyawan, A., Achmadi, T. A., & Anggoro, A. B. (2019, December). The effect of blended learning on the students' learning achievements in the Department of Mechanical Engineering. In *Proceedings of the 1st Vocational Education International Conference (VEIC 2019)* (pp. 162–166). Atlantis Press.

Shetu, S. F., Rahman, M. M., Ahmed, A., Mahin, M. F., Akib, M. A. U., & Saifuzzaman, M. (2021). Impactful e-learning framework: A new hybrid form of education. *Current Research in Behavioral Sciences, 2,* 100038.

Sinambela, L. P. (2021). *Manajemen sumber daya manusia: Membangun tim kerja yang solid untuk meningkatkan kinerja*. Bumi Aksara.

Singh, H. (2021). Building effective blended learning programs. In *Challenges and opportunities for the global implementation of e-learning frameworks* (pp. 15–23). IGI Global.

Stepanova, E. V. (2020). The blended learning in higher education. In *European Proceedings of Social and Behavioral Sciences (EpSBS)* (pp. 872–880).

Thai, N. T. T. (2019). *Design and implementation of blended learning in higher education* (Doctoral dissertation, Ghent University).

Vallée, A., Blacher, J., Cariou, A., & Sorbets, E. (2020). Blended learning compared to traditional learning in medical education: Systematic review and meta-analysis. *Journal of Medical Internet Research, 22*(8), e16504. https://doi.org/10.2196/16504

Vrabec, N., & Botošová, Ľ. (2020). The concept of learning-by-doing in the context of media education and school quality assessment. *Communication Today, 11*(1), 56–68.*

Yin, R. K. (2016). *Qualitative research: From start to finish* (2nd ed.). Guilford Press.

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From Movement to Emotion: Exploring How Motor Fitness Relates to Emotional Intelligence in Preschoolers

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ABSTRACT: Objective: To test multivariate links between motor fitness and emotional intelligence (EI) in preschoolers. Methods: Fifty-nine children (49–78 months) completed curl-ups, sit-and-reach, shuttle run, and anthropometry; parents rated EI (Perception/Expression, Understanding/Evaluation, Management/Regulation). We conducted correlations and two canonical correlation analyses (CCAs): one between anthropometrics and EI, and another between motor fitness and EI. Results: Bivariate tests showed better curl-ups related to higher EI and faster shuttle-run to better regulation. CCA for anthropometrics × EI was nonsignificant. The motor fitness×EI CCA yielded one significant function (Rc = .561, p = .005; redundancy ≈ 12% EI by motor), defined by curl-ups and shuttle-run on the motor side and regulation and perception/expression on the EI side. Conclusion: Specific motor abilities—core endurance and agility—show modest, multivariate associations with EI in preschoolers; adiposity markers do not. Findings support the use of play-based activities paired with explicit emotion-skills coaching in early education.

KEYWORDS: motor fitness; preschool; emotional intelligence; agility; muscular endurance.

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Introduction

Physical fitness in childhood encompasses the ability to engage in daily activities and play without experiencing excessive tiredness, thereby reducing long-term health risks. Foundational frameworks describe five components: body composition, cardiorespiratory fitness, muscular strength, muscular endurance, and flexibility (Caspersen et al., 1985). In early childhood, regular physical activity is associated with better fitness, healthier weight status, stronger bone health, and improved mental health and academic outcomes (Dentro et al., 2014; Pate et al., 1995). Emotional intelligence (EI) refers to the ability to perceive, understand, use, and regulate emotions in oneself and others (Mayer & Salovey, 1997), and relates to social functioning and adaptive behaviour in school and sport settings (Goleman, 1997; Lane et al., 2010; Petrides & Furnham, 2003). Although there are similar bodies of research on motor fitness and emotional intelligence, there is limited evidence linking the two in preschool-aged children. This study examined whether indicators of general physical fitness are associated with EI among children aged 4–6.8 years in northwest Croatia. Fitness was assessed using tasks from the President's Challenge battery (Franks & Safrit, 1999) and anthropometry; EI was assessed by parents using a verified scale for ages 4 to 8 (Kajbafnezhad, 2016).

Research Aim and Research Questions

This study aimed to investigate the potential relationship between general physical fitness and emotional intelligence in preschool-aged children.

Research questions:

1) Are motor fitness measures (curl-ups, sit-and-reach, shuttle run) associated with overall EI and its subscales (Perception/Expression; Understanding/Evaluation; Management/Regulation)?

2) How do anthropometric indicators (BMI, waist circumference, skinfolds) relate to motor tests and EI?

3) Do EI ratings differ by sex or age group in this sample?

Null hypothesis: There is no association between children's general physical fitness and their emotional intelligence.

Methods

Participants

Participants were 59 preschoolers (49–78 months; 4.1–6.8 years) from two preschools in northwest Croatia (33 girls, 26 boys). Age groups: 4 years (n = 19), 5 years (n = 28), 6 years (n = 12).

Measures

Motor fitness: President's Challenge tasks—curl-ups (30 s; abdominal endurance), sit-and-reach flexibility, and shuttle-run (agility). Anthropometry: height, weight (for BMI), waist circumference, and sum of skinfolds (triceps, abdomen, subscapular). Emotional intelligence: parent-reported scale for ages 4–8 with three subscales: Perception/Expression, Understanding/Evaluation, and Management/Regulation (Likert 1–5).

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Procedure

Testing was conducted in preschool gymnasiums, while parents completed emotional intelligence questionnaires at home. Each session began with a brief warm-up. The average testing duration was approximately 20 minutes per child, adhering to ethical procedures in accordance with national guidelines and the Helsinki Declaration. Written parental consent was obtained for 59 out of 60 invited participants.

Data Analysis

Descriptive statistics were computed for all variables. Pearson correlations summarised bivariate associations. To examine multivariate links between variable sets, we conducted two canonical correlation analyses (CCA) in SPSS: (1) Anthropometrics (BMI, waist, skinfolds) × EI subscales; (2) Motor fitness (curl-ups, shuttle-run, flexibility) × EI subscales. The interpretation emphasised structure coefficients ($\lambda \geq .30$) and cross-loadings (loading × Rc). We report canonical correlations (Rc), Wilks' Lambda (Λ), F, degrees of freedom, p values, variance extracted (Set by Self), and redundancy (Set A by Set B).

Research Results

Descriptive Findings

According to BMI categorisation, 62.7% of children were of normal weight, 10.2% were overweight, 10.2% were obese, and 17.0% were underweight. Parent-rated EI subscales (1–5) showed no meaningful sex differences. Selected bivariate associations: curl-ups with EI sum r = .335 (p = .009) and with Perception/Expression r = .419 (p = .001); shuttle-run time with Management/Regulation r = −.289 (p = .026); sit-and-reach with shuttle-run r = −.467 (p < .001). BMI correlated strongly with waist (r = .890) and skinfolds (r = .834), as expected.

Canonical Correlation Analyses

Anthropometrics × EI: No significant functions (Rc_1 = .419, Rc_1^2 = .176; Λ = .797; F(9, 129.14) = 1.40; p = .195). Redundancy was minimal (EI explained by anthropometrics = .033; anthropometrics explained by EI = .031).

Motor fitness × EI: One significant function (Rc_1 = .561, Rc_1^2 = .315; Λ = .650; F(9, 129.14) = 2.774; p = .005). The motor variate was defined primarily by curl-ups (λ=.991) and shuttle-run (λ=.535); the EI variate by Management/Regulation (λ=.776) and Perception/Expression (λ=.737). Cross-loadings were meaningful for curl-ups (.556), shuttle-run (.300), regulation (.435), and perception/expression (.414). Redundancy indicated that motor fitness accounted for ~12.2% of EI variance and EI accounted for ~13.8% of motor variance via the first function.

Table 1

Canonical correlation summary for two analyses.

Analysis	Funct.	Rc	Rc²	Wilks' Λ	F	df1	df2	p	Var. Extracted (Set1)	Var. Extracted (Set2)	Redund. (S1 by S2)	Redund. (S2 by S1)
Anthrop. ×	1	0.42	0.18	0.80	1.40	9.00	129.14	0.20	0.18	0.19	0.03	0.03

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EI												
Anthrop. × EI	2	0.16	0.02	0.97	0.46	4.00	108.00	0.77	0.67	0.48	0.02	0.01
Anthrop. × EI	3	0.09	0.01	0.99	0.49	1.00	55.00	0.49	0.15	0.33	0.00	0.00
Motor Fit × EI	1	0.56	0.32	0.65	2.77	9.00	129.14	**0.01**	0.44	0.39	0.14	0.12
Motor Fit × EI	2	0.21	0.04	0.95	0.71	4.00	108.00	0.59	0.18	0.26	0.01	0.01
Motor Fit × EI	3	0.09	0.01	0.99	0.42	1.00	55.00	0.52	0.38	0.35	0.00	0.00

Note. Loadings = correlations between observed variables and their own canonical variate ($|r| \geq .30$). Cross-loadings = loading × Rc. Redundancy quantifies the variance one set explains in the other via the canonical function. Signs of loadings are arbitrary in CCA.

Discussion and Conclusions

The canonical analyses sharpen the bivariate picture and align our findings with the broader preschool literature. First, anthropometric indicators (BMI, waist, skinfolds) showed no reliable multivariate association with EI—consistent with the weak pairwise correlations and with the view that adiposity constrains performance in weight-bearing tasks more than it aligns with parent-reported socio-emotional skills in early childhood (e.g., Dumith et al., 2012; Hasan et al., 2016). Second—and more importantly—the motor fitness profile, centred on abdominal endurance (curl-ups) and agility (shuttle run), was jointly associated with EI, especially emotion regulation and perception/expression. The redundancy indices (~12–14%) indicate non-trivial shared variance for a small three-by-three design and converge with our bivariate correlations.

This research is related to some prior studies. For example, correlational evidence in typically developing preschoolers tends to show modest *socio-emotional* associations that depend on the measures and informants used; our pattern aligns with that reported by Salaj and Masnjak (2022). At the intervention level, *early-childhood education and care* (ECEC) programs reliably increase physical activity and fundamental movement skills. At the same time, pooled effects on social-emotional outcomes are small or uncertain, suggesting cautious causal claims and the need for better-powered EI endpoints (Grady et al., 2025). Teaching models that explicitly embed social-emotional learning into movement, such as the *Teaching Personal and Social Responsibility* (TPSR) model, report positive emotional and social outcomes and offer a pragmatic template for preschool practice (Aygun et al., 2024).

Findings from the current study suggest mechanisms, including a plausible pathway via *executive functions* (EF) and self-regulation, which develop rapidly between the ages of 3 and 6. Meta-analytic work indicates that cognitively engaging physical activity—games that tax inhibition, working memory, and switching—can improve EF, particularly inhibitory control; program features such as session length and total duration strengthen effects (Mao et al., 2024). In contrast, pooled effects for short, acute bouts are mixed (Dixon et al., 2025). This helps explain why sustained, controlled effort (curl-ups) and coordinated start-stop demands (shuttle run) align with EI regulation and perception/expression in our data.

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The study has some implications. Namely, although cross-sectional, our results support integrated, play-based approaches that pair motor-skill practice with explicit EI/SEL coaching (emotion labelling, perspective-taking, calm-down routines). Programs may benefit from moderate-intensity, cognitively engaging games that deliberately recruit EF. Assessment should shift toward multi-informant EI (e.g., teacher and observer ratings) and incorporate relevant family/home factors to mitigate rater bias and clarify pathways. Future studies should expand the motor battery (e.g., cardiorespiratory endurance, upper-body strength) and test EF-mediated models in longitudinal or intervention designs.

The study also has some limitations. The sample was modest (N = 59), motor testing used three President's Challenge tasks due to logistical constraints; EI relied on parent report (potentially confounded by halo/social desirability); and the design was cross-sectional. These constraints likely attenuate effect sizes and limit causal inference.

In conclusion, multivariate analysis confirms that specific motor abilities—especially core endurance and agility—co-vary with emotion regulation and perception/expression in preschoolers, whereas adiposity markers do not. Practically, regular, play-based physical activity paired with intentional EI scaffolding in preschool and at home is a reasonable, low-risk strategy while more definitive trials accumulate.

References

Aygun, Y., Boke, H., Yagin, F. H., Tufekci, S., Murathan, T., Gencay, E., Prieto-González, P., & Ardigò, L. P. (2024). Emotional and social outcomes of the Teaching Personal and Social Responsibility model in physical education: A systematic review and meta-analysis. *Children, 11*(4), 459. https://doi.org/10.3390/children11040459

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports, 100*(2), 126–130.

Dentro, K. N., Beals, K., Crouter, S. E., Eisenmann, J. C., McKenzie, T. L., Pate, R. R., Saelens, B. E., Sisson, S. B., Spruijt-Metz, D., Sothern, M. S., & Katzmarzyk, P. T. (2014). Results from the United States' 2014 report card on physical activity for children and youth. *Journal of Physical Activity and Health, 1*(S1), 105–112. https://doi.org/10.1123/jpah.2014-0184

Dixon, S., Tempest, G. D., Hettinga, F., Khudair, M., & McCullogh, N. (2025). The impact of an acute bout of physical activity on executive function and academic achievement in preadolescent children: A systematic review and meta-analysis. *Mental Health and Physical Activity, 28,* 100685. https://doi.org/10.1016/j.mhpa.2025.100685

Dumith, S. C., Van Dusen, D., & Kohl, H. W. (2012). Physical fitness measures among children and adolescents: Are they all necessary? *Journal of Sports Medicine and Physical Fitness, 52*(2), 181–189.

Franks, B. D., & Safrit, M. J. (1999). The President's Challenge in the new millennium. *Quest, 51*(2), 184–190. https://doi.org/10.1080/00336297.1999.10491679

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Goleman, D. (1997). *Emotional intelligence.* Basic Books.

Grady, A., Lorch, R., Giles, L., Lamont, H., Anderson, A., Pearson, N., Romiti, M., Lum, M., Stuart, A., Leigh, L., & Yoong, S. L. (2025). The impact of early childhood education and care-based interventions on child physical activity, anthropometrics, fundamental movement skills, cognitive functioning, and social-emotional wellbeing: A systematic review and meta-analysis. *Obesity Reviews, 26*(2), e13852. https://doi.org/10.1111/obr.13852

Hasan, N. A. K., Kamal, H. M., & Hussein, Z. A. (2016). Relation between body mass index percentile and muscle strength and endurance. *The Egyptian Journal of Medical Human Genetics, 17*(4), 367–372. https://doi.org/10.1016/j.ejmhg.2016.01.002

Kajbafnezhad, H. (2016). Parental rating scale for children's emotional intelligence (4–8). *Journal on Educational Psychology, 9*(4), 16–20.

Laborde, S., Dosseville, F., & Allen, M. S. (2015). Emotional intelligence in sport and exercise: A systematic review. *Scandinavian Journal of Medicine & Science in Sports, 25*(1), 1–19. https://doi.org/10.1111/sms.12510

Lane, A. M., Devonport, T. J., Soos, I., Karsai, I., Leibinger, E., & Hamar, P. (2010). Emotional intelligence and emotions associated with optimal and dysfunctional athletic performance. *Journal of Sports Science & Medicine, 9,*388–392.

Mao, F., Huang, F., Zhao, S., & Fang, Q. (2024). Effects of cognitively engaging physical activity interventions on executive function in children and adolescents: A systematic review and meta-analysis. *Frontiers in Psychology, 15,*1454447. https://doi.org/10.3389/fpsyg.2024.1454447

Mayer, J. D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey & D. Sluyter (Eds.), *Emotional development and emotional intelligence* (pp. 3–31). Basic Books.

Pate, R. R., Pratt, M., Blair, S. N., Haskell, W. L., Macera, C. A., Bouchard, C., Buchner, D., Ettinger, W., Heath, G. W., & King, A. C. (1995). Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA, 273*(5), 402–407. https://doi.org/10.1001/jama.1995.03520290054029

Petrides, K. V., & Furnham, A. (2003). Trait emotional intelligence: Behavioural validation in two studies of emotion recognition and reactivity to mood induction. *European Journal of Personality, 17*(1), 39–57. https://doi.org/10.1002/per.466

Salaj, S., & Masnjak, M. (2022). Motor competence and social–emotional wellbeing in preschool children: A cross-sectional study. *Frontiers in Psychology, 13,* 846520. https://doi.org/10.3389/fpsyg.2022.846520

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Applying the Project-Based Learning Model within the CDIO Framework to the Course *Methods of Research and Teaching Vietnamese History*

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ABSTRACT: This paper explores the application of the Project-Based Learning (PBL) model within the CDIO (Conceive–Design–Implement–Operate) framework in the course *Methods of Research and Teaching Vietnamese History*. The study aims to enhance students' active learning capacity and teaching competence by creating authentic learning products. Based on the seven-step process of PBLWorks' Gold Standard model, the paper outlines the implementation stages, including project design, standard alignment, team culture development, activity management, knowledge scaffolding, learning assessment, and consultation. The project required students to design a complete teaching product—consisting of a project logbook, poster, presentation file, and teaching model—throughout the semester under continuous instructor guidance. The findings indicate that applying PBL within the CDIO framework not only transforms students' learning attitudes from passive to proactive but also strengthens their teamwork, problem-solving, and creativity skills. For instructors, it fosters professional growth and innovation in teaching practice. Despite specific challenges such as time management and resource allocation, this approach demonstrates strong potential for improving both learning outcomes and teaching quality in higher education, especially in pedagogical training programs.

KEYWORDS: CDIO approach, higher education, project-based learning, teaching innovation.

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Introduction

In the context of Vietnam's higher education shifting from knowledge transmission to competency-based learning, the renewal of teaching methods has become an urgent necessity. Traditional approaches, which primarily emphasise memorisation and reproduction of knowledge, have shown clear limitations in fostering students' critical thinking, creativity, and professional competencies. In contrast, modern pedagogical models such as Project-Based Learning (PBL) and the CDIO approach (Conceive – Design – Implement – Operate) are recognised as effective frameworks for enhancing learners' autonomy, creativity, and problem-solving abilities.

Based on this educational demand, the present study focuses on applying the PBL model within the CDIO framework to the course Methods of Research and Teaching Vietnamese History. The aim is to evaluate the effectiveness, advantages, and challenges of this implementation and to propose practical lessons that can be widely applied in university teaching contexts.

Research Aim

This study aims to explore the effectiveness of applying the Project-Based Learning (PBL) model within the CDIO framework to the course "*Methods of Research and Teaching Vietnamese History*," focusing on improving students' learning outcomes, teaching competencies, and engagement.

Research Questions

1. How can the CDIO-based Project-Based Learning model be effectively implemented in the course *Methods of Research and Teaching Vietnamese History*?
2. What impacts does the application of the PBL model have on students' learning outcomes and teaching competencies?
3. What challenges and practical lessons emerge from the implementation process for both lecturers and students?

Research Results

Comparison between Traditional and Modern Teaching Methods

According to Lewis (2019), Bloom's Taxonomy not only describes the cognitive process but also serves as a framework for developing learner-centred teaching methodologies. Based on Bloom's cognitive hierarchy, learners' thinking abilities are categorised into six levels, comprising three lower-order thinking skills—Remembering, Understanding, and Applying—and three higher-order thinking skills – Analysing, Evaluating, and Creating.

In the traditional teaching model, the instructor is positioned at the centre of the knowledge delivery process, while students primarily play a passive, receptive role. Learning activities primarily focus on memorising and reproducing provided information, with the main objective of completing

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examinations, assessments, or applying knowledge in a limited and mechanical manner. As most class time is devoted to content transmission, learners have few opportunities to develop higher-order thinking skills such as analysis, evaluation, and creativity.

In contrast, modern teaching approaches redefine classroom roles by placing the learner at the centre, where the teacher acts as a facilitator, mentor, and guide. The goal of these approaches is to stimulate critical thinking, creativity, and self-directed learning, thereby enabling students to construct knowledge and develop comprehensive competencies actively.

Among modern pedagogical approaches, Project-based Learning is one of the most widely implemented models, as it empowers learners and creates a learning environment closely connected to real-life contexts. Through this approach, learners can develop higher-order thinking skills that meet the demands of 21st-century education.

Introduction to Project-based Learning

According to the CDIO (Conceive – Design – Implement – Operate) framework, project-based learning (PBL) is a practice-oriented pedagogical approach in which students acquire disciplinary knowledge and develop essential competencies through the design, implementation, and evaluation of their own learning projects. These projects are typically derived from real-world problems closely related to professional contexts or societal challenges (CDIO Initiative, n.d.).

The core of PBL does not lie in the final product itself, but in the learning process that takes place throughout the project's development. During this process, learners work collaboratively in teams, engage in discussions and critical reflections, and share individual experiences—thereby cultivating teamwork, creative thinking, and problem-solving abilities. This approach enables students to "learn by doing," fostering critical thinking and soft skills —essential components of modern higher education.

It is essential to distinguish between *"doing a project"* and *"learning through a project"*:

A project aims to produce a complete product or a concrete solution.

Learning through a project, by contrast, focuses on the process of inquiry, experience, and knowledge construction, emphasising the development of learners' competencies rather than tangible outcomes.

Therefore, PBL is not merely a teaching method but a modern educational philosophy that empowers students to become active agents in knowledge creation—fully aligned with the learner-centred orientation of contemporary higher education reform.

Comparison between "Doing a Project" and "Project-Based Learning"

Although the two concepts of *"doing a project"* and *"project-based learning"* are often used interchangeably in teaching practice, they differ fundamentally in terms of objectives, implementation,

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and the learner's role. According to Thomas (2000), *doing a project* is typically employed as a final course assignment, in which students complete a task at the end of the semester and are assessed primarily based on the quality of the final product. In contrast, *Project-Based Learning* is an integrated pedagogical approach implemented throughout the learning process. It is designed from the beginning of the course, allowing students to acquire knowledge while simultaneously developing higher-order thinking skills through the conception, execution, and evaluation of their learning projects (CDIO Initiative, n.d).

This distinction is also reflected in the roles of teachers and students. In the project implementation model, instructors act as directors, controllers, and evaluators of outcomes, while students primarily follow the given instructions. In contrast, within the Project-Based Learning framework, learners become the central agents in the process of knowledge construction, whereas instructors serve as facilitators and mentors (Blumenfeld et al., 1991). PBL requires mandatory teamwork, fostering collaboration, sharing, and peer critique, thereby cultivating communication skills and systems thinking. Notably, the outcomes of PBL projects are often presented publicly to the academic community or external partners, rather than being confined to the classroom, which enhances both practical value and social feedback (see Table 1).

Table 1

Comparison between Project Work and Project-Based Learning

Aspect	**Project Work**	**Project-Based Learning**
Implementation timing	Assigned at the end of the course as a final assignment	Introduced at the beginning of the course and implemented throughout the learning process
Assessment objective	Evaluation based solely on the final product	Evaluation of both the learning process and the final outcomes
Role of instructor	Acts as a director and controller of the working process	Serves as a facilitator and mentor, fostering learner autonomy
Role of students	Passive participants who follow instructions	Active learners who explore and construct knowledge
Working format	Can be done individually	Requires mandatory teamwork
Presentation of results	Limited to classroom presentations	Publicly presented to the academic community or external partners

Source: Compiled by the author based on Thomas (2000), Blumenfeld et al. (1991), and CDIO Initiative (n.d.).

The Benefits of Project-Based Learning

The Project-Based Learning approach provides multidimensional benefits for both learners and educators. For students, PBL fosters a fundamental shift in learning attitudes—from passively receiving knowledge to actively exploring and applying it. Knowledge is constructed through the process of project implementation, becoming dynamic and contextually relevant rather than remaining abstract concepts in textbooks. In addition to developing professional competencies, students also cultivate

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essential 21st-century skills, including critical thinking, collaboration, creativity, and effective communication (Blumenfeld et al., 1991).

For educators, PBL enhances pedagogical capacity and professional identity by transforming the teacher's role from a transmitter of knowledge to a designer, facilitator, and evaluator of learning activities. This method simultaneously encourages interdisciplinary collaboration, establishing professional networks among instructors, academic institutions, and industries—thus bridging education with real-world demands. Through organising interdisciplinary projects, teachers can help students integrate multi-domain knowledge into their learning processes, thereby strengthening problem-solving skills and adaptability in an increasingly globalised context.

Advantages and Challenges of Project-Based Learning

Project-Based Learning is regarded as a modern pedagogical model that enables learners to develop comprehensive competencies through the implementation of authentic, practice-oriented tasks. Numerous studies have affirmed that PBL not only enhances students' acquisition of knowledge but also strengthens their problem-solving abilities, critical thinking, and teamwork skills (Thomas, 2000; Bell, 2010; CDIO Initiative, n.d). However, alongside these advantages, the approach also presents several challenges in practical implementation.

Advantages:

- PBL projects are highly authentic and closely connected to professional practice, allowing students to "learn by doing" and to construct living, applicable knowledge rather than relying solely on memorisation of theoretical concepts.
- The method encourages interdisciplinary integration, thereby reducing assessment workload while maintaining the quality of learning outcomes.
- Because it incorporates a variety of learning activities (research, design, presentation, peer review, etc.), PBL accommodates diverse learning styles among students.
- Implementing PBL increases learner engagement, fostering autonomy, creativity, and a stronger sense of responsibility for their own learning outcomes.

Challenges:

- PBL requires significant effort from instructors in designing, monitoring, and evaluating projects, while students must demonstrate high levels of self-management, collaboration, and initiative (Thomas, 2000).
- Group-based learning activities demand effective communication and coordination among team members, which can become difficult if responsibilities are unevenly distributed.

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- Due to the dynamic nature of PBL, scheduling meetings and consultations between instructors and students often needs to be flexible and may extend beyond regular class hours.
- Some projects require additional material resources, equipment, or financial investment, making implementation more complex within the constraints of institutional conditions (CDIO Initiative, n.d).

Practical Application: Steps for Implementing Project-Based Learning

According to the *Gold Standard PBL: Teaching Practices* proposed by PBLWorks, the implementation process of project-based learning comprises seven fundamental steps, which serve as a standard framework to ensure teaching quality and effective learning outcomes (PBLWorks, n.d.).

Step 1. Design and Plan

Instructors take the initiative to develop or adapt an existing project to fit the institution's educational context and the characteristics of learners. At this stage, the teacher designs the entire learning framework—from initiation and implementation to evaluation—while listening to students' voices and incorporating their feedback to make the project more relevant and realistic.

Step 2. Align to Standards

Projects must be designed based on clear assessment standards that reflect students' competencies, knowledge, and understanding within the subject area. PBLWorks (n.d.) proposes seven quality assurance criteria, including:

1. A challenging and meaningful problem or question;
2. Encouragement of inquiry and exploration;
3. Authenticity and real-world relevance;
4. Student voice and choice;
5. Reflection and self-evaluation;
6. Opportunities for revision and improvement;
7. Connection to and impact on the community

Step 3. Build the Culture

Instructors should foster an open and collaborative learning environment that encourages students to develop independence, creativity, inquiry skills, and teamwork. This culture of learning helps students recognise the value of quality outputs and personal responsibility within the collective.

Step 4. Manage Activities

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The instructor acts as a facilitator, collaborating with students to build schedules, assign tasks, and set key milestones and deadlines. At the same time, the teacher provides support in identifying and utilising resources necessary for completing the project and sharing its outcomes within the learning community.

Step 5. Scaffold Student Learning

Teachers guide students through mini-lessons and provide the necessary tools, resources, and learning strategies to help them achieve project goals. This scaffolding process should be flexible, ensuring that students develop their individual competencies while maintaining autonomy and ownership of their learning journey.

Step 6. Assess Student Learning

Assessment is conducted throughout the project, combining formative assessment (ongoing evaluation) and summative assessment (final evaluation). Moreover, students are encouraged to participate in self-assessment and peer assessment, which strengthen their critical thinking and self-awareness.

Step 7. Engage and Coach

Instructors serve as mentors and coaches, continuously motivating, providing feedback, and supporting students whenever adjustments or new skills are needed. Encouragement and recognition of effort help maintain students' enthusiasm, creativity, and perseverance throughout the project implementation process.

Practical Application of the PBL Model in Teaching the Course "Methods of Research and Teaching Vietnamese History"

Within the framework of the course "*Methods of Research and Teaching Vietnamese History*," the instructor implemented the Project-Based Learning model in combination with the CDIO framework to enhance the applicability of the course and develop the professional competencies of students in history teacher education.

Course duration: 30 periods.

Project Requirements: Students were assigned the task of applying the CDIO model (Conceive – Design – Implement – Operate) to design a creative, practical, and pedagogically applicable lesson product. The project spanned the entire course—from the initial ideation stage to the completion and presentation of the final product—under the guidance and mentorship of the course instructor.

Deliverables:

1. Project Journal and Report: A complete record of the project's development process, from ideation and task allocation to reflection after each phase.

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2. Group Poster: A visual representation introducing the group's identity, project objectives, product concept, and implementation process.
3. Presentation File: A summary of the content, evidence of learning outcomes, and demonstration of how the CDIO framework was applied in designing the lesson.
4. Final Product or Model Prototype: The outcome of the project—such as an e-learning lesson, a visual teaching model, or a teaching aid designed based on Vietnamese History content.

Educational Outcomes: The integration of PBL and CDIO in the course enabled students not only to reinforce disciplinary knowledge but also to develop essential competencies in designing, organising, and evaluating history teaching activities. This approach fosters creativity, scientific thinking, and practical relevance to the current context of general education in Vietnam.

Practical Experience in Implementing the Project-Based Learning (PBL) Model in the Course "Methods of Research and Teaching Vietnamese History"

Based on the theoretical framework of the Gold Standard PBL (PBLWorks, n.d.), the author implemented the Project-Based Learning model in the course "*Methods of Research and Teaching Vietnamese History*" with a total duration of 30 periods. The implementation process followed seven specific steps, combining theoretical instruction with practical teaching experience.

Step 1. Design and Plan

The project was implemented simultaneously across all class sections. Building upon a standardised model provided by the Department, the instructor both applied the sample project and designed a new one based on PBL criteria, ensuring feasibility, learner appropriateness, and alignment with course learning outcomes. This process required creativity, experience, and the ability to integrate learning objectives with the students' professional competencies.

Step 2. Align to Standards

The instructor referred to the core standards proposed by PBLWorks – including challenging problems, authenticity, student agency, and reflection – to ensure that the project accurately reflected the students' cognitive abilities and skills throughout the learning process.

Step 3. Build the Culture

At the initial stage, students in each group were required to establish a team contract, outlining personal information, strengths, weaknesses, individual and collective goals, as well as agreed-upon working principles. This step was considered a key factor in reinforcing commitment, responsibility, and teamwork discipline, particularly for newly formed groups.

Step 4. Manage Activities

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The project was conducted over three months, with clearly defined milestones for progress reporting. The instructor allocated the last 30–45 minutes of each class for progress discussions and evaluations of each group's performance against output objectives. Periodic progress monitoring not only helped students maintain motivation but also enabled the toinstructor by make timely adjustments whenever issues arose.

Step 5. Scaffold Student Learning

Between reporting sessions, thematic lessons were organised to pstudents with rovide the necessary knowledge, skills, andudents to continue developing their projects. The instructor emphasised just-in-time learning, ensuring that support was contextually relevant and directly addressed the challenges students faced during project implementation.

Step 6. Assess Student Learning

A detailed evaluation rubric was developed by the instructor, covering both the final product and the learning process. In addition to the instructor's assessment, students participated in peer assessments between groups and intra-group evaluations, ensuring objectivity and fostering reflective thinking.

Step 7. Engage and Coach

Throughout the project, the instructor acted as a facilitator and mentor, providing ongoing support via online communication channels outside of class hours to ensure timely feedback. However, this support was limited to consultation—posing questions, offering suggestions, and providing direction—rather than direct intervention in the product or decision-making process. This approach maintained student autonomy while maximising their creativity and individual responsibility.

Conclusion

The Project-Based Learning model represents an advanced and modern pedagogical approach that clearly embodies the philosophy of learner-centred education in higher education. The application of this model to courses, training modules, or academic programs at the departmental, faculty, or institutional level significantly contributes to innovating teaching and learning methods, thereby developing learner competencies, enhancing creativity, and promoting autonomy in learning.

However, the process of implementing PBL in practice inevitably faces various difficulties and challenges, ranging from design and organisation to assessment and ensuring sufficient resources and time. These limitations necessitate further research, experimentation, and contextual adaptation to accommodate the specific characteristics of each course and group of students.

In addition to mastering the theoretical foundations discussed in this paper and reflecting on the author's practical example, instructors are encouraged to flexibly integrate PBL and Inquiry-Based

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Learning (IBL) models according to the specific conditions of their classes and the capacities of their departments. A creative and selective application of these models not only helps achieve course learning outcomes but also enhances teaching quality, stimulates engagement and collaboration, and fosters self-directed and research-oriented learning among students in today's modern educational environment.

References

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House: A Journal of Educational Strategies, Issues, and Ideas, 83*(2), 39–43. https://doi.org/10.1080/00098650903505415

Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist, 26*(3–4), 369–398. https://doi.org/10.1080/00461520.1991.9653139

CDIO Initiative. (n.d.). *Project-based learning*. https://www.cdio.org/knowledge-library/project-based-learning

Lewis, B. (2019, November 10). *Using Bloom's taxonomy for effective learning*. ThoughtCo. https://www.thoughtco.com/blooms-taxonomy-the-incredible-teaching-tool-2081869

PBLWorks. (n.d.). *Gold standard: Teaching practices*. Retrieved October 22, 2025, from https://www.pblworks.org/what-is-pbl/gold-standard-teaching-practices

Thomas, J. W. (2000). *A review of research on project-based learning*. Autodesk Foundation. http://www.bobpearlman.org/BestPractices/PBL_Research.pdf

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Creative Storytelling and the Hero's *Journey* to *Catharsis*: A Case Study of *The Lion King*

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ABSTRACT: This paper explores the concept of *catharsis* in Creative Storytelling through the lens of the *Emotional* Hero's *Journey* and its pedagogical applications. Drawing connections between Aristotle's *Poetics* and contemporary narrative theory, it presents *catharsis* as the culmination of the hero's emotional and moral transformation. Using Disney's *The Lion King* as a case study, it illustrates how emotional challenges, inner conflicts, and processes of self-discovery lead to *catharsis*. The study highlights the educational potential of storytelling to cultivate empathy, self-reflection, and social-emotional learning, transforming narrative experience into a means of psychological insight and educational enrichment.

KEYWORDS: Creative Storytelling, Hero's *Journey*, *Emotional Journey*, *Catharsis*, *Poetics*, "The Lion King".

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1. Introduction: The Hero's *Journey* and *Emotional Journey* in Creative Storytelling

Creative Storytelling is the art of conveying ideas, emotions, and experiences through coherent, emotionally engaging narratives. It enables individuals to interpret their experiences linking thought with emotion, and to dramatize life lessons that illustrate both the external and internal journeys of the hero toward *catharsis*. Through narrative, audiences explore universal human experiences, enhancing both intellectual and emotional engagement.

Joseph Campbell (1949) introduced the archetypal "Hero's Journey," later adapted by Vogler (2007), who demonstrated its practical value in literature, cinema, and education. This twelve-stage model structures the hero's path from the ordinary world to transformation and return with the "acquired treasure". The journey not only ensures plot cohesion and logical narrative progression but also provides a framework for understanding the emotional and moral growth of characters.

The *Emotional Journey* focuses on the hero's internal path toward self-realization and *catharsis*, emphasizing psychological transformation through challenges and conflicts. It begins with an initial state of balance that is disrupted by events provoking intense emotional responses, setting the hero on a path of self-discovery. While initially reluctant, the hero gradually accepts the challenge, encountering emotions such as fear, anger, disappointment, joy, and hope. At the climax, the hero confronts deepest fears, undergoes profound transformation, and achieves *catharsis*. Common themes may include coming of age, loss, abuse, abandonment, or bullying (Lampropoulos, 2024).

This journey reveals the events that shape and affect the hero's psyche, emphasizing the dynamic interplay between external challenges and internal growth. Through difficulties, the hero recognizes strengths and weaknesses, gains autonomy, and develops resilience. Emotional identification allows students to empathize and engage actively, fostering insight and personal growth (Lampropoulos, 2024). In educational contexts, such identification encourages learners to reflect critically on moral dilemmas, social interactions, and personal decision-making, bridging literature and psychological awareness.

1.1 Creative Storytelling and Aristotelian *Poetics*

Creative storytelling aligns with Aristotle's concept of *mimesis*, using narrative, song, and movement to imitate life (*Poetics*, 1447b). Its key elements –harmony, proportion, and completeness– ensure the logical and aesthetically engaging presentation of both characters and plot. Stories may follow linear, nonlinear, or circular structures, often divided into three acts, that reflect Aristotle's principle of beginning, middle, and end (Lampropoulos, 2024).

A well-structured narrative enables characters and events to evolve coherently, fostering emotional engagement and cognitive understanding. By adhering to Aristotelian principles,

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storytellers can create works that are simultaneously aesthetically compelling and pedagogically meaningful. Such narratives enhance learners' comprehension of cause-and-effect relationships, character development, and emotional dynamics.

Moreover, Aristotle emphasized the value of eliciting emotional responses as a means of promoting moral and intellectual reflection. In Creative Storytelling, this principle underscores that characters' struggles and resolutions are not merely entertaining but serve an educational purpose. They help learners recognize patterns of human behavior and internalize ethical or social lessons. Through the careful structuring of narrative, educators can guide students to anticipate the consequences of actions, analyze motivations, and engage deeply with both the external events and the internal transformations of characters.

1.2 Aristotelian *Catharsis*

In *Poetics* (1449b21–1450b20), Aristotle describes *catharsis* as the purification of emotions through *pity* and *fear*. Düring (2006) interprets it as a process of "elimination" or "removal" of unpleasant emotions -an emotional release. Tsitsiridis (2010) questions whether *catharsis* is experienced by the hero or the audience, while Heath (1996) views it as therapeutic process that enables moral and emotional understanding.

In Creative Storytelling, *catharsis* has a dual role: it signifies both the hero's internal transformation and the audience's emotional release. Students, while safely observing these emotional trials, are encouraged to re-evaluate their own perceptions of fear, guilt, and grief. In this way, *catharsis* serves as both an artistic and a psycho-pedagogical tool, bridging literary engagement and emotional development.

Furthermore, catharsis fosters metacognitive reflection: as students process the hero's *Emotional Journey*, they become more aware of their own emotional responses, biases, and coping strategies. This pedagogical function transforms storytelling from a purely aesthetic experience into a structured framework for social-emotional learning and self-regulation.

1.3 The *Emotional* Hero's *Journey* as a Path to *Catharsis*

The Hero's *Emotional Journey* represents the psychological and emotional dimension of the Hero's *Journey*, focusing on the protagonist's internal transformation. Initially, the hero exists in a state of equilibrium within the ordinary world. The "call to adventure" triggers intense emotional reactions, such as fear, doubt, or excitement, challenging the status quo. Initial resistance to the call is a key element, as the hero needs time to recognize the mission's significance and value.

During trials, the hero experiences a spectrum of emotions –fear, anger, anxiety, joy– that prompt reassessment of values and abilities. Internal struggles reach critical points, where the

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hero must confront their deepest fears and doubts. At a pivotal moment of insight or crisis, the hero undergoes significant emotional development, resulting in an internal transformation and integration of experience (Stiles, 2002). Each stage introduces new challenges, moral dilemmas, or emotional tests, contributing to the hero's growth. Encounters with antagonists, failures, or moments of isolation amplify emotional intensity, making eventual catharsis more meaningful.

By analyzing each stage of the *Emotional* Hero's *Journey* –call to adventure, trials, confrontation, and ultimate transformation– students can identify emotional patterns, recognize coping strategies, and gain a deeper understanding of the dynamics of personal development. This process also strengthens critical thinking, as learners assess narrative decisions, examine character motivations, and articulate their own thoughts and feelings, fostering empathy, social skills, and narrative intelligence.

Through storytelling, creators and audiences share experiences, recognize the emotions influencing decisions, and enhancing creative thinking and the ability to structure and express their own stories effectively (Lampropoulos, 2025). The hero's internal transformation serves as a mirror for students' self-reflection, encouraging them to examine their emotional responses and develop problem-solving skills without direct exposure to personal trauma (Lampropoulos, 2024). This comprehensive process links Creative Storytelling to the psycho-pedagogical function of education, providing a safe, structured framework for emotional growth and reflective thinking.

2. The *Emotional Journey* in *The Lion King*

Disney's *The Lion King* (1994, 2019)[1] exemplifies the *Emotional* Hero's *Journey* through Simba's growth from naïve cub to responsible adult. His initial imbalance stems from naivety and a disregard for responsibility. The death of Mufasa and Scar's manipulation provoke grief, guilt, and fear, leading to Simba's exile. Mentors Timon, Pumbaa, and Rafiki guide him toward decisiveness, helping him confront internal doubts. The emotional climax involves acceptance, courage, and overcoming fears, culminating in victory and restoration of both internal and external balance. The final *catharsis* embodies wisdom, maturity, and inner peace, with reconciliation and fulfillment completing the journey (Favreau, 2019; Minkoff & Allers, 1994).

Key stages with emotional intensity and educational relevance

The following key stages highlight both the emotional intensity of Simba's journey and their pedagogical implications, demonstrating how the narrative can foster empathy, self-reflection,

[1] This analysis draws on narrative elements from both versions of *The Lion King* (1994, 2019), referenced strictly for academic and educational purposes in accordance with the principle of fair use. It is further informed by a student project produced within the course *Creative Writing/Storytelling – Project Method* at the Department of Educational Sciences and Social Work, University of Patras (Lampropoulou, 2024).

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and creative engagement among students.

1. **Imbalance:** Simba initially enjoys a carefree life under his father's protection but disregards warnings, disrupting his equilibrium.

   Pedagogical implication: Students can discuss the role of naivety, privilege, and unawareness in emotional development, reflecting on their own experiences.

2. **Grief and Manipulation:** Following Mufasa's death and Scar's psychological manipulation, Simba experiences guilt, fear, and isolation. Emotional intensity peaks, provoking deep reflection on responsibility and coping with loss.

   Pedagogical implication: Observing grief allows students to identify with difficult emotions, fostering empathy and recognition of consequences of actions.

3. **Determination:** Friends (Timon & Pumbaa) and mentor (Rafiki) guide Simba toward courage and acceptance of his destiny. Emotional intensity is moderate, focused on hope and encouragement.

   Pedagogical implication: Highlights the importance of social support and mentoring in overcoming challenges, reinforcing collaborative learning principles.

4. **Inner Conflict:** Simba confronts fear, self-doubt, and reluctance to assume responsibility. Emotional tension is high, emphasizing moral and psychological struggle.

   Pedagogical implication: Encourages students to examine internal conflicts and strategies for self-regulation and decision-making.

5. **Emotional Climax – Acceptance – Renewal:** Simba decides to face his challenges, restoring confidence and resolving internal conflicts. Emotional intensity peaks positively, combining courage, insight, and determination.

   Pedagogical implication: Demonstrates the transformative potential of confronting fears, enabling discussions about resilience and self-efficacy.

6. **External and Internal Victory:** Simba confronts Scar, achieves justice, and regains inner peace and leadership. Emotional intensity remains high, highlighting courage, justice, and restoration.

   Pedagogical implication: Students can explore the interplay between internal growth and external action, linking narrative resolution to real-life problem-solving.

7. ***Catharsis*:** Through recognition of past mistakes, confrontation of fears, and reconciliation, Simba attains emotional maturity and equilibrium, reflecting the universal path to *catharsis*. Emotional intensity stabilizes, producing relief and satisfaction.

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Pedagogical implication: Provides a model for students to understand emotional processing and the psychological benefits of narrative resolution, promoting self-awareness and reflective thinking.

This case illustrates how storytelling engages viewers in emotional identification, empathy, and personal reflection, paralleling educational objectives in Creative Writing and social-emotional learning. It fosters self-awareness, reflective thinking, and the development of narrative intelligence and creativity (Lampropoulos, 2024).

3. Conclusions

The Hero's *Emotional Journey* serves as a psycho-pedagogical tool, guiding both the hero and participants toward *catharsis* and self-awareness. By confronting negative emotions such as loss, guilt, betrayal, or fear, *catharsis* highlights the importance of self-discovery and personal development. Creative storytelling allows students to identify with the hero, experience emotional states, and reflect on values and behaviors, promoting empathy, self-esteem, and psychological resilience (Lampropoulos, 2024).

Moreover,engagement in Creative Storytelling fosters emotional maturation, as experiencing events through the hero helps students understand consequences and internal conflicts. Stories function as "psychological maps," enabling learners to transform negative experiences into constructive frameworks and creating a safe space for processing emotions. In this way, Creative storytelling aligns with principles of Positive Psychology and education (Vasileiou & Theodosakis, 2022), enhancing students' emotional, social, and cognitive well-being.

Importantly, tracing the hero's emotional trajectory provides students with insight into personal growth and *catharsis*. Observing and discussing the hero's emotional challenges offers a structured opportunity to develop reflective thinking, moral reasoning, and emotional intelligence. Ultimately, this process facilitates *catharsis*, self-awareness, and emotional balance, providing tangible psycho-pedagogical benefits, and reaffirming the central role of the Hero's *Journey* as both an educational and therapeutic framework.

References

Düring, I. (1991/ 2006). *Aristotle: Presentation and interpretation of his thought* (Vol. A) [Ο Αριστοτέλης: Παρουσίαση και ερμηνεία της σκέψης του (τόμ. Α')] (3rd rev. ed.). MIET.

Favreau, J. (Director). (2019). *The Lion King* [Film]. Walt Disney Pictures.

Gergen, K. J., & Gergen, M. M. (1988). Narrative and the self as relationship. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 17–56). Academic Press.

Heath, M. (1996). *Aristotle Poetics*. Penguin Books.

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Lampropoulos, N. (2024). *Creativity and creative storytelling in education* [Η δημιουργικότητα και η δημιουργική αφήγηση στην εκπαίδευση]. Grigoris.

Lampropoulos, N. (2025). *The art and practice of creative storytelling. Cambridge Scholars Publishing*.

Lampropoulou, A. (2024). *The hero's journey and the values of social responsibility* [Το ταξίδι του ήρωα και οι αξίες της κοινωνικής ευθύνης] (Unpublished course assignment). University of Patras.

Minkoff, R., & Allers, R. (Directors). (1994). *The Lion King* [Film]. Walt Disney Pictures.

Stiles, W. B. (2002). Assimilation of problematic experiences. In J. C. Nor-cross (Ed.), *Psychotherapy relationships that work: Therapist contributions and responsiveness to patient*s (pp. 357-365). Oxford University Press.

Tsitsiridis, S. (2010). *The Aristotelian definition of tragedy* [«Ο αριστοτελικός ορισμός της τραγωδίας»]. *Ellinika, 60*(1), 25–61.

Vasileiou, V., & Theodosakis, N. (2022). *Narrative technique, emotional education, and positive education* [Αφηγηματική Τεχνική, Συναισθηματική Αγωγή και Θετική Εκπαίδευση]. Grigoris.

Vogler, C. (2007). *The writer's journey: Mythic structure for storytellers and screenwriters* (3rd ed.). Michael Wiese Productions.

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The Application of Participatory Public Art in University Public Art Education

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ABSTRACT: Participatory public art emphasises the joint participation of artists, students, and the public. This study aims to explore the application paths and educational value of participatory public art in university public art education. Drawing on literature analysis and international representative case studies, the study examines the characteristics and practical model of university teaching. The study found that participatory public art exhibits unique social and practical advantages in art education, effectively promoting the comprehensive improvement of students' aesthetic experience, creativity, teamwork, and emotional expression. This model enhances the public art curriculum in universities, providing students with a platform for in-depth artistic practice. Its significance lies in the fact that through collaborative creation, students can better understand the relationship between art and society, thereby enhancing their comprehensive qualities, such as artistic appreciation, teamwork, and social engagement.

KEYWORDS: Participatory Public Art, University Public Art Education, Collaborative Creation, Aesthetic Competence, Comprehensive Literacy, Teaching Practice.

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Introduction

In recent years, public art education in universities has received increased attention; however, practical teaching still faces challenges, including a disconnect between theory and practice, insufficient curriculum resources, and low student engagement. Participatory public art, which emphasises collaborative engagement among artists, students, and the public, offers new possibilities by integrating visual arts, social design, and community practice. Through this open creative process, students' creativity and social responsibility are stimulated, broadening curriculum content and strengthening their understanding of art's social value.

Research Aim and Research Questions

The primary purpose of this study is to clarify the application paths and practical significance of participatory public art, specifically within university public art education. This will be addressed by examining the following focused research questions:

1) What are the core characteristics, development trends, and educational benefits of participatory public art?

2) How can participatory public art promote students' aesthetic abilities, creativity, teamwork, and emotional development?

3) How can universities effectively incorporate participatory public art into their curriculum and practical activities?

Research Results

I. Characteristics and Development of Participatory Public Art

Participatory public art is a distinctive art form that can be found in public spaces. Artists, students, and the public conceive, create, and implement these projects together. Unlike traditional top-down art, it uses an open and democratic process. This approach integrates art with social life (Bishop, 2012; Kester, 2004). It centres on collaboration through group discussions, workshops, and on-site work. Art becomes a tool for expressing shared emotions and advancing social issues.

This concept gradually emerged in the late 20th century. Its development can be roughly divided into two phases. The first phase, in the late 20th century, featured early participatory public art, such as community murals and sculptures, with a focus on environmental improvement. The Philadelphia Mural Arts Program, founded in 1984, is a prime example. Since then, the program has produced over 4,000 murals and engaged thousands of citizens in direct participation. It has integrated art into the community and served as an important platform for social education (Finkelpearl, 2001). The second phase began at the start of the 21st century, when societal attention to empowerment and community building grew.

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The core of participatory art gradually shifted from "work" to "process" (Bishop, 2012), its forms became more diverse, and its themes grew more complex. Issues now include urban memory, environmental protection, and social justice. Contemporary participatory public art emphasises social connections and emotional exchanges fostered by the act of creation. It focuses on stimulating the creativity of all participants, aiming for deep integration of art and community. This collaborative, educational, and socially practical nature has gradually extended into educational practice. Participatory public art is now recognised as a vital means of connecting artistic learning with social engagement.

II. Challenges Facing Public Art Education in Universities

Insufficient Concepts and Priority

Although the significance of public art education is widely acknowledged, it is often given inadequate emphasis in university curricula. Curriculum development often fails to address the diverse needs of students, particularly those in science and engineering disciplines, who have limited opportunities to participate in art courses. In non-arts universities, public art education is frequently marginalised and lacks sufficient institutional and resource support. Even in prominent art institutions, course offerings are typically confined to theoretical instruction or brief workshops, rather than sustained, practical projects. These limitations diminish both the effectiveness and practical relevance of public art education (Li, 2024; Zhang, 2021).

Lagging Teaching Management and Resource Allocation

Significant deficiencies in teaching management also hinder public art education in universities. Administrative departments in many institutions lack a unified understanding of public art education, leading to inadequate scientific and systematic planning. Consequently, teaching resources are distributed unevenly, and curriculum formats remain uniform, failing to address the diverse developmental needs of students. Furthermore, public art education programs are frequently sporadic and lack continuity. The absence of consistent, systematic management mechanisms negatively affects both curriculum quality and teaching efficiency (Kang, 2023; Guo & Guo, 2019).

Lack of Professional Faculty

A shortage of qualified faculty poses a significant challenge to the advancement of public art education. The limited availability of instructors with interdisciplinary expertise and substantial practical experience impedes the integration of theoretical knowledge with practical application in course offerings. While many faculty members have strong academic backgrounds, they often lack experience in practical teaching and interdisciplinary instruction. Additionally, as students' artistic literacy and needs diversify, some faculty members are unable to implement individualised teaching strategies. These factors collectively hinder the effective development of students' potential and compromise overall teaching quality (Hu et al., 2022; Zhang, 2020).

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III. The Impact of Participatory Public Art on Students' Comprehensive Literacy

Improving Students' Aesthetic Abilities

As an art form that values collaborative creation, participatory public art sharpens students' aesthetic literacy. It often merges disciplines such as visual arts and social design. Through interactive communication and joint expression during the creative process, works emerge that are evocative and rich in narrative. These creations not only reflect humanistic meaning and distinctive beauty but also allow students to experience the link between art, emotion, and social issues throughout the inception and creation process, thereby steadily elevating their perception and appreciation of aesthetics.

This aesthetic experience emerges in the collective and social dimensions of participation. For instance, in the London Underground's "Art on the Underground" project, contemporary artist Mark Wallinger invited students from 27 London schools to collaborate on creating the "Labyrinth" series. Through this process, students not only witnessed shared creativity but also gained a clearer understanding of how artwork merges with urban space and public service, thereby refining their aesthetic judgment. Additionally, material and style choices often stemmed from group discussion, giving students direct experience with art's democratic and inventive aspects. The "Labyrinth" installations were ultimately permanently displayed at 270 subway stations (Liu & Yang, 2021).

Enhancing Students' Creativity and Imagination

Participatory public art prioritises creative ideas and open expression, giving students platforms to hone their originality and imagination. Through group discussion and planning, students must suggest novel concepts and construct unified artistic themes and spatial stories tailored to particular sites and circumstances. This unbounded process sparks imagination and builds interdisciplinary thinking and design abilities.

For instance, in the required general education course "Public Art" offered at Shanghai Jiao Tong University, students from diverse majors joined an art project titled "Fighting the Epidemic." Using media such as photography, silhouettes, and light boxes, they created commemorative public art on campus documenting this collective experience. This art practice refined students' creative abilities and expanded their spatial storytelling and problem-solving skills.

Cultivating Students' Teamwork

Another key aspect of participatory public art is teamwork. The creative process encompasses stages ranging from concept development to selecting materials, creating the artwork, and final display. Each phase depends on clear communication, negotiation, and cooperation among team members. Students learn to listen, coordinate, and collaborate, ensuring projects are completed.

In Seoul's "Urban Regeneration Art Project," students partnered with residents and artists to build temporary public art installations. They overcame technical obstacles during construction and

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developed mutual understanding through cross-cultural interaction. This direct involvement not only strengthened teamwork but also highlighted the importance of collaboration for complex projects (Poxie & Le, 2020). Through this experience, students saw firsthand the results of collaboration —a skill they would develop for future studies and careers.

IV. The Impact of Participatory Public Art on Students' Emotional Development

Improving Students' Emotional Cognition and Expression

Participatory public art is not only a form of visual presentation but also a means of emotional expression. Its themes often draw on participants' life experiences and inner feelings, touching on multifaceted emotional issues such as social concerns, historical memory, and interpersonal relationships. When participating in creative works, students need to understand and empathise with diverse emotions as they engage with others' narratives and social realities, thereby gradually improving their own emotional cognition.

For example, within Zhejiang University's "Aesthetic Education and Society" series of practices, students participated in the "Art Therapy and Community Care" project, visiting communities and engaging in activities such as painting, music creation, and improvisational theatre with groups including autistic children and elderly individuals who had lost their only child. Through these interactions, students not only witnessed how art can help others express and release their emotions, but also learned to respond to others' psychological needs and to reflect further on social issues. These experiences allow them to free themselves and express themselves through collaborative creation, gradually developing more mature emotional expression skills.

Cultivating a Positive Mindset in Students

Themes in participatory public art often encompass beautiful visions of life or responses to social issues. This positive orientation itself can inspire students to develop a positive mindset. During the creative process, they often face difficulties with space, materials, or technology. Only through persistence and collaboration can they achieve their goals, and overcoming challenges is inherently educational.

Philadelphia's "Community Mural Project" is a prime example. This project has engaged at-risk youth in mural painting, helping them escape drug addiction and violence. Through artistic practice, they rediscover a sense of belonging and value, and experience accomplishment and pride in their creative work. This case study also reminds us that participatory public art can help students develop a positive attitude in the face of challenges and resist giving up easily in the face of setbacks (Finkelpearl, 2001).

Strengthening Students' Social Skills and Emotional Intelligence

Participatory public art makes students communicate, listen, and collaborate throughout the

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creative process. These interactions enhance social skills and allow students to practice emotional intelligence.

For example, faculty and students from the School of Design at the Hong Kong Polytechnic University have been actively involved in community-building projects for some time. Students form teams with peers from diverse disciplines to design public art installations or small public spaces for their communities. Not only do they need to solve technical problems during their creations, but they also engage with residents, listen to their needs and stories, and incorporate these into their final works. This process enables students to gain firsthand experience in cross-cultural and cross-class communication, while also teaching them to develop empathy and a sense of social responsibility.

Through these practices, students gradually master managing complex interpersonal relationships and responding to and expressing life experiences through art. This enhances their social skills and emotional intelligence, which in turn lays the foundation for more comprehensive social practices in the future.

V. Application of Participatory Public Art in Public Art Education in Universities

Incorporating Participatory Public Art into the University Curriculum

Introducing participatory public art into university curricula has practical value. It provides students with a more comprehensive art education experience. Such courses allow students to learn public art theory and deepen their understanding of its planning, design, and social significance. As a result, students enhance their practical skills and awareness of innovation in real-world contexts.

For example, in its general education course "Art and Society," Fudan University encourages students from various majors to develop art projects within campus or community spaces. Students conduct on-site research, propose public art intervention proposals, and collaborate in groups to create temporary installations or performances. Both science and engineering students, as well as students from the humanities, participate. Interdisciplinary collaboration sparks creativity and strengthens social responsibility and public awareness (Li, 2024).

Through this curricular approach, students master the fundamentals of public art. They also engage in creative, reflective, and communicative work within real-world projects. This shift from classroom-based learning to public spaces offers new possibilities for aesthetic education. It also creates excellent conditions for cultivating social responsibility and comprehensive abilities. Universities can expand these practical activities through student clubs, interdisciplinary communities, or themed workshops. These efforts encourage students to participate and form a broader network for art education.

Conducting Extracurricular Activities Related to Participatory Public Art

In addition to incorporating participatory public art into the curriculum, universities can provide practical platforms for students through extracurricular activities. By integrating artistic creation and

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public space experiences, students collaborate across disciplines and interact with faculty. This approach enhances their artistic practice.

In 2023, the Wuhan Institute of Design and Engineering and the Hubei Artists Association jointly organised the inaugural "Wu Xing Wu Se Public Art Festival." This event is a typical example. It encompassed sculpture, installation, new media, fibre art, and ecological art. Faculty, students, and professional artists participated in the event. The process emphasised integrating art and the environment. It also focused on the works' interactivity and public expression. University leaders, artists, and students jointly promoted the event. Public art creation became part of daily campus life. The festival fostered an atmosphere of empathy for campus life through art and the co-creation of the campus environment through design. Through these activities, students enhance their aesthetic literacy, creativity, and practical skills by engaging in creation, observation, exchange, and teamwork. The public interaction generated by the works enhances the campus's cultural atmosphere and the effectiveness of aesthetic education. Public art becomes a truly integral part of campus life (Zhang, 2020).

Conclusions

In summary, the introduction of participatory public art into university education not only provides students with opportunities to understand the relationship between art and society but also fosters their aesthetic sense, creativity, collaboration, and emotional development. By integrating curricular and extracurricular activities, students can gain experience in real-world social and public spaces, thereby enhancing their comprehensive literacy and awareness of humanistic care. This research aligns with the core goals of modern aesthetic education, confirming that participatory art serves as a necessary bridge between theoretical learning and social responsibility.

Future teaching practices should prioritise integrating diverse disciplinary backgrounds and educational needs to design more open and sustainable participatory art projects. Educators and administrators are encouraged to collaborate in continuously implementing and refining these projects. By doing so, the educational value of participatory public art will be further realised, deepening the connection between university aesthetic education and social practice.

References

Bishop, C. (2012). *Artificial hells: Participatory art and the politics of spectatorship*. Verso.

Finkelpearl, T. (2001). *Dialogues in public art*. MIT Press.

Guo, H., & Guo, R. (2019). Gaoxiao gonggong yishu jiaoyu jiaogai mianlinde kunjing yu celüe yanjiu [Research on the dilemmas and strategies of public art education reform in colleges and universities]. *Zuojia Tiandi [Writer's World], (29)*.

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Hoshina, T. (保科丰巳), & Le, L. (乐丽君). (2020). Dongjing yishu daxue gonggong yishu canyu shi jiaoxue [Participatory teaching of public art at Tokyo University of the Arts]. *Gonggong Yishu [Public Art], (1),* 249.

Hu, W., Deng, Y., & Xiong, Y. (2022). Gaoxiao gonggong yishu jiaoyu mianlinde kunjing ji chulu—Ping 《Gonggong yishu jiaoyu yanjiu》 [Dilemmas and solutions of public art education in colleges and universities—Review of "Research on public art education"]. *Zhongguo Gaoxiao Keji [China University Science and Technology], (2),* 408.

Kang, C. (2023). "Yi meiyu ren" shiyu xia gaoxiao gonggong yishu jiaoyu fazhan yanjiu [Research on the development of public art education in colleges and universities from the perspective of "educating people with aesthetics"]. *Daguan (Lun Tan) [Grand View (Forum)], (4).*

Kester, G. H. (2004). *Conversation pieces: Community and communication in modern art*. University of California Press.

Li, H. (2024). Xin shidai meiyu shiyu xia gaoxiao gonggong yishu jiaoyu yanjiu [Research on public art education in colleges and universities from the perspective of aesthetic education in the new era]. *Xin Meiyu [New Aesthetic Domain], (5),* 108.

Li, T. (2023). Xin shidai gaoxiao gonggong yishu jiaoyu de yuanjing, kunjing yu fazhan celüe [Vision, dilemma, and development strategy of public art education in colleges and universities in the new era]. *Zhongguo Renmin Daxue Jiaoyuxue Kan [Journal of Education Science of Renmin University of China], (8),* 859.

Liu, Y., & Yang, J. (2021). Yishu yu shequ gongsheng: Mo'erben huangjia ligong daxue de canyu shi gonggong yishu jiaoyu [The symbiosis of art and community: Participatory public art education at RMIT University, Melbourne]. *Gonggong Yishu [Public Art], (3),* 336.

Zhang, D. (2021). Meiyu shiyu xia gaoxiao gonggong yishu jiaoyu de gaige yanjiu [Research on the reform of public art education in colleges and universities from the perspective of aesthetic education]. *Jiangsu Gaojiao [Jiangsu Higher Education], (39),* 2687.

Zhang, H. (2020). Gaoxiao gonggong yishu jiaoyu kechixu fazhan lujing chutan [Preliminary study on the sustainable development path of public art education in colleges and universities]. *Jiaoyu Lilun Yu Shijian [Theory and Practice of Education],* (2020-04-25).

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Harnessing Digital Informal Learning for Quantity Surveying Student Development

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ABSTRACT: The growing digitalisation of the construction industry demands that future quantity surveyors develop strong digital competencies. While formal education remains central, students increasingly engage in *digital informal learning*- self-motivated use of online platforms, tools, and communities beyond the classroom. Despite its prevalence, little is known about how quantity surveying students harness digital informal learning, the skills they acquire, the barriers they encounter, and strategies for integrating such practices into their academic and professional development. This study employed a qualitative approach, guided by four research questions. Data were analysed thematically to explore the platforms students use, the competencies they develop, the challenges they face, and strategies to strengthen digital informal learning within higher education. The findings reveal that students rely heavily on platforms such as YouTube, LinkedIn, WhatsApp groups, and professional forums to acquire both technical competencies and employability skills. However, barriers such as poor internet access and time constraints hinder optimal engagement. Students expressed the need for institutional support, curriculum integration, and student-centred approaches to maximise the benefits of digital informal learning. The study concludes that digital informal learning is not peripheral but central to the way quantity surveying students engage with knowledge and professional skill-building.

KEYWORDS: Digital informal learning, quantity surveying students, professional competencies, employability skills, construction education.

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Introduction

The construction industry is becoming increasingly digitised, requiring future professionals such as quantity surveyors to develop strong digital literacy, adaptability, and self-directed learning skills (Liebenberg and Els, 2022). Traditionally, formal education has been the cornerstone of knowledge acquisition in quantity surveying (Ebekozien and Aigbavboa, 2024). However, the rapid growth of digital technologies, social media platforms, online communities, and open-access resources has created new opportunities for learning outside the structured classroom environment. This phenomenon, commonly referred to as digital informal learning, involves the use of digital platforms to acquire knowledge, share experiences, and build competencies in an unstructured, self-driven manner (He and Li, 2019; Tazhenova et al., 2024). For students in quantity surveying, digital informal learning may include engaging with online forums, video tutorials, collaborative platforms, professional networking sites, or digital tools that simulate industry practices. Such learning experiences can foster academic growth, professional development, and employability skills, thereby complementing formal curriculum delivery.

Despite its growing relevance, limited attention has been given to how quantity surveying students specifically harness digital informal learning, the kinds of skills they acquire through it, and the challenges they encounter in the process. Few studies specify actual platforms for digital informal learning; Masanet et al. (2019) mention YouTube, while Leiß & Rausch (2023) highlight information-seeking and peer support. Most others are abstract. Mehrvarz (2021), Heidari (2021), and He (2021) provide strong evidence that digital competence and digital informal learning improve performance and engagement, which can be linked to QS professional skills. Identified barriers include the underutilization of collaboration tools (Degner, 2022), cultural/competence gaps (He & Li, 2019), gender differences (He, 2018), and negative emotional factors (Leiß & Rausch, 2023). Suggested strategies include competence training, user-friendly platforms, integrating digital media into pedagogy, and fostering collaboration/social interaction (He & Li, 2019; Tazhenova, 2024; Heidari, 2021).

While digital informal learning has been widely recognised in broader higher education contexts, its role in the development of quantity surveying students remains underexplored. Many students rely heavily on digital resources outside the classroom; however, there is a lack of systematic understanding of the platforms they use, the professional and employability skills they acquire, and the barriers that constrain effective engagement. Furthermore, strategies for integrating or complementing digital informal learning within formal academic structures are not clearly articulated. Without this knowledge, educators and institutions may miss opportunities to leverage digital informal learning as a powerful tool for student development in an increasingly digital professional landscape. Such knowledge will provide insights into how quantity surveying students can maximise digital informal learning opportunities to complement formal education. By identifying the platforms and practices that enhance professional competencies and employability skills, students will be better positioned to take charge of their personal and career development in a highly digitalised industry.

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It will inform lecturers and curriculum developers about the hidden learning practices students already engage in beyond the classroom. Recognising these practices can help educators design teaching strategies that align with students' digital learning habits and encourage a blended approach that bridges formal and informal learning. Universities and training bodies can utilise the findings to develop policies and support systems that promote digital informal learning, such as integrating recommended platforms, providing digital resources, or offering guidance on self-directed online learning. This may also contribute to improving student outcomes and readiness for professional practice. This research contributes to preparing future professionals who are not only technically competent but also digitally literate, adaptable, and capable of continuous self-learning. As the industry adopts Building Information Modelling (BIM), digital project management, and collaborative platforms, graduates accustomed to digital informal learning will be more effective in adopting and applying new technologies. It will also fill a gap in the existing body of literature by focusing specifically on quantity surveying students—a group whose engagement with digital informal learning has not been widely examined.

Research Aim and Research Questions

This study aims to explore how quantity surveying students harness digital informal learning for their academic and professional development. The study aimed to address the following research question: What digital platforms and tools do quantity surveying students most frequently utilise for informal learning? How does digital informal learning enhance the professional competencies of quantity surveying students? What barriers hinder quantity surveying students from fully engaging in digital informal learning? What strategies can be developed to strengthen the role of digital informal learning in quantity surveying education?

Literature review

Previous studies provide valuable insights into digital informal learning (DIL), but their relevance to the specific context of quantity surveying (QS) education varies. In terms of identifying the digital platforms and tools most frequently used for informal learning, the literature offers only partial answers. Degner et al. (2022) show that both portable and stationary digital media are used almost equally in informal learning contexts, with emerging interest in augmented reality. However, the focus remains on functional categories rather than specific platforms. Masanet et al. (2019) go further by identifying YouTube as a central tool for adolescents' acquisition of transmedia skills, which can be extrapolated to QS students who often rely on video-based tutorials for software learning. Similarly, Leiß and Rausch (2023) emphasise the importance of online information-seeking and peer consultation in resolving digital problems, although their study focuses specifically on software troubleshooting. Overall, while these findings highlight the centrality of information-rich platforms such as YouTube, search engines, and peer networks, there is limited direct evidence of the platforms most relevant to QS students, particularly those aligned with professional applications like BIM or cost management software.

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When considering the role of DIL in enhancing professional competencies, several studies underscore the link between digital competence and learning outcomes. Mehrvarz et al. (2021) demonstrate that digital informal learning mediates the relationship between digital competence and academic performance, implying that informal engagement is not merely supplemental but contributes directly to measurable outcomes. Heidari et al. (2021) and He et al. (2021) similarly show that digital competence improves academic engagement and learning behaviours, with informal learning mediating or reinforcing these effects. For QS education, this suggests that cultivating students' digital competence is likely to improve their ability to engage informally with domain-specific tools, thereby strengthening competencies in areas such as measurement, contract administration, and project management. Degner et al. (2022) also highlight the potential of digital media to support cognitive and motivational processes, while Tazhenova et al. (2024) emphasise the role of digital media in enhancing engagement and motivation, though with less evidence of direct cognitive gain. These findings confirm that informal learning is a meaningful contributor to competency development, although the studies rarely specify competencies in professional fields, such as QS.

The literature also highlights barriers that hinder students' engagement with digital informal learning. Degner et al. (2022) highlight the underutilization of collaborative functions in digital tools, while He and Li (2019) emphasise that cultural factors and technology expectancy significantly influence learning behaviours, suggesting that cultural diversity in QS classrooms may shape the uptake of informal learning. He et al. (2018) identify gender-based differences in digital competence, which may limit equitable engagement. Leiß and Rausch (2023) introduce a psychological perspective, noting that irritation, annoyance, and even experimentation may negatively affect perceived learning outcomes, while guilt and social support foster them. These findings suggest that barriers extend beyond technical access to include cultural, psychological, and gendered factors that impact the quality of engagement. However, most of these studies do not address structural barriers such as the cost of access, digital infrastructure, or lack of domain-specific resources, which may be more pressing in QS education in developing contexts.

Ultimately, the reviewed studies offer strategic recommendations for enhancing digital informal learning in higher education. He and Li (2019) emphasise the importance of digital competence training and user-friendly platform design to ensure inclusivity across cultural contexts. Heidari et al. (2021) recommend institutional provision of efficient and engaging platforms to sustain academic engagement, while Tazhenova et al. (2024) advocate integrating media technologies into pedagogy to boost motivation and active involvement. Georgopoulou et al. (2023) add a conceptual dimension by proposing frameworks that integrate formal and informal learning with critical digital literacy, offering a useful design lens for QS education. Despite these recommendations, most strategies remain broad and non-disciplinary, with little attention to tailoring informal learning approaches to specific professional fields such as quantity surveying. Previous studies collectively highlight that digital informal learning is

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supported by general-purpose platforms (such as YouTube and search engines), improves learning outcomes through digital competence, and faces barriers shaped by cultural, psychological, and gender differences. They also propose strategies that emphasise competence training, user-friendly design, and pedagogical integration. However, significant gaps remain in relation to quantity surveying education, particularly regarding the identification of QS-specific platforms and tools, the direct mapping of informal learning to professional competencies, and the contextual barriers that affect students in developing economies. Addressing these gaps will be crucial to developing targeted strategies for leveraging digital informal learning in QS education.

Methods

This study employed a qualitative research design to investigate how quantity surveying students utilise digital informal learning for their academic and professional development. A qualitative approach was considered appropriate because it allows for an in-depth understanding of students' experiences, perceptions, and challenges within their natural learning contexts. The population for this study comprised undergraduate quantity surveying students at Obafemi Awolowo University, Ile-Ife, Nigeria. Using purposive sampling, 22 students were selected across different levels of study (from 200 to 500 levels). This sampling ensured a diversity of perspectives, capturing variations in digital informal learning practices among students at different stages of their academic journey. Data were collected through semi-structured interviews. An interview guide was developed based on the research questions, covering areas such as platforms and tools used for digital informal learning, skills acquired, challenges encountered, and suggestions for enhancing digital informal learning. Each interview lasted between 30 and 45 minutes and was conducted either face-to-face or virtually, depending on participants' availability. With consent, all interviews were audio-recorded and later transcribed verbatim. Questions asked in the interview include:

- What digital platforms and tools do quantity surveying students most frequently use for informal learning?
- In what ways do quantity surveying students engage with digital informal learning outside the formal classroom?
- How does digital informal learning enhance the professional competencies of quantity surveying students?
- What employability skills do students report gaining through digital informal learning activities?
- What barriers hinder quantity surveying students from fully engaging in digital informal learning?
- How do students perceive the limitations of digital informal learning in their academic and professional development?

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- What strategies can be developed to strengthen the role of digital informal learning in quantity surveying education?
- How can academic institutions support students in leveraging digital informal learning for holistic development?

The data were analyzed using thematic analysis, following Braun and Clarke's six-step approach: (1) Familiarization with data through repeated reading of transcripts; (2) Initial coding of meaningful units related to the research questions; (3) Searching for themes by grouping similar codes; (4) Reviewing themes to ensure alignment with the dataset; (5) Defining and naming themes to capture their essence; and (6) Producing the final report, supported with illustrative quotes from participants. Themes were organised around the four research questions: (i) platforms and tools used; (ii) competencies developed; (iii) challenges encountered; and (iv) strategies for improvement. To ensure credibility and reliability, measures such as member checking (selected participants reviewed the transcripts and summaries of findings for accuracy), triangulation (data were compared across participants at different study levels to identify consistent patterns), peer debriefing (emerging themes were discussed with colleagues in the built environment discipline to validate interpretations), and audit trail (detailed documentation of the research process was maintained to enhance transparency). Participants were informed of the study's purpose and assured of confidentiality and anonymity. Informed consent was obtained before data collection, and participants retained the right to withdraw at any time without consequence.

Results and Discussion

The thematic analysis in Table 1 shows that digital informal learning is already a vibrant and impactful practice among quantity surveying students, shaping both their academic and professional development. However, its potential is curtailed by barriers that require institutional recognition and strategic support. By aligning formal education with students' informal practices, universities can foster a more holistic and future-ready learning ecosystem. A consistent pattern from RQ1 is the heavy reliance on social media platforms (such as WhatsApp and LinkedIn) and video-based resources (like YouTube) for informal learning. These platforms are favoured for their accessibility, immediacy, and collaborative features. Unlike formal institutional platforms (for example, Learning Management Systems, or LMS), students tend to gravitate toward tools that are flexible and peer-driven. This highlights that students' preferred digital spaces are often outside the formal control of institutions. Universities need to recognise and align teaching strategies with the platforms students already use, rather than relying solely on traditional learning management systems. From RQ2, digital informal learning was found to contribute not just to technical skill development (for example, BIM, cost estimation software) but also to soft skills such as communication, networking, and adaptability. Students reported acquiring relevant knowledge more quickly than through classroom instruction. This suggests that digital informal learning is a valuable complement to formal education, equipping students with a broader skill set that aligns with industry expectations. It supports the view that informal learning helps bridge the gap between academic

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knowledge and professional practice.

RQ3 revealed structural barriers, such as poor internet access and limited access to credible resources, alongside individual challenges, including time constraints and difficulty evaluating quality information. These barriers limit the depth and consistency of students' engagement with digital informal learning. This highlights the need for systemic interventions, such as enhancing digital infrastructure, and personal development interventions, including teaching digital literacy and critical evaluation skills. Without addressing these barriers, the benefits of digital informal learning cannot be fully realised. Under RQ4, students suggested institutional support (providing access to professional platforms, workshops) and curriculum integration (embedding recommended digital resources into coursework) as ways to strengthen digital informal learning. They also emphasised student-centred approaches, such as peer-to-peer learning and recognition of digital practices within formal assessment. This underscores the importance of moving from a passive tolerance of digital informal learning to an active integration of it within academic programs. Institutions that adopt these strategies can cultivate digitally literate, self-directed learners who are better prepared for the modern construction industry.

The thematic analysis of quantity surveying students' digital informal learning practices, as analysed in Table 1, confirms much of what the broader literature suggests, while also offering sharper discipline-specific insights. Regarding RQ1 (platforms and tools), the findings indicate that QS students heavily rely on social media platforms (WhatsApp, LinkedIn) and video-based resources (YouTube) for informal learning. This corroborates Masanet et al. (2019), who identified YouTube as a key site for transmedia skill development, and Leiß and Rausch (2023), who stressed the role of online information-seeking and peer support. However, while Degner et al. (2022) emphasised general digital media functions (information retrieval, AR, collaboration), they did not highlight the strong preference for peer-driven and accessible platforms that were revealed in this study. Likewise, studies such as He and Li (2019) and Heidari et al. (2021) discuss the importance of digital competence but are less attentive to the specific platforms students gravitate toward. The contrast here is clear: whereas much of the literature remains abstract, the findings of this study pinpoint the everyday platforms shaping QS students' informal learning, underscoring the mismatch between institutional reliance on formal LMSs and students' preference for flexible, collaborative, and non-institutional tools.

For RQ2 (contribution to competencies), this study's findings demonstrate that digital informal learning enhances not only technical skills, such as BIM and cost estimation software, but also soft skills, including communication, networking, and adaptability. This aligns strongly with Mehrvarz et al. (2021) and Heidari et al. (2021), who demonstrated that DIL mediates the relationship between digital competence and academic performance or engagement, thereby enhancing overall outcomes. Similarly, Degner et al. (2022) and Tazhenova et al. (2024) reported the motivational and social benefits of digital media use, which align with the soft skills that QS students reported. Yet, the findings of this study extend these insights by explicitly mapping DIL outcomes to QS professional competencies,

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providing a discipline-specific layer that is often missing from most studies. Importantly, QS students reported acquiring relevant knowledge more quickly than in classrooms, suggesting that informal digital practices bridge the academic–industry gap more directly than formal instruction—a nuance not captured in broader higher education researRegarding RQ3 (barriers), the analysis identifies structural obstacles, such as poor internet access and limited credible resources, alongside individual challenges, including time constraints and difficulty in evaluatingting information quality. These findings partially corroborate earlier work: He and Li (2019) highlighted cultural and competence-related differences, while He et al. (2018) identified gender disparities, and Leiß and Rausch (2023) pointed to emotional barriers such as frustration. However, the structural barriers evident in this study – especially unreliable infrastructure and resource scarcity – are largely absent from the global literature, which tends to assume relatively robust digital ecosystems. This contrast highlights the contextual realities of QS students in developing economies, where infrastructural deficits can significantly curtail the depth of digital engagement. This study's findings, therefore, add a critical dimension to the literature, stressing that access issues, not just competence or attitudes, must be addressed.

Finally, for RQ4 (strategies), students in this study called for institutional recognition of informal practices through measures such as access to professional platforms, workshops, and integration of digital resources into the curriculum. This aligns with recommendations from Heidari et al. (2021), who emphasised user-friendly platforms, and Tazhenova et al. (2024), who advocated for greater integration of media technologies into pedagogy. Georgopoulou et al. (2023) further emphasise the importance of connecting formal and informal learning spaces through intentional design. Yet, this study's findings go further by revealing student-driven strategies such as peer-to-peer learning, recognition of digital practices in assessment, and embedding of industry-relevant platforms into coursework. These student-centred proposals highlight a shift from passive acknowledgement of informal learning, often found in the literature, toward active institutional integration that directly supports QS students' professional preparation.

Table 1

Thematic analysis of quantity surveying students' digital informal learning practices

Research Question	Themes Identified	Findings
RQ1: What digital platforms and tools do quantity surveying students most frequently use for informal learning?	• Social Media Platforms • Video-based Learning • Professional/Technical Tools	"I rely heavily on YouTube tutorials for cost estimation software." "WhatsApp groups with classmates help me exchange materials quickly." "LinkedIn and professional forums expose me to industry trends."
RQ2: How does digital informal learning enhance the professional competencies of	• Technical Skill Development • Employability Skills	"Through online forums, I learned how to use BIM-related applications." "Sharing content on LinkedIn improved

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quantity surveying students?	• Lifelong Learning Habits	my communication and networking skills." "It helps me stay up to date without waiting for lectures."
RQ3: What barriers hinder quantity surveying students from fully engaging in digital informal learning?	• Technological Constraints • Quality/ Credibility Issues • Personal and Environmental Challenges	"Poor internet access sometimes discourages me from learning online." "It's hard to know which resources are reliable." "Balancing coursework with time spent on digital learning is a struggle."
RQ4: What strategies can be developed to strengthen the role of digital informal learning in quantity surveying education?	• Institutional Support • Curriculum Integration • Student-Centered Approaches	"Universities should give us access to paid professional platforms." "Lecturers could recommend credible YouTube channels and websites." "Workshops on evaluating digital resources would be very useful."

Source: author's own development

Conclusions

This study examined the role of digital informal learning in the development of quantity surveying students, focusing on the platforms they utilise, the skills they acquire, the challenges they encounter, and strategies to enhance its educational impact. The findings reveal that students are already highly engaged in digital informal learning, primarily through social media, video-based resources, and professional platforms. These practices significantly enhance their technical competencies and employability skills, bridging gaps between classroom learning and industry expectations. However, persistent barriers such as limited internet access, challenges in evaluating credible resources, and time management constraints hinder optimal engagement. Despite these challenges, students express a strong desire for institutional support, curriculum integration, and the creation of student-centred digital learning initiatives. In conclusion, digital informal learning is not peripheral but central to the way quantity surveying students learn, adapt, and prepare for professional practice. Harnessing it effectively can produce graduates who are not only academically competent but also digitally literate, self-directed, and industry-ready.

Based on the findings, several targeted recommendations are advanced for students, educators, institutions, and the broader quantity surveying profession. For students, it is essential to cultivate critical digital literacy skills that enable them to evaluate the credibility of online resources. They are also encouraged to actively participate in professional networks such as LinkedIn and BIM forums, as these platforms provide valuable opportunities to strengthen employability prospects. At the same time, students should learn to balance their formal coursework with informal digital learning to maximise the

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benefits of both without experiencing information overload. For educators, greater recognition of students' preferred digital platforms—such as YouTube and WhatsApp groups—can help improve teaching strategies and enhance engagement. Educators should also recommend credible online resources while curating digital toolkits that align with curriculum objectives. In addition, fostering peer-to-peer digital learning communities is encouraged, as such interactions can effectively complement formal classroom activities.

At the institutional level, efforts should be directed toward strengthening digital infrastructure, particularly by ensuring reliable internet access across campuses. Institutions should also provide access to paid professional learning platforms, including specialised resources such as RICS databases and BIM software tutorials. Furthermore, organising workshops on self-directed learning, digital resource evaluation, and professional networking will help equip students with essential lifelong learning skills. Finally, for the quantity surveying profession and industry, collaboration with universities is recommended to develop industry-aligned digital learning modules. The profession should also support students' access to professional digital platforms and online communities, recognising that such engagement is integral to their development. Importantly, digital informal learning should be formally acknowledged as a critical pathway for continuous professional development in the profession.

References

Degner, M., Moser, S., & Lewalter, D. (2022). Digital media in institutional informal learning places: A systematic literature review. *Computers and Education Open, 3,* 100068.

Ebekozien, A., & Aigbavboa, C. O. (2024). Improving quantity surveying education through continually updating curriculum digitalisation to meet industry requirements. *Journal of Engineering, Design and Technology, 22*(5), 1523–1543.

Georgopoulou, M. S., Troussas, C., & Sgouropoulou, C. (2023, September). A conceptual framework for a critical approach to the digital world: Integrating digital humanities and informal learning into educational design. In *Novel & Intelligent Digital Systems Conferences* (pp. 141–150). Springer Nature Switzerland.

He, T., & Li, S. (2019). A comparative study of digital informal learning: The effects of digital competence and technology expectancy. *British Journal of Educational Technology, 50*(4), 1744–1758.

He, T., Huang, Q., Yu, X., & Li, S. (2021). Exploring students' digital informal learning: The roles of digital competence and DTPB factors. *Behaviour & Information Technology, 40*(13), 1406–1416.

He, T., Zhu, C., & Questier, F. (2018). Predicting digital informal learning: An empirical study among Chinese university students. *Asia Pacific Education Review, 19*(1), 79–90.

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Heidari, E., Mehrvarz, M., Marzooghi, R., & Stoyanov, S. (2021). The role of digital informal learning in the relationship between students' digital competence and academic engagement during the COVID-19 pandemic. *Journal of Computer Assisted Learning, 37*(4), 1154–1166.

Leiß, T. V., & Rausch, A. (2023). Informal learning from dealing with software-related problems in the digital workplace. *Journal of Workplace Learning, 35*(9), 291–310.

Liebenberg, G., & Els, M. M. (2022). The impact of the 4th industrial revolution on quantity surveying education in South Africa: A qualitative overview on soft skill requirements. In *Building smart, resilient and sustainable infrastructure in developing countries* (pp. 79–88).

Masanet, M. J., Guerrero-Pico, M., & Establés, M. J. (2019). From digital native to digital apprentice: A case study of the transmedia skills and informal learning strategies of adolescents in Spain. *Learning, Media and Technology, 44*(4), 400–413.

Mehrvarz, M., Heidari, E., Farrokhnia, M., & Noroozi, O. (2021). The mediating role of digital informal learning in the relationship between students' digital competence and their academic performance. *Computers & Education, 167,*104184.

Tavares, V. D. S., & Melo, R. B. D. (2019). Possibilities for formal and informal learning in the digital era: What does the digital native youth think? *Psicologia Escolar e Educacional, 23,* e183039.

Tazhenova, G., Mikhaylova, N., & Turgunbayeva, B. (2024). Digital media in informal learning activities. *Education and Information Technologies, 29*(16), 21673–21690.

Trinder, K., Guiller, J., Margaryan, A., Littlejohn, A., & Nicol, D. (2008). Learning from digital natives: Bridging formal and informal learning. *Higher Education, 1,* 1–57.

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Artificial Intelligence Applications in University Autonomy: A Case of Selected Vietnamese Universities

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ABSTRACT: In the digital age, with the remarkable development of artificial intelligence (AI), AI has been applied in many fields. The education sector also needs to be focused on; universities should apply AI to university autonomy. In this article, we present the current situation and solutions, the benefits of applying AI to university autonomy: (i) From the school side; (ii) From the lecturer side. The study emphasises that applying AI to university autonomy will help manage university activities more effectively, accurately and sustainably.

KEYWORDS: AI applications; university initiative; university finance; university governance.

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Introduction

Artificial Intelligence (AI) refers to human-developed systems that enable machines to perform intelligent or computational tasks beyond human capabilities. University autonomy refers to the capacity of higher education institutions to make independent decisions in governance, finance, academics, and personnel management within established legal frameworks. As higher education advances through digital transformation, applying AI in university autonomy presents both challenges and opportunities, enhancing flexibility, governance efficiency, and academic quality. The current global economic and management context is strongly influenced by digital transformation, economic and political uncertainty, and environmental change. According to the OECD (2025), global economic growth is projected to decline to approximately 2.9% by 2026 due to fluctuations in trade and investment policies. This situation requires universities – as centres of knowledge – to adapt rapidly and apply new technologies, particularly AI, to strengthen their management, planning, and decision-making capacities in an ever-changing environment.

Research Methodology

During the research phase, most authors adopted qualitative research methods. The collected data helps determine the validity of conclusions and guides future studies. Therefore, this paper evaluates the comprehensive quality of AI applications in university autonomy by employing principles of synthesis and comparative analysis.

Current Status of University Autonomy in Vietnam

University Autonomy

On December 14, 2024, more than 400 representatives from over 150 higher education institutions nationwide participated in the national conference titled "Innovating University Governance Based on Autonomy Linked to Quality Assurance." The conference highlighted major factors affecting university autonomy in Vietnam, such as faculty quality, student satisfaction, digital transformation, competency frameworks, quality assurance, and university–industry collaboration. Since 2019, autonomy reforms in Vietnamese universities have driven innovation, but they have also revealed challenges in management, regulation, and coordination. Clarifying the roles of university councils and ensuring equality between public and private institutions remains essential. Globally, autonomy models are increasingly linked to digital transformation. OECD and UNESCO emphasise the use of big data and AI to enhance transparency, efficiency, and sustainability. Universities such as those in Helsinki and Singapore have applied AI in human resource planning, budgeting, and learner analytics to enhance governance flexibility and institutional self-reliance.

Challenges in Governance Autonomy: Lack of management capacity, power conflicts, and insufficient supervisory mechanisms.

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Challenges in Organisational and Personnel Autonomy: Shortages of qualified personnel, resistance to change, and a lack of transparency and fairness in recruitment.

Challenges in Financial Autonomy: Some universities, particularly public ones, struggle to balance expenses and revenue, facing instability in financial resources.

Challenges in Academic Autonomy: Difficulties in improving training programs, governance, and scientific research due to limited resources and inadequate support mechanisms.

Challenges in Brand and Communication Autonomy: As of 2023, social media and internet users in Vietnam reached approximately 77 million, accounting for 79.1% of the population.

This situation presents both opportunities and challenges: negative news can spread quickly, demanding effective crisis communication. Public perception also remains a barrier, as parents and students tend to favour long-established universities, making it more challenging for new autonomous institutions to establish trust and build their reputation.

Solutions for Applying Artificial Intelligence in University Autonomy

Governance Autonomy

AI-supported tools, such as Virtual Reality (VR), can enhance university management, improve the student and faculty experiences, and streamline administrative processes.

VR enables virtual workshops and meetings, reducing costs while increasing interactivity. Integrated with AI, it can visualise student data in 3D, enabling administrators to track performance and make informed decisions.

According to McKinsey (2025), AI applications in administration can reduce strategic decision-making time by 25% through automated data analysis, enabling universities to forecast enrollment, finances, and research trends more accurately.

Organisational and Human Resource Autonomy

AI supports universities in recruitment, appointment, and faculty development aligned with institutional needs and competency standards. Data-driven analytics can forecast staffing demands using trends in recruitment, turnover, and workload, ensuring precise human resource planning. AI-based performance tools automatically assess staff productivity and faculty outcomes, identify competency gaps, and suggest suitable training programs.

Financial Autonomy

According to David (2020), artificial intelligence is highly beneficial in helping institutional managers design budgets and allocate resources more efficiently. Supporting this view, Pawar et al. (2023) argue that advanced algorithms can analyse historical financial data and accurately predict future trends, enabling real-time adjustments to changing market conditions. Based on these findings, research

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concludes that AI-assisted financial tools enhance the quality of financial service delivery in universities. When AI is implemented in financial automation, auditing, and budgeting, it improves documentation accuracy and optimises resource allocation to support high-quality educational services.

Recommendations include:

(i) University administrators should adopt AI to automate major expenditures and revenues, enhancing accuracy and transparency in financial transactions.

(ii) Governments should implement AI-supported auditing tools in universities to ensure precise financial reporting and cost reduction.

(iii) Administrators should train staff to use AI tools for sustainable budgeting effectively.

Financial and budget management: VR-based software can simulate budget flows, operational expenses, and investment projects in 3D charts, enabling leadership teams to analyse data and make informed financial decisions.

Academic Autonomy

AI chatbots serve as intelligent assistants that support teachers in instruction, grading, and tracking student performance, acting as virtual tutors that complement real educators. For example, ELSA Speak applies AI tutoring to enhance English pronunciation. Modern e-learning platforms are increasingly integrating AI and IoT to create intelligent systems for online teaching, assessment, and communication among schools, students, and parents. AI-based game learning personalises education through adaptive, interactive games tailored to each learner's goals and abilities, promoting faster and more engaging learning.

Developing a Quality Training System

AI can help overcome overcrowded classrooms and limited practice by personalising learning through E-learning platforms such as Coursera and Khan Academy, which adapt content to learners' levels and include virtual labs for simulation. AI also analyses labour market trends to update curricula, aligning programs with real-world job demands. It supports faculty through automated grading, learning analytics, and personalised training, helping to improve teaching efficiency. According to the World Economic Forum (2024), 44% of the global workforce's skills will change within five years due to AI and automation, emphasising the need for universities to integrate digital literacy, data management, and AI ethics into their curricula.

Conclusion

To integrate AI effectively in university autonomy, institutions must invest in technology and staff training, supported by public or private funding. Clear policies are essential to ensure AI enhances education without compromising its humanistic values. AI streamlines operations, improves accuracy,

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and optimises resources while helping faculty enhance teaching quality and students access innovative learning tools. When applied strategically, it strengthens the overall quality and competitiveness of higher education.

Amidst globalisation and digital transformation, AI serves as a strategic driver for Vietnamese universities in their pursuit of international integration. Following OECD, UNESCO, and World Bank frameworks, investment in digital infrastructure and AI-skilled faculty will determine the competitiveness of Vietnam's higher education by 2030.

References

Fabrice, H., & Mitterle, A. (2010). *Governance and quality guidelines in higher education: A review of governance arrangements and quality assurance guidelines* (pp. 17–35). Organisation for Economic Co-operation and Development (OECD).

Hearn, J. C., & Burns, R. (2021). Contingent faculty employment and financial stress in public universities. *Higher Education Review, 92*(3), 331–362.

Hồng, G. (2024). Đổi mới quản trị đại học trên cơ sở tự chủ đại học phải gắn liền với bảo đảm chất lượng [University governance reform based on autonomy must be associated with quality assurance]. *Trang tin của Quân đội Nhân dân – Cơ quan của Quân ủy Trung ương và Bộ Quốc phòng*.

Major-Jack, B. (2025, January). Artificial intelligence-enabled financial management tools for effective quality service delivery in Rivers State universities. *International Journal of Educational Management, 1*(2), 398–410.

McKinsey Global Institute. (2025). *AI and decision-making in organizations*. McKinsey & Company.

Organisation for Economic Co-operation and Development (OECD). (2025, September). *Global economic outlook 2025: Policy uncertainty and slowing growth*. OECD Publishing.

Tony, D. (2023). *Internet Việt Nam 2023: Số liệu mới nhất và xu hướng phát triển* [Vietnam Internet 2023: Latest data and development trends]. VNETWORK.

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2025). *Artificial intelligence and the futures of learning: Policy guidance for higher education*. UNESCO Publishing.

World Bank. (2025). *Digital transformation in higher education 2025*. Education Global Practice, World Bank Group.

World Economic Forum. (2024, April). *The future of jobs report 2024*. Centre for the New Economy and Society, World Economic Forum.

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Inclusive Teaching Strategies: Insights From Student Teachers' Experiences in South African Rural Schools

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ABSTRACT: This study examines the inclusive teaching strategies employed by student-teachers during their teaching practices in South African rural schools. The study was grounded in a qualitative research approach, employing an interpretive research paradigm to explore diverse insights from the student-teachers' experiences during teaching practice in South African rural schools. The study utilised the Learner Integration Wheel (LIW) theory of practice as its lens to frame all the insights from the student teachers. It employed a convenience sampling method to select eight participants from two rural schools (four from each school). Data was collected through focus group discussions and a reflective writing activity, which was thematically analysed. Findings from two themes that emerged from the collected data revealed that negative experiences included the unavailability of resources, lack of inclusive training, poor school support, and lack of parental involvement. The study concludes that student-teachers must be exposed to diverse and inclusive teaching strategies to accommodate the diverse learning needs of students in the classroom.

KEYWORDS: inclusive education, inclusive teaching strategies, Student-teachers, rural schools, teaching practice.

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Introduction

Drawing from the body of literature, Inclusive teaching refers to creating a learning environment where all learners are valued, respected, and supported regardless of their diverse learning needs (Nembambula et al., 2023; Sepadi, 2025). Through the Universal Design for Learning (UDL) principles, teachers are required to diversify the curriculum, teaching methods, and materials to foster a welcoming learning environment in their classrooms (McKenzie et al., 2021; Song, 2017). Through the lens of invitational theory perspectives, this study considers inclusive teaching

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strategies, such as collaborative learning and facilitative learning, crucial for ensuring effective learner engagement while offering equal opportunities for all.

Meanwhile, research has shown that a considerable factor in the effective implementation of inclusive education in rural schools is determined by teachers' attitudes, their varying interpretations of inclusive education, as well as their roles during the implementation process (Ramadhan et al., 2024; Sydorenko et al., 2024). Conversely, the implementation of inclusive education in South African schools has been widely reported since 2001, after the introduction of the Education White Paper 6. However, the literature shows that the main focus of most studies tends to be on in-service teachers, which is why the authors of this study observed an urgent need to explore the experiences of student teachers in implementing inclusive education in South African schools.

Research Aim and Objectives

The purpose of this study is to explore the inclusive teaching strategies employed by student-teachers during their teaching practices in South African rural schools. To achieve this aim, the study must ensure that these objectives are met.

1. To explore the inclusive teaching strategies employed by student teachers during their teaching practice in South African rural schools.
2. To examine the challenges encountered by student teachers in implementing inclusive teaching strategies in rural school contexts.

Research Questions

1. What inclusive teaching strategies do student teachers employ during their teaching practice in South African rural schools?
2. What challenges do student teachers experience in implementing inclusive teaching strategies in rural school contexts?

Participants profile

Table 1

Biographic information of participants

Participants Synonyms	Gender	Age between	Academic study year	Phases Teaching
Student teacher 1	Male	20-25	Third year	Foundation phase
Student teacher 2	Male	20-25	Third year	Foundation phase
Student teacher 3	Female	20-25	Third year	EFT and Senior phase
Student teacher 4	Female	25-30	Fourth Year	Foundation phase
Student teacher 5	Female	20-25	Fourth Year	EFT and Senior phase
Student teacher 6	Male	25-30	Fourth Year	EFT and Senior phase
Student teacher 7	Male	25-30	Fourth Year	EFT and Senior phase
Student teacher 8	Female	25-30	Fourth Year	EFT and Senior phase

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Research Results

Theme one: Contextually adapted inclusive teaching strategies

Through focus group discussions and reflective writing activities, student teachers demonstrated a strong awareness of the need to make learning accessible to all learners, despite the constraints of rural classrooms. Their responses stipulated various strategies they employed to ensure inclusion in their classrooms.

Use of local resources

Findings revealed that student teachers effectively utilised local resources to support learning. Moreover, in contexts where teaching aids and technological resources were limited, student teachers relied on locally available materials such as stones, sticks, cardboard, or community objects to create visual and tactile learning aids. These strategies are reflected in their comments when they engage in group discussions and reflective writing, as they answer research questions.

"In my school, we didn't have enough textbooks or charts, so I used what was available in the environment. I collected stones and sticks for counting in Mathematics, and asked learners to bring empty containers to demonstrate capacity. It helped them understand better because they could relate to what we used." (Student teacher 3, female, BEd 3rd year)

"I learned that inclusion is not about fancy technology but about being creative. In my environmentaNatural Sciences lessons, I used leaves, soil, and water from around the schoolyard to teach topics on the topics. The learners were excited, and everyone participated, even those who usually keep quiet". (Student teacher 7, male, BEd 4th year)

Use of code switching and language adaptation

Given that most rural learners speak African languages as their home languages, findings revealed that student teachers often used code-switching between English and local languages (such as Sesotho, isiXhosa, or isiZulu) to enhance comprehension (Kanyopa, 2023). Participants commented that this linguistic adaptation was particularly important for learners who struggled with English as the language of learning and teaching (LoLT).

> *"Most of my learners struggled to understand English instructions, so I explained in Sesotho and then repeated in English. This way, they were not left behind, and even those who were shy started to participate more actively."*
> (Student teacher 1, female, BEd 3rd year)

"Code-switching became part of my teaching strategy. I realised that using isiXhosa examples helped learners grasp new concepts quickly. I didn't see it as lowering standards but as helping them build confidence in learning through understanding."
(Student teacher 8, female, BEd 4th year)

Use of indigenous knowledge and cultural response activities

Findings also indicated that some student teachers used indigenous stories, songs, and role-play to promote participation, particularly among learners with learning difficulties or those with limited confidence. This was observed from the following comments.

"I used local stories and proverbs to explain moral lessons in Life Skills, so that my learners could connect with the examples because they were part of their daily lives. It made teaching

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inclusive because everyone's background mattered."
(Student teacher 4, female, BEd 4th year)

"When I taught History, I asked learners to share stories from their grandparents about life in the past. It encouraged participation and showed that even those with limited reading skills had valuable knowledge to contribute."
(Student teacher 2, Male, BEd 3rd year)

Overall, these inclusive strategies reflected a resilience in teaching and learning, whereby the drawn experiences of student teainsSouthsAfricabshapedltheidrawn rxperiencescofistudent teachersAfrica. However, the findings also revealed that the effectiveness of these strategies depended largely on the level of support from mentor teachers and school leadership, as well as the student teachers' own confidence in applying the inclusive principles they had learned at university.

Theme two: Challenges and constraints faced by student teachers in the Implementation of inclusive teaching in rural schools

Despite their passion and commitment to inclusive teaching, student teachers faced multiple barriers that limited the consistent implementation of inclusive strategies. These challenges are discussed as follows.

Overcrowded classrooms

Findings revealed that large class sizes were one of the most prominent challenges, making it difficult to provide individualised attention or differentiated instruction (Kanyopa & Mokhele-Makgalwa, 2024a). In their comments, student teachers mentioned that they had to manage classes of 40–60 learners in under-resourced classrooms.

"In my Grade 6 class, there were more than fifty learners, and it was very difficult to give individual attention. Even when I wanted to help struggling learners, the time was never enough because I had to manage the whole class." (Student teacher 2, male, BEd 3rd year)

"The number of learners in one classroom was overwhelming. I tried to use group work, but some learners still got lost in the crowd. It made inclusive teaching very challenging." (Student teacher 8, female, Bed 4th year)

Limited understanding of inclusive education among mentor teachers

Another significant challenge was the limited understanding of inclusive education among some mentor teachers, who often viewed inclusion as relevant only to learners with visible disabilities. Participants revealed that this narrow interpretation hindered their efforts to apply a broader, socially inclusive approach aligned with the Department of Basic Education's (DBE) policy on inclusive education, which promotes access and participation for all learners regardless of their (dis) abilities (Kanyopa & Hlalele, 2021; Kanyopa & Chibaya, 2025). The participants of the study expressed their thoughts as follows.

"My mentor teacher believed inclusive education was only for children with disabilities. When I tried to use group work and peer support, she told me it was a waste of time and that I should just teach and move on." (Student teacher 6, male, Bed 4th year)

"Some of the teachers didn't understand what inclusion really means. They expected me to teach traditionally and not to 'spend too much time on weak learners,' as they called them."
(Student teacher 3, female, BEd 3rd year)

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Inadequate teaching and learning resources

Moreover, this study has found that South African rural schools have inadequate teaching resources, including a lack of textbooks, assistive devices, and visual aids, which further constrain inclusive practices (Kanyopa & Mokhele-Makgalwa, 2024b). Participants in the study reported the following.

> *"We didn't have enough teaching materials or visual aids. Sometimes I had to draw diagrams on the chalkboard instead of using charts or pictures, which limited how much learners could engage, especially those who learn better visually."* (Student teacher 1, male, BEd 3rd year)

> *"It was frustrating when I wanted to implement inclusive activities but lacked resources. Even basic things like paper or crayons were not available, so I had to improvise with what was around the school."* (Student teacher 7, male, BEd 4th year)

Cultural and language barriers

Additionally, findings revealed that student teachers faced language and cultural barriers in South African rural schools. Findings have shown that some cultural norms discourage learner participation (especially for girls in some communities), which has resulted in challenges in creating inclusive classroom environments.

"Most learners spoke isiXhosa, but the language of teaching was English. I had to explain things in both languages, and sometimes I wasn't fluent enough to translate certain terms accurately. It made teaching slower and stressful." (Student teacher 5, female, BEd 4th year)

"In some classes, boys dominated discussions because of cultural expectations. Some girls were quiet and hesitant to speak. It was difficult to encourage full participation without going against local norms." (Student teacher 4, female, BEd 4th year)

Nevertheless, the findings of this study also stipulate that student teachers in South African rural schools are experiencing emotional challenges when implementing inclusive practices, as in most cases, their efforts to make their lessons inclusive are not always appreciated by their mentor teachers. This was evidenced by the comment that says

> *"Some teachers thought I was just trying to impress university lecturers instead of teaching the normal way."* (Student teacher 2, female, Bed 3rd year)

In essence, these participant reflections on both emerged themes provided valuable learning insights regarding the issue of inclusive education in rural school contexts. Student teachers reflected that rural school placements enhanced their professional resilience, creativity, and adaptability. Through their teaching practice period, they developed a deeper understanding of the socio-economic and cultural factors that influence learning. They recognised the importance of collaboration with peers, parents, and community members in supporting inclusive education.

Conclusions

To conclude, this study examined student teachers' experiences in implementing inclusive teaching strategies during their teaching practice in rural schools in South Africa. Findings revealed their commitment and creativity in promoting inclusion even under difficult rural conditions. However, the findings have shown several challenges that limit the full implementation of inclusive teaching. Participants in the study made considerable efforts to include all learners by utilising local resources, code-switching between English and local languages, and engaging learners through

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group work and storytelling. These strategies helped them make lessons more meaningful and accessible despite limited resources. Therefore, this study recommends that universities and schools collaborate to prepare and support student teachers more effectively for their teaching practices. This study also emphasises the importance of proper training for mentor teachers to help them understand and promote inclusive education. As elaborated in the Learner Integration Wheel (LIW) theory of practice, teachers in schools cannot do it alone; thus, this study also calls for collaboration with parents from the school community and curriculum developers to work together to make inclusion in rural schools more sustainable.

References

Kanyopa, T. J. (2023). Exclusion, diversity and inclusion. In *Inclusion in Southern African education: Understanding, challenges and enablement* (pp. 3–9).

Kanyopa, T. J. (2025). Unconditional love and support for humanity. In *Internationalisation of higher education for sustainable development: A Southern African perspective* (Vol. 22, p. 72).

Kanyopa, T. J., & Chibaya, S. (2025). Conceptual analysis of the Basic Education Laws Amendment Act and its implications for diversity and inclusion. *Journal of Posthumanism, 5,* 2987. https://doi.org/10.63332/joph.v5i7.2987

Kanyopa, T. J., & Hlalele, D. J. (2021). The learning experiences of learners transitioning from rural and township schools to ex-Model C schools. *The Independent Journal of Teaching and Learning, 16*(1), 96–114. https://hdl.handle.net/10520/ejc-jitl1-v16-n1-a9

Kanyopa, T. J., & Makgalwa, M. M. (2024a). Engaging creativity as an alternative for sustainable inclusion and integration in schools: Visual participatory approach. *African Journal of Inter/Multidisciplinary Studies, 6*(1), 1–13. https://doi.org/10.51415/ajims.v6i1.1383

Kanyopa, T. J., & Mokhele-Makgalwa, M. (2024b). Engaging learner integration wheel theory of practice to promote inclusion in South African rural schools. *International Journal, 5*(12), 1752–1760. https://doi.org/10.61707/c9f6hj03

McKenzie, J., Karisa, A., Kahonde, C., & Tesni, S. (2021). *Review of UDL in low- and middle-income countries.*International Disability and Education Alliance (IDEA). https://www.cbm.org/fileadmin/user_upload/UDL_review_report_2021.pdf

Nembambula, T. A., Ooko, M., & Aluko, R. (2023). Exploring challenges experienced by teachers in implementing inclusive education in classrooms: A South African perspective. *International Journal of Social Sciences & Educational Studies, 10*(2), 1–15. https://doi.org/10.69569/jip.2024.0434

Ramadhan, N. J. H., Sutiah, S., & Aziz, A. (2024). The implementation of inclusive education policy in Indonesia: A literature review. *Esteem Journal of English Education Study Programme, 7*(1), 310–317. https://jurnal.univpgri-palembang.ac.id/index.php/esteem/article/view/15702

Sepadi, M. D. (2025). Teachers' understanding of implementing inclusion in mainstream classrooms in rural areas. *Education Sciences, 15*(7), 889. https://doi.org/10.3390/educsci15070889

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Song, Y. (2017). To what extent is universal design for learning "universal"? A case study in township special needs schools in South Africa. *Journal of Inclusive Education Research, 2*(1), 1–12. https://d1wqtxts1xzle7.cloudfront.net/48802697

Sydorenko, S., Akimova, O., Stechenko, O., Stanichenko, O., & Iievliev, O. (2024). The development of strategies and approaches to the successful implementation of inclusive education. *Multidisciplinary Science Journal, 6*(3), 11–24. https://doi.org/10.31893/multiscience.2024ss0204

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Challenges and Student-Proposed Solutions in Developing Collaborative Competence in High School Biology: A Study in Can Tho, Vietnam

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ABSTRACT: This qualitative survey explored the challenges faced by 1,373 high school students in Can Tho City during group work in Biology classes, their resolution strategies, and their proposed improvements. From 671 valid responses identifying difficulties, the most prevalent issues included disagreements in opinions (29.06%), unequal task distribution and responsibility (24.29%), and communication barriers (16.69%). Among these, 213 students suggested solutions, most commonly through discussion and active listening (38.50%). Regarding enhancement proposals, 356 valid responses emphasised improving instructional content and methods through practical experiments and technology integration (13.77%). The findings indicate a strong need for structured group protocols, teacher facilitation, and resource enhancement to foster collaborative competence. Recommendations include integrating cooperative learning models into the curriculum, providing targeted teacher training, and building students' collaborative skills to optimise group-based learning in Vietnamese high school Biology education.

KEYWORDS: Biology education, cooperative learning, collaborative competence, challenges, high school students.

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Introduction

Cooperative learning has long been acknowledged as a practical pedagogical approach in science education, particularly in Biology, where collaborative tasks promote critical thinking, problem-solving, and interpersonal skills essential to scientific inquiry, (Johnson & Johnson, 2018). In Vietnamese high school education, group work is increasingly integrated into the Biology curriculum to align with Vietnam's 2018 General Education Program, which emphasises competency-based learning and designates collaboration as a key transferable competence (Ministry of Education and Training, 2018). Recent Vietnamese studies have underscored the potential of cooperative methods to enhance student engagement and competence in Biology, while also revealing persistent challenges such as insufficient teacher training and limited instructional resources (Pham & Phan, 2022; Tran, 2023; Trinh, 2019).

Previous studies have identified common barriers to practical group work in science education, including interpersonal conflicts, uneven task distribution, communication difficulties, and inadequate teacher support (Ajaja & Eravwoke, 2010; Chatila & Al Husseiny, 2017; Driessen et al., 2024). In Vietnam, similar issues are evident, with research indicating that while cooperative learning promotes active participation in Biology classes, factors such as large class sizes, insufficient guidance, and the presence of uncooperative group members hinder its efficacy (Trinh, 2019). Moreover, local investigations reveal uneven student motivation and limited experiential integration, which affect the development of cooperative skills in high school Biology (Pham & Phan, 2022; Tran, 2023). While these issues are documented globally, there is limited empirical evidence on how Vietnamese high school students experience and address such challenges in Biology-specific group tasks. Student perspectives on improving collaborative activities remain underexplored, yet they are crucial for designing contextually relevant interventions (Shala & Pavlin, 2025).

This study examines the development of collaborative competence among high school students in Can Tho City through Biology group work, focusing on the difficulties encountered, strategies to overcome them, and student-generated proposals for improvement. The research aims to inform curriculum design, teacher training, and instructional practices by optimising collaborative learning outcomes in secondary science education, capturing qualitative insights from a large sample.

Research Aim and Research Questions

This study examines the development of collaborative competence among high school students in Can Tho City through Biology group work, identifying key difficulties, resolution strategies, and student proposals to enhance the effectiveness of collaborative learning and inform evidence-based pedagogical improvements.

The study's findings respond to the following research questions:

1. What are the primary difficulties high school students encounter in Can Tho City during group work in Biology, and how do they attempt to resolve them?

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2. What suggestions do students propose to make group activities in Biology classes more effective?

Methodology

Research Design: The study employed a cross-sectional survey design, utilising open-ended qualitative questions to investigate the status and determinants of collaborative competence development among high school students through Biology group work in selected schools in Can Tho City.

Participants: A total of 1373 high school students currently enrolled in Biology classes at several public high schools in Can Tho City, Vietnam, participated in the study.

Data Collection: Qualitative data were gathered through a paper-based questionnaire distributed during regular class sessions. The instrument included two open-ended questions; responses were collected anonymously to encourage candid feedback, and all questionnaires were retrieved immediately after completion.

Data Analysis: Invalid responses (e.g., blank, "no difficulties," "I don't know," or irrelevant answers) were excluded, resulting in 671 valid responses for Question 1 and 356 for Question 2. Valid responses were manually coded and thematically categorised using Microsoft Excel 2021, following the six-phase framework proposed by Braun and Clarke (2006).

Research Results

The survey was conducted among 1373 high school students from selected schools in Can Tho City, focusing on their experiences with group work in Biology classes. Responses to the qualitative questions were analysed thematically, categorising valid answers after excluding invalid ones. This section presents the detailed findings for each question, including frequency distributions, percentages, and key thematic contents. Percentages for difficulties and solutions are calculated based on the valid responses, while proposals are reported relative to the total sample to highlight participation rates.

Difficulties

For Question 1 ("*What difficulties do you encounter during group work? How did you resolve those difficulties?*"), A total of 1373 responses were collected. After screening, 702 responses were deemed invalid due to being blank, irrelevant, or non-descriptive, resulting in 671 valid responses (48.87% of the total). These valid responses were thematically grouped into six categories of difficulties, reflecting the primary challenges students faced in collaborative Biology activities. The distribution indicates that interpersonal and structural issues dominate, with opinions and perspectives being the most frequently reported difficulty.

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Table 1

Typical difficulties that students encounter when working in groups

Group of Solutions	Percentage (%)	Main Methods
Opinions & Perspectives	29.06	Disagreements, conflicts, or differences in opinions among group members; challenges in unifying ideas or synthesizing a common content outline for Biology tasks.
Division & Responsibility	24.29	Lack of proactivity or responsibility from some members; non-cooperation; uneven or unclear division of tasks; instances of sloppy or incomplete work affecting group outcomes.
Communication Skills	16.69	Shyness or difficulty in communicating ideas; lack of confidence when speaking or presenting; tendencies to be quiet; interpersonal frictions or relational discords within the group.
Knowledge & Competence	14.16	Insufficient background knowledge in Biology topics; difficulty understanding lesson content; challenges with complex material; struggles searching, filtering, or generating ideas from resources.
Time & Organization	4.47	Difficulties in coordinating a common schedule for group meetings; tendencies to work right up to deadlines; frequent late submissions of group assignments.
Others	11.33	Unclear explanations or guidance from teachers; shortages of necessary materials, facilities, or equipment for Biology group activities.

This subset illustrates students' adaptive strategies for resolving conflicts and optimising group performance (Table 2). These resolution strategies were categorised into six groups, showcasing a range of adaptive approaches from interpersonal negotiation to seeking external help. The most common strategy involved discussion and active listening, suggesting that students preferred dialogue-based conflict resolution.

Table 2

The solution students used to solve the problem

Group of Solutions	Percentage (%)	Main Methods
Discussion & Listening	38.50	Engaging in calm and frank exchanges; unifying through compromise or synthesis; using voting or decision-making processes to identify common ground.
Improve Organization	14.55	Reassign tasks more clearly based on individual strengths or abilities; remind or urge members to contribute; implement accountability measures such as penalties; opt for collective work sessions.
Self-Learning &	14.08	Personal efforts to become more open, active, or confident; practicing

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Group of Solutions	Percentage (%)	Main Methods
Self-Improvement		communication and presentation skills; independent research using books, the internet, or AI tools; improving time management by preparing work in advance.
Seek External Support	12.21	Consulting teachers for guidance; seeking advice or help from knowledgeable peers or experts outside the group.
Group Support & Bonding	8.45	Taking initiative to integrate and participate; assisting or explaining concepts to struggling members; motivating the group; proposing neutral or mediating ideas; deferring to a group leader for decisions.
Others	12.21	Reviewing and editing content collaboratively; maintaining composure during conflicts; fulfilling personal duties minimally and then disengaging.

Proposals

For Question 2 (“What proposals do you have to make group activities in Biology classes more effective?”), One thousand three hundred seventy-three responses were gathered. A substantial portion, 1017 (74.07%), were invalid (e.g., blank, “no opinion," “don't know," or unrelated, such as "not studying Biology"). This resulted in 356 valid responses (25.93% of the total), which were thematically categorised into six groups. The proposals emphasise enhancements in teaching methods and group dynamics, with a notable focus on content and pedagogical improvements. Percentages are reported relative to the total sample to illustrate the overall engagement level, highlighting areas where student input was limited (Table 3).

Table 3

Student proposals for improving the effectiveness of group activities in biology classes

Group of Proposals	Percentage	Main Content
Organization & Division	4.52%	Establish clear and specific task assignments; form balanced or smaller groups for better manageability; set explicit goals or timelines for biology group work.
Improve Content & Methods	13.77%	Incorporating more hands-on practices, experiments, or real-life applications; integrating videos, technology, games, or multimedia; and diversifying activity formats to make Biology lessons more engaging.
Awareness & Personal Responsibility	2.92%	Encouraging self-motivation, proactivity, and positive attitudes; promoting preparation of lessons; fostering focus and commitment to individual duties within the group.
Interaction & Group Environment	2.99%	Promoting active listening and respect for diverse opinions; building friendliness, unity, and open communication; creating a relaxed and supportive atmosphere for discussions.

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Group of Proposals	Percentage	Main Content
Evaluation & Encouragement	0.66%	Implement fair assessment criteria for group contributions and introduce incentives such as rewards or bonus points to motivate participation.
Facilities & Support	1.02%	Ensuring adequate facilities, tools, and equipment; leveraging technology, the internet, or digital resources to support Biology group activities.

Discussion

The findings highlight key barriers to collaborative competence in high school Biology group work in Can Tho, aligning with global and Vietnamese research. The most frequently reported challenges were disagreements in opinions (29.06%) and unequal task division or responsibility (24.29%), reflecting the interpersonal and structural complexities typical of cooperative learning environments (Shala & Pavlin, 2025). In Vietnam, large class sizes and dominant members exacerbate these conflicts (Trinh, 2019). Communication barriers (16.69%), knowledge gaps (14.16%), and time constraints (4.47%) further hinder collaboration, consistent with studies on science education (Chatila & Al Husseiny, 2017). Resource shortages and unclear teacher guidance (11.33%) underscore systemic limitations, which are also echoed locally (Tran, 2023). Students' predominant resolution strategies, particularly discussion and active listening (38.50%), rely on dialogue-based problem-solving, which aligns with collaborative learning theory (Field, Marbach-Ad (Marbach-Ad et al., 2016). However, only 32% of those reporting difficulties offered resolutions, suggesting gaps in problem-solving training (Pham & Phan, 2022). Proposals focused on practical, technology-integrated activities (13.77%) and clear task structures (4.52%), supporting calls for more engaging instructional methods and equitable evaluation (Driessen et al., 2024). The high proportion of non-responses (74.07%) suggests potential disengagement or uncertainty regarding agency in classroom reform, underscoring the importance of promoting student agency in classroom collaboration. Overall, targeted curriculum design, teacher training, and resource support are essential to transform group work into an effective tool for building collaborative competence in Vietnamese Biology education.

Conclusions

This study examined challenges in developing collaborative competence among high school students in Can Tho through Biology group work. The main difficulties included disagreements in opinions (29.06%), unequal task division (24.29%), communication barriers, and knowledge gaps. While many students addressed these issues through discussion and active listening (38.50%), only about one-third proposed specific solutions, indicating limited training in problem-solving. Students emphasised the need for more practical, technology-integrated activities (13.77%), clearer organisation, and supportive learning environments. Overall, the findings highlight the importance of structured, student-centred group work. Strengthening teacher facilitation, experiential learning, and student motivation can foster collaborative competence and enhance learning outcomes in Vietnamese Biology education.

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References

Ajaja, O. P., & Eravwoke, O. U. (2010). Effects of cooperative learning strategy on junior secondary school students' achievement in integrated science. *The Electronic Journal for Research in Science & Mathematics Education, 14*(1), 1–18. https://ejrsme.icrsme.com/article/view/7323

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Chatila, H., & Al Husseiny, F. (2017). Effect of cooperative learning strategy on students' acquisition and practice of scientific skills in biology. *Journal of Education in Science, Environment and Health, 3*(1), 88–99. https://dergipark.org.tr/en/download/article-file/262082

Driessen, E. P., Wilson, A. E., Hall, I., Brewer, P., Odom, S., Ramsey, S. B., … Ballen, C. J. (2024). Group work enhances student performance in biology: A meta-analysis. *BioScience, 74*(3), 207–217. https://doi.org/10.1093/biosci/biae001

Johnson, D. W., & Johnson, R. T. (2018). Cooperative learning: The foundation for active learning. In *Active learning – Beyond the future* (pp. 59–71). IntechOpen. https://doi.org/10.5772/intechopen.81086

Marbach-Ad, G., Rietschel, C. H., Saluja, N., Carleton, K. L., & Haag, E. S. (2016). The use of group activities in introductory biology supports learning gains and uniquely benefits high-achieving students. *Journal of Microbiology & Biology Education, 17*(3), 360–369. https://doi.org/10.1128/jmbe.v17i3.1071

Ministry of Education and Training. (2018). *Chương trình giáo dục phổ thông – Chương trình tổng thể [General education curriculum – Overall curriculum]* (Ban hành kèm theo Thông tư số 32/2018/TT-BGDĐT). https://moet.gov.vn/content/vanban/Lists/VBPQ/Attachments/1483/vbhn-chuong-trinh-tong-the.pdf

Pham, T. H., & Phan, M. N. (2022). Sử dụng trò chơi nhằm phát huy hứng thú học tập cho học sinh trong dạy học môn Sinh học ở trung học phổ thông [The use of game-based learning in high schools to promote students' interest in biology]. *Vietnam Journal of Educational Sciences (VJES), 18*(11), 34–39. http://vjes.vnies.edu.vn/sites/default/files/khdg_tap_18-so_11_nam_2022-34-39.pdf

Shala, N., & Pavlin, J. (2025). Effects of introducing the cooperative learning approach in Kosovo's secondary school physics. *Eurasia Journal of Mathematics, Science and Technology Education, 21*(8), 1–11. https://doi.org/10.29333/ejmste/16716

Tran, T. H. (2023). *Giải pháp dạy học tích hợp hoạt động trải nghiệm, hướng nghiệp trong môn Sinh học 10 góp phần phát triển năng lực cho học sinh [Integrated teaching solutions that combine experiential and career-oriented activities in grade 10 biology to foster students' competency development]*. Tan Yen No. 1 High School. https://quanlysangkien.bacgiang.gov.vn/sites/default/files/thuyet_minh._sinh_hoc._tranhuong.giapthonganh.thpt_tan_yen_so_1.pdf

Trinh, V. B. (2019). Dạy học hợp tác – một xu hướng mới của giáo dục thế kỉ XXI [Cooperative teaching – A new educational trend of 21st century education]. *Journal of Science – Ho Chi Minh City University of Education, 25,* 1–6. https://doi.org/10.54607/hcmue.js.0.25.1176

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Preliminary Evaluation of Biology Experimental Teaching in Grade 7 Natural Science

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ABSTRACT: This exploratory study aims to design and conduct an initial evaluation of experimental practice–based biology lesson plans for Grade 7 Natural Science, which are aligned with Vietnam's 2018 General Education Curriculum. Surveys were combined with document analysis and data processing using Jamovi 2.6.44 to obtain preliminary expert assessments. Findings from eight participating experts indicated that the developed lesson plans were generally rated as appropriate, pedagogically sound, and scientifically feasible for classroom application. The study also identified several limitations and proposed suggestions to enhance the organisation and effectiveness of experimental practice activities at the Secondary School level. These initial results provide valuable reference materials for teachers seeking to innovate teaching methods, strengthen hands-on experimental learning, and foster students' scientific competencies in accordance with competency-based education reform.

KEYWORDS: Experimental practice, Grade 7, Natural Science, Lesson plan, Competency-based education.

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Introduction

A key innovation of Vietnam's 2018 General Education Program (GEP) was the introduction of Natural Science as a compulsory subject at the Secondary School level, aiming to develop students' scientific competencies through observation, experimentation, and application of knowledge (Ministry of Education and Training, 2018). Practical laboratory work in Biology is an essential means of implementing this orientation. Previous studies have shown that inquiry-based or group-based experimental lessons can improve students' interest, competencies, and learning outcomes (Xu & Julian, 2020). However, when practical activities lack clear guidance or real-world connections, students may experience stress or fail to achieve meaningful educational benefits (Oliveira & Bonito, 2023). If experiments are performed mechanically without contextual understanding, practice-based learning loses its pedagogical value (Sotiriou et al., 2017) and may even diminish students' confidence in the approach (Shana & Abulibdeh, 2020). In Vietnam, recent research has emphasised the development of pedagogical competencies for teachers of Natural Science. Vu and Nguyen (2024) noted that teachers face challenges in designing practical activities suitable for the new curriculum.

Meanwhile, Chu et al. (2018) reported that integrated teaching promotes problem-solving skills but remains theoretical. Additionally, Byukusenge et al. (2022) observed that virtual laboratories can alleviate equipment shortages but require careful pedagogical design. From then on, the Preliminary Evaluation of Biology Experimental Teaching in Grade 7 Natural Science was conducted to meet the reform requirements of the 2018 General Education Program, while also assessing its suitability and applicability in actual teaching practice at lower secondary schools.

Research Aim and Research Questions

This study aimed to conduct a preliminary evaluation of experimental Biology teaching in Grade 7 Natural Science, focusing on its potential effects on students' cognitive competencies, practical skills, and learning attitudes at the Secondary School level. Based on this objective, the study addressed the following research questions: (1) To what extent were the Grade 7 Biology practical lesson plans, designed with a competency-based orientation, suitable for the curriculum content and the psychological characteristics of students? (2) How did experts assess these lesson plans' scientific rigour and pedagogical quality? (3) How were the feasibility and applicability of the lesson plans evaluated under actual teaching conditions in Secondary Schools?

Methodology

Research participants: The study involved six experts from secondary schools, all of whom had extensive experience teaching biology and Natural Science.

Document analysis: This method was employed to collect, synthesise, and analyse documents related to experimental teaching, the 2018 GEP, and prior studies, thereby establishing the theoretical foundation for the research.

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Data collection and analysis. Survey data were gathered via Google Forms. A 5-point Likert scale was used to quantify the experts' evaluations regarding the experimental lesson plans' quality, suitability, scientific rigour, and feasibility. The scale was divided into five equal intervals, calculated as (5 – 1)/5 = 0.8, corresponding to: 1.0 ≤ M < 1.8 = Strongly disagree; 1.8 ≤ M < 2.6 = Disagree; 2.6 ≤ M < 3.4 = Neutral; 3.4 ≤ M < 4.2 = Agree; and 4.2 ≤ M ≤ 5.0 = Strongly agree (Narli, 2010; Yavuz et al., 2013). The collected data were analysed using descriptive statistics, including mean (M) and standard deviation (SD), to reflect the consensus degree among experts for each evaluation criterion.

Research Results

The survey included general information about the experts and their evaluations of the lesson plans' suitability, pedagogical and scientific quality, and feasibility. Feedback on strengths, weaknesses, and suggestions was also collected.

Among the six participating experts, five were male (83.3%) and one female (16.7%). Most experts had over ten years of teaching experience (83.3%), and one had less than ten years (16.7%). This suggests that the participants had substantial expertise in teaching and educational research.

Suitability of the Lesson Plans

The mean scores for the suitability of the lesson plans with the 2018 GEP ranged from 4.50 ± 0.22 to 4.83 ± 0.17, indicating consistently positive evaluations among experts (Table 1). Criterion Q15 received the highest score (4.83 ± 0.17), while Q11 and Q13 also strongly agreed (4.67 ± 0.21). All criteria were rated "Strongly agree," demonstrating overall positive feedback.

Table 1

Experts' Evaluation of the Suitability of the Lesson Plans

Code	Content	Mean ±SE	Evaluation Level
Q11	The lesson content was suitable for the learning outcomes required by the 2018 GEP	4.67±0.21	Strongly agree
Q12	The experimental knowledge and content ensured scientific accuracy	4.50±0.22	Strongly agree
Q13	The learning objectives were clear, specific, and measurable	4.67±0.21	Strongly agree
Q14	The lesson content and teaching activities were linked to students' real-life contexts	4.50±0.22	Strongly agree
Q15	The experimental activities were integrated with interdisciplinary knowledge (Physics, Chemistry, Biology)	4.83±0.17	Strongly agree

Note: 1.0 ≤ M < 1.8: Strongly disagree; 1.8 ≤ M < 2.6: Disagree; 2.6 ≤ M < 3.4: Neutral; 3.4 ≤ M < 4.2: Agree; 4.2 ≤ M ≤ 5.0: Strongly agree.

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Pedagogical and Scientific Quality

Mean pedagogical and scientific quality scores ranged from 4.33 ± 0.49 to 4.83 ± 0.17 (Table 2). Criteria Q21 and Q22 both received a score of 4.67 ± 0.21, indicating strong agreement on the coherence and logic of the lesson structure. Criterion Q23, with the highest score (4.83 ± 0.17), reflected expert recognition of the active, student-centred approach.

Table 2

Experts' Evaluation of the Pedagogical and Scientific Quality in Design

Code	Content	Mean ±SE	Evaluation Level
Q21	The teaching activities were arranged in a reasonable and logical sequence	4.67±0.21	Strongly agree
Q22	The time allocation for each activity (theory–practice) was appropriate	4.67±0.21	Strongly agree
Q23	The teaching methods and techniques promoted students' active participation and self-directed learning.	4.83±0.17	Strongly agree
Q24	There was a reasonable integration between theoretical and practical/experimental Biology activities	4.33±0.49	Strongly agree
Q25	The experimental activities ensured safety and developed students' practical skills	4.33±0.49	Strongly agree
Q26	Learning materials, equipment, and experimental tools were adequately and appropriately prepared	4.33±0.49	Strongly agree

Note: $1.0 \leq M < 1.8$: Strongly disagree; $1.8 \leq M < 2.6$: Disagree; $2.6 \leq M < 3.4$: Neutral; $3.4 \leq M < 4.2$: Agree; $4.2 \leq M \leq 5.0$: Strongly agree.

Feasibility and Practical Applicability

The mean scores for feasibility and applicability ranged from 4.50 ± 0.22 to 4.83 ± 0.17 (Table 3). All criteria were rated "Strongly agree," indicating that experts considered the lesson plans feasible and practical for actual teaching conditions.

Table 3

Experts' Evaluation of Feasibility and Practical Applicability

Code	Content	Mean ±SE	Evaluation Level
Q31	The lesson plans could be implemented under the typical facilities available in lower secondary schools	4.50±0.22	Strongly agree
Q32	The content and activities were suitable for the psychological characteristics and academic level of Grade 7 students	4.50±0.22	Strongly agree
Q33	The activities had the potential to stimulate students' interest and learning motivation	4.50±0.22	Strongly agree

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Q34	The lesson plans demonstrated creativity and innovation compared to traditional teaching methods	4.67±0.21	Strongly agree
Q35	The practical/experimental activities contributed to the development of students' competencies in exploring the living world and problem-solving skills	4.83±0.17	Strongly agree

Note: $1.0 \leq M < 1.8$: Strongly disagree; $1.8 \leq M < 2.6$: Disagree; $2.6 \leq M < 3.4$: Neutral; $3.4 \leq M < 4.2$: Agree; $4.2 \leq M \leq 5.0$: Strongly agree.

Discussion

The findings suggest that the Grade 7 experimental Biology lesson plans aligned well with the competency-based orientation of Vietnam's 2018 GEP (Ministry of Education and Training, 2018). Experts emphasised the interdisciplinary integration evident in the plans, which is consistent with the findings of Nguyen and Do (2024). The lesson plans also ensured scientific accuracy and safety, which aligns with recommendations from Millar (2004) and Abrahams and Reiss (2012), who noted that scientifically sound experiments deepen students' conceptual understanding rather than promoting rote performance.

Regarding pedagogical design, the lesson plans' logical sequencing and student-centred orientation (Q21–Q23) reflected the active learning principles described by Nguyen (2020). Including appropriate materials, attention to experimental safety, and integrating theory and practice (Pham et al., 2023) contributed to the positive expert evaluations. Regarding feasibility, experts confirmed that the lesson plans could be implemented using existing school resources, aligning with the conclusions of Nguyen and Duong (2022). The activities were considered engaging and appropriate for the psychological characteristics of Grade 7 students (Kong, 2021), incorporating innovative teaching approaches that enhanced student motivation (Nguyen & Pham, 2025).

Overall, the lesson plans were recognised as scientifically sound, practical, and consistent with current educational reforms. They effectively integrated theory with experimentation, promoted active learning, and contributed to the development of students' core competencies, including critical thinking, collaboration, and an appreciation for nature. However, several limitations were noted. Some experiments required equipment that was not readily available in disadvantaged schools. Time allocation between theoretical and experimental components was occasionally insufficient, and differentiation for students with diverse abilities required further attention. Therefore, experts proposed the following improvements: (1) Increase teacher flexibility in adapting experimental activities to local conditions; (2) Differentiate learning tasks based on students' abilities and interests; and (3) Rebalance the time between theoretical and practical phases to enhance learning effectiveness.

Conclusions

This preliminary study found that the Grade 7 experimental Biology lesson plans were positively evaluated for suitability, pedagogical and scientific quality, and feasibility. The plans reflected the

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competency-based orientation of Vietnam's 2018 GEP and were consistent with actual classroom conditions. Experts noted that the lessons were practical, easy to implement, and supported students' critical thinking and practical skills. Despite minor limitations in equipment, timing, and differentiation, the plans were considered feasible and potentially applicable for teaching Natural Science at the Secondary School level.

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References

Abrahams, I. Z., & Reiss, M. (2012). Practical work: Its effectiveness in primary and secondary schools in England. *Journal of Research in Science Teaching, 49*(8), 1035–1055. https://doi.org/10.1002/tea.21036

Byukusenge, C., Nsanganwimana, F., & Tarmo, A. P. (2022). Effectiveness of virtual laboratories in teaching and learning biology: A review of literature. *International Journal of Learning, Teaching and Educational Research, 21*(6), 1–17. https://doi.org/10.26803/ijlter.21.6.1

Chu, V. T., Dao, T. V. A., & Nguyen, T. T. C. (2018). Developing students' problem-solving capacity through the teaching of natural science in secondary schools in Vietnam. *American Journal of Educational Research, 6*(6), 741–748. https://doi.org/10.12691/education-6-6-24

Kong, Y. (2021). The role of experiential learning on students' motivation and classroom engagement. *Frontiers in Psychology, 12,* Article 771272. https://doi.org/10.3389/fpsyg.2021.771272

Millar, R. (2004). *The role of practical work in the teaching and learning of science*. University of York, Department of Educational Studies.

Ministry of Education and Training (MOET). (2018a). *General education program – Natural science curriculum*(Promulgated with Circular No. 32/2018/MOET). Ministry of Education and Training, Vietnam.

Ministry of Education and Training (MOET). (2018b). *General education chapter* (Circular No. 32/2018/MOET). Ministry of Education and Training, Vietnam.

Narli, S. (2010). An alternative evaluation method for Likert-type attitude scales: Rough set data analysis. *Scientific Research and Essays, 5*(6), 519–528.

Nguyen, T. H., & Do, H. T. (2024). Implementing integrated teaching of natural sciences in junior high schools and proposing some solutions in teacher training. *Journal of Education, 24*(18), 47–52.

Nguyen, T. N. B., & Duong, T. T. (2022). Current status of teaching equipment in secondary schools – Ba Ria City, Ba Ria–Vung Tau Province. *Journal of Education,* 108–112.

Nguyen, T. T. H. (2020). Developing self-study capacity for primary school students in teaching practical biology. *Vietnam Journal of Educational Sciences,* 25–30.

Nguyen, T. H., Le, T. H., & Pham, H. A. (2025). Measures to improve teacher training quality through innovative teaching methods. *Hanoi Pedagogical University 2 Scientific Journal: Educational Science Special Issue, 1*(04), 58–64.

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Oliveira, H., & Bonito, J. (2023). Practical work in science education: A systematic literature review. *Frontiers in Education, 8,* Article 1151641. https://doi.org/10.3389/feduc.2023.1151641

Pham, T. H. T., Nguyen, T. H., Hoang, T. T., Ha, V. D., Nguyen, T. N., & Nguyen, T. T. (2023). Using experiments to develop students' natural exploration capacity in teaching the topic "Photosynthesis" (Natural Science 7). *Journal of Education, 23*(6), 26–31.

Shana, Z., & Abulibdeh, E. S. (2020). Science practical work and its impact on students' science achievement. *Journal of Technology and Science Education, 10*(2), 199–215. https://doi.org/10.3926/jotse.888

Sotiriou, S., Bybee, R. W., & Bogner, F. X. (2017). PATHWAYS – A case of large-scale implementation of evidence-based practice in scientific inquiry-based science education. *International Journal of Higher Education, 6*(2), 8–19. https://doi.org/10.5430/ijhe.v6n2p8

Vu, C. T., & Nguyen, Y. C. (2024). Some studies on professional development activities for teachers of natural sciences. *Journal of Education, 24*(7), 30–36. https://tcgd.tapchigiaoduc.edu.vn/index.php/tapchi/article/view/1629/761

Xu, Y., & Julian, M. (2020). The effect of inquiry-based learning on students' science achievement and motivation. *Journal of Education and Learning, 14*(6), 406–415. https://doi.org/10.5539/jel.v14n6p406

Yavuz, G., Günhan, B. C., Ersoy, E., & Narli, S. (2013). Self-efficacy beliefs of prospective primary mathematics teachers about mathematical literacy. *Journal of College Teaching & Learning, 10*(4), 279–287. https://doi.org/10.19030/tlc.v10i4.8124

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Enhancing Self-Directed Learning in Natural Science: Insights from Secondary Teachers in Can Tho City, Vietnam

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ABSTRACT: This study explores the current status, influencing factors, and potential solutions for developing self-directed learning (SDL) competencies among junior secondary school students in Natural Science education in Can Tho City, Vietnam. A qualitative survey involving 30 Natural Science teachers was conducted using open-ended questions, and data were analysed through thematic analysis. Findings revealed that 70% of teachers recognised positive aspects of students' SDL, particularly in exploration and application (26.7%) and self-study skills (20%), although 26.7% reported student dependency on teacher guidance. Influencing factors included foundation knowledge (30.8%), learning motivation (30.8%), and multifaceted environmental conditions (43.3%). Proposed strategies emphasised experiential learning (25%), teacher guidance (25%), and family–school collaboration (14.3%). The study emphasises the importance of integrated, student-centred approaches to enhance self-directed learning competencies, thereby supporting Vietnam's ongoing educational reform and promoting greater student autonomy in Natural Science education.

KEYWORDS: Current status, Educational reform, Natural Science education, Self-directed learning, Student autonomy.

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Introduction

Self-directed learning (SDL) has become a key focus in contemporary education, fostering lifelong learning and adaptability among students. Within Natural Science education, SDL enables learners to take initiative, set learning goals, and engage actively with scientific concepts, enhancing their critical thinking and problem-solving abilities. In Vietnam, the national education reform agenda emphasises competency-based learning. SDL is recognised as a cornerstone for developing student autonomy, especially in subjects such as Natural Science at the junior secondary level(Nguyen, 2024). However, several challenges, including traditional teacher-centred pedagogies, limited instructional resources, and socio-cultural constraints, continue to hinder the development of SDL in Vietnamese classrooms (Mai et al., 2025).

In Can Tho City, located in the Mekong Delta, teaching Natural Science in junior secondary schools reflects opportunities and limitations. The region's socio-economic diversity and educational infrastructure influence students' self-learning practices (Huynh et al., 2023). Teachers play a pivotal role in fostering SDL through innovative approaches, such as experiential and project-based learning, which align with global trends in science education (Silva et al., 2024). Nevertheless, factors including students' foundational knowledge, learning motivation, family support, and school environment substantially affect their ability to self-learn (Dao et al., 2025). Understanding these dynamics is essential for designing effective pedagogical interventions that enhance SDL within the context of Vietnam's ongoing educational reforms (Luu, 2024).

Accordingly, this study aims to examine the current status of SDL among junior secondary students in Natural Science education in Can Tho City, identify the key influencing factors, and propose practical strategies to strengthen this competency. By surveying 30 Natural Science teachers, the research captures teachers' insights into existing strengths, challenges, and solutions for improving SDL. The findings are expected to contribute to the broader discourse on competency-based education in Vietnam and support policymakers and educators in aligning teaching practices with the demands of modern education systems.

Research Aim and Research Questions

The primary aim of this study is to investigate the current status, influencing factors, and proposed solutions for developing self-directed learning (SDL) competencies in Natural Science education among junior secondary school students in Can Tho City, Vietnam.

To achieve this aim, the study addresses the following research questions:

(1) What are the main strengths in students' self-directed learning abilities in Natural Science, as teachers perceive?

(2) What factors influence students' self-directed learning in Natural Science?

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(3) What strategies do teachers propose to enhance self-directed learning in Natural Science?

(4) Which solutions are the most important and feasible for developing self-directed learning competencies among junior secondary school students?

Methodology

Research Design: This study employed a qualitative research design, utilising a survey with open-ended questions to explore teachers' perspectives on self-directed learning (SDL) in Natural Science among secondary students in Can Tho City (Creswell & Poth, 2016).

Participants: Thirty Natural Science teachers from junior secondary schools in Can Tho City were selected through purposive sampling to ensure school location and teaching experience variation. All participants voluntarily provided informed consent.

Data Collection: Data were gathered in October 2025 through a four-question survey focusing on the current status, influencing factors, and proposed solutions related to SDL. The survey was distributed in physical and digital formats (Huynh et al., 2023).

Data Analysis: Responses were analysed using thematic analysis, based on Braun and Clarke (2006) a six-phase framework. Data were manually coded and categorised using Microsoft Excel 2019 to identify recurring patterns and key themes.

Research Results

Current Status

The survey responses to Question 1, "According to you, what are the prominent strengths in the self-directed learning competencies of students in your Natural Science classes?", which inquired about the prominent strengths in students' self-learning capacity in Natural Science, revealed a predominantly positive outlook among the 30 teachers (Table 1). The majority (70%) highlighted positive strengths such as exploration, application, and self-study skills, indicating that many students demonstrate initiative in engaging with the subject matter. A small portion (3.3%) reported no notable strengths, suggesting minimal perceived autonomy in some classrooms. Meanwhile, 26.7% described mixed or conditional strengths, where students show initiative but often depend on teacher guidance. These findings suggest that while self-learning is evident, it is not uniformly strong across all students.

Table 1

Strengths in Self-directed learning in Natural Science

Category	Responses	Percentage
Positive Strengths (e.g., Exploration, Application, Self-Study)	21	70%
No Notable Strengths	1	3.3%
Mixed/Conditional (e.g., Dependency but Initiative in Some)	8	26.7%

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Influencing Factors

Responses to Question 2 – "*In your opinion, what is the most significant factor influencing students' self-directed learning competencies?*" – revealed diverse perspectives (Table 2). The largest group (43.3%) emphasised multifaceted influences involving family, school, and society, highlighting the interplay of external and internal factors. Motivation and goals were identified by 30% of teachers as key drivers, while foundational knowledge accounted for 13.3%. Family factors, self-awareness, and learning conditions were less frequently mentioned (6.7%, 3.3%, and 3.3%). These findings indicate that SDL development depends on a combination of environmental and personal elements rather than a single dominant factor.

Table 2

Most Influential Factors on Self-directed learning

Category	Responses	Percentage
Foundational Knowledge	4	13.3%
Motivation and Goals	9	30%
Family Factors	2	6.7%
Self-Awareness	1	3.3%
Learning Conditions	1	3.3%
Multifaceted (e.g., Family, School, Society)	13	43.3%

Proposals

Responses to Question 3 – "*What solutions or suggestions do you propose to enhance students' self-directed learning competencies in Natural Science?*" – yielded 16 distinct answers (Table 3). Experiential and project-based learning, along with teacher guidance and skills training, each accounted for 25%, reflecting a preference for practical and supportive approaches to learning. Other suggestions included self-study and awareness (18.8%), motivation and interest (12.5%), creating an environment (6.3%), technology support (6.3%), and no specific proposals (6.3%).

Table 3

Suggested Solutions to Enhance Self-Learning in Natural Science

Category	Count	%
Experiential & project-based learning	4	25.0
Teacher guidance & skills training	4	25.0
Self-study & awareness	3	18.8
Motivation & interest	2	12.5

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Environment creation	1	6.3
Technology support	1	6.3
None	1	6.3

Most Important and Feasible Solutions

Question 4 – "*In your view, what is the most important and feasible solution currently available for developing self-directed learning competencies among junior secondary school students?*" – received 14 responses (Table 4). Experiential and project-based learning, motivation and goal setting, and teacher guidance accounted for 21.4%, indicating balanced emphasis. Family–school collaboration was mentioned by 14.3%, while other solutions, such as self-management, innovative teaching, and self-study, were noted by 7.1% each.

Table 4

Most Important and Feasible Solution for Self-Learning Development

Category	**Count**	**%**
Experiential & project-based learning	3	21.4
Motivation & goal setting	3	21.4
Teacher guidance	3	21.4
Family-school collaboration	2	14.3
Others (self-management, innovative teaching, self-study)	3	7.1 each

Discussion

The survey of 30 Natural Science teachers in Can Tho City highlights key aspects of students' self-learning competencies, influencing factors, and proposed solutions. The 70% reporting positive strengths, such as exploration and application, aligns with research on intrinsic motivation in science education (Li et al., 2023). However, 26.7% of mixed strengths indicate a dependency on teacher guidance, a challenge noted in Vietnam's teacher-centred pedagogy (Mai et al., 2025).

Multifaceted factors (43.3%), including family, school, and society, are the primary influences on SDL, reflecting Vietnam's collectivist culture (Pham & Le, 2021). Motivation and goals (30%) align with self-determination theory, emphasising autonomous engagement (Hew et al., 2016). Foundational knowledge (13.3%) is critical, as weak prior skills hinder self-study (Kan'an & Osman, 2015). Family factors (6.7%) play a role but are often part of broader systemic dynamics (Nguyen et al., 2025).

Proposed solutions emphasise experiential and project-based learning (25% in Question 3, 21.4% in Question 4), supported by Huynh et al (2023)those who highlight its effectiveness in the Mekong Delta.

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Teacher guidance (25% and 21.4%) is vital for scaffolding SDL (Luu, 2024), while motivation strategies (12.5% and 21.4%) foster engagement (Dao et al., 2025). Family-school collaboration (14.3%) and technology support (6.3%) address holistic needs, noting the growing role of digital tools (Nguyen, 2024).

Compared to Western studies prioritising self-efficacy (Arcoverde et al., 2022), Vietnam's context emphasises systemic factors (Tran et al., 2025). Experiential learning aligns with global trends (Silva et al., 2024), but resource constraints necessitate tailored solutions, such as teacher training (Nguyen & Do, 2024). The study's qualitative nature and small sample suggest future quantitative validation. Integrating project-based curricula and enhancing teacher support can advance SDL, aligning with Vietnam's reform goals (Pham & Tran, 2025).

Conclusions

This study examined self-directed learning (SDL) in Natural Science among junior secondary students in Can Tho City. Findings showed that most teachers recognised students' strengths in exploration and self-study, though many remained dependent on teacher guidance. Motivation, foundational knowledge, and socio-family factors were key influences on the decision. Teachers emphasised experiential learning, guidance, and family–school collaboration as feasible strategies. Strengthening teacher training and integrating project-based activities can effectively enhance SDL, supporting Vietnam's competency-based education reform.

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References

Arcoverde, Â. R. d. R., Boruchovitch, E., Góes, N. M., & Acee, T. W. (2022). Self-regulated learning of natural sciences and mathematics future teachers: Learning strategies, self-efficacy, and socio-demographic factors. *Psicologia: Reflexão e Crítica, 35,* Article 1. https://doi.org/10.1186/s41155-021-00203-x

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Sage Publications. https://elib.vku.udn.vn/bitstream/123456789/5123/1/2013.%20Qualitative%20Inquiry%20And%20Research%20Design%20Choosing%20Among%20Five%20Approaches%20%283th%20Edition%29.pdf

Dao, V. H., Nguyen, M. D., & Pham, T. H. H. (2025). Developing self-learning skills in higher education in Vietnam: A survey of current practices and proposed solutions. *Nurture, 19*(1), 38–53. https://doi.org/10.55951/nurture.v19i1.944

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Hew, K. F., Law, N., Wan, J., Lee, Y., & Kwok, A. (2016). Self-directed learning in science education: Explicating the enabling factors. *Proceedings of the International Society of the Learning Sciences*. Singapore. https://doi.org/10.22318/icls2016.88

Huynh, T. T. D., Dinh, M. Q., & Nguyen, Q. T. (2023). Thực trạng dạy học môn Khoa học tự nhiên của giáo viên trung học cơ sở ở vùng đồng bằng sông Cửu Long [Teaching natural science by secondary school teachers in the Mekong Delta]. *Dong Thap University Journal of Science, 12*(6), 22–29. https://doi.org/10.52714/dthu.12.6.2023.1112

Kan'an, A., & Osman, K. (2015). The relationship between self-directed learning skills and science achievement among Qatari students. *Creative Education, 6*(8), 790–797. https://doi.org/10.4236/ce.2015.68082

Li, H., Zhu, S., Wu, D., Yang, H. H., & Guo, Q. (2023). Impact of information literacy, self-directed learning skills, and academic emotions on high school students' online learning engagement: A structural equation modeling analysis. *Education and Information Technologies, 28*(10), 13485–13504. https://doi.org/10.1007/s10639-023-11760-2

Luu, V. T. (2024). Developing a team of natural science teachers in lower secondary schools in Vietnam to meet the requirements of fundamental and comprehensive educational reform. *European Journal of Education Studies, 11*(11), 867–878. https://oapub.org/edu/index.php/ejes/article/view/5696/8327

Mai, V. A., Nguyen, C. Q., Duong, N. T., Tran, M. Q. T., & Le, H. H. (2025). The impact of teaching strategies in blended learning on students' self-directed learning capability at Hanoi University of Science and Technology. *Vietnam Journal of Education, 9*(1), 85–98. https://doi.org/10.52296/vje.2025.434

Nguyen, P. L. (2024). Vietnam's STEM education landscape: Evolution, challenges, and policy interventions. *Vietnam Journal of Education, 8*(2), 177–189. https://doi.org/10.52296/vje.2024.389

Nguyen, T. H., & Do, H. T. (2024). Thực trạng dạy học tích hợp môn Khoa học tự nhiên ở trung học cơ sở và đề xuất một số giải pháp trong đào tạo giáo viên [The current situation of integrated natural science teaching in secondary schools and proposed solutions in teacher training]. *Tạp chí Giáo dục, 24*(18), 47–52. https://tcgd.tapchigiaoduc.edu.vn/index.php/tapchi/article/view/2450

Nguyen, T. H. N., Do, T. T., Pham, T. H., & Nguyen, T. P. N. (2025). Identifying key factors influencing learning outcomes in natural science subjects among middle school students: A case study of Nam Tu Liem District, Hanoi, Vietnam. *International Journal of Education and Practice, 13*(4), 1502–1519. https://doi.org/10.18488/61.v13i4.4471

Pham, T. T. H., & Tran, T. H. T. (2025). Literature review of STEM/STEAM teaching in Vietnam. *VNU Journal of Science: Education Research,* 1–20. https://doi.org/10.25073/2588-1159/vnuer.5250

Silva, P. C., Rodrigues, A. V., & Vicente, P. N. (2024). An evaluation of the experimental science teaching program for primary education from the teachers' perspective: An educational design research journey. *Education Sciences, 14*(7), 782. https://doi.org/10.3390/educsci14070782

Tran, T. T. H., Nguyen, Q. L., Do, H. T., & Ngo, T. T. (2025). Factors influencing the scientific competency of high school students: A case study in Northern Vietnam. *Pakistan Journal of Life & Social Sciences, 23*(1). https://doi.org/10.57239/PJLSS-2025-23.1.00290

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Preliminary Insights into the Advantages and Challenges of Teaching Natural Science: A Case Study from Ca Mau Province, Vietnam

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ABSTRACT: This preliminary study provides initial insights into the advantages and challenges of teaching the Natural Science subject under Vietnam's 2018 General Education Curriculum at secondary schools in Ca Mau Province. Using a qualitative exploratory approach, eight Natural Science teachers were purposively selected to ensure diversity in teaching experience and school context. Data were collected through semi-structured interviews and were analysed thematically following Braun and Clarke's (2006) six-step framework. Findings reveal that while several teachers expressed confidence and positive attitudes toward the integrated curriculum, they also encountered notable difficulties, such as limited laboratory facilities, insufficient specialisation, and student behaviour management. Some teachers highlighted advantages, including collegial support, adaptable teaching methods, and the relevance of the integrated approach. The results suggest a need for continuous professional development, enhanced teaching resources, and collaborative support networks among teachers. Although based on a small sample, these findings provide valuable preliminary evidence for understanding classroom realities in resource-constrained contexts and contribute to the improvement of integrated science education in Vietnam.

KEYWORDS: Natural Science, preliminary study, secondary education, teacher challenges, Vietnam.

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Introduction

In Vietnam's 2018 General Education Curriculum, the Natural Sciences subject integrates Physics, Chemistry, Biology, and Earth Sciences to develop students' scientific competencies, problem-solving abilities, and practical application skills (Ministry of Education and Training [MOET], 2018a). It emphasises inquiry-based learning and environmental responsibility to prepare globally competent citizens (MOET, 2018b). Vietnam's strong PISA science rankings (8th out of 65 countries in 2012 and 70th in 2015) highlight the effectiveness of its science education, which is comparable to systems in Canada and Finland (OECD, 2012, 2019). However, the 2018 curriculum's shift to competency-based teaching poses challenges, particularly in resource-constrained regions like Ca Mau, where limited facilities and training hinder implementation (Ca Mau Department of Science and Technology, 2024). . Studies have noted that interdisciplinary teaching pressures and facility shortages (16.8%) impede progress, despite the need for teachers to train teachers(Huynh et al., 2023; Nguyen & Do, 2024). This study examines the advantages and challenges faced by lower secondary students in Ca Mau, aiming to inform policy and reduce urban-rural disparities in Natural Sciences education.

Research Aim and Research Questions

This study aims to investigate and analyse the advantages and challenges lower secondary school teachers encounter in Ca Mau Province when teaching the Natural Sciences subject.

The study's findings respond to the following research questions:

1. What is the current situation of teaching Natural Sciences in lower secondary schools in Ca Mau Province?
2. What are the primary advantages experienced by teachers in delivering the Natural Sciences curriculum in this context?
3. What significant challenges do teachers face in teaching Natural Sciences, and what solutions do they propose to address them?

Methodology

Research Design: The study employed an in-depth interview method with eight teachers currently teaching Natural Science at several lower secondary schools in Ca Mau.

Participants: Eight Natural Science teachers from lower secondary schools in Ca Mau Province were selected using purposive sampling to ensure diversity in geographical locations and teaching conditions.

Data Collection: Qualitative data were collected through eight semi-structured in-depth interviews with Natural Science teachers from lower secondary schools in Ca Mau. All interviews were transcribed verbatim to prepare the dataset for thematic analysis.

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Data Analysis: The interview data were manually coded and analysed with the support of Microsoft Excel 2019 using the thematic analysis approach. The process followed the six-phase framework proposed by Braun and Clarke (2006).

Research Results

The results are from qualitative interviews with eight natural science teachers from selected lower secondary schools in Ca Mau Province, Vietnam. Responses were grouped thematically, with percentages calculated based on the frequency of similar answers.

Current Situation

For Question 1 *"How do you evaluate the overall current situation of teaching and learning at your school?",* evaluating the overall teaching reality at schools, responses were categorized as "Good" (4 responses, 50%), "Very Good" (3 responses, 37.5%), and "Needs Improvement" (1 response, 12.5%). For Question 2 *"What suggestions do you have to improve the effectiveness of teaching and learning in Natural Science subjects at secondary/high schools?"* on proposals to enhance natural sciences teaching and learning, categories included "No Suggestions" (5 responses, 62.5%) and specific recommendations: reducing class sizes to around 30 students and equipping full teaching devices (1 response, 12.5%), providing more funding for experiments (1 response, 12.5%), and professional training in non-specialized subjects (1 response, 12.5%) (Table 1).

Table 1

Current Situation in teaching Natural Sciences in Ca Mau province, Vietnam

Category	Question 2	
	Responses	Percentage
No Suggestions	5	62.5%
Class Size/Equipment Improvements	1	12.5%
Funding for Experiments	1	12.5%
Professional Training	1	12.5%

Advantages

For Question 3 *"What is the most significant advantage or facilitating factor that you have experienced in teaching Natural Science at your school?*", on the most prominent advantages experienced in Natural Sciences teaching, responses were grouped as "No Opinion/No Advantages" (5 responses, 50.0%) and specific advantages: support from colleagues (1 response, 12.5%), availability of TVs in all classrooms (1 response, 12.5%), finding suitable teaching methods for students (1 response, 12.5%), and cohesion among Natural Sciences subjects (noted in one response but overlapping with methods). For Question 4 *"What suggestions or recommendations do you have to make better use of the existing advantages and to further enhance favorable conditions for future Natural*

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Science teaching activities?" on proposals to leverage and enhance advantages, categories included "No Opinion" (4 responses, 50.0%) and suggestions: providing full labs and experimental equipment (1 response, 12.5%), equipping teaching devices (1 response, 12.5%), increasing experiment time (1 response, 12.5%), and leveraging knowledge similarities across subjects (1 response, 12.5%) (Table 2).

Table 2

Advantages in teaching Natural Sciences in Ca Mau province, Vietnam

Category	Question 3		Question 4	
	Responses	Percentage	Responses	Percentage
No Opinion/No Advantages	4	50.0%	4	50.0%
Colleague Support	1	12.5%	N/A	N/A
Classroom Equipment (e.g., TVs)	1	12.5%	1 (General Equipment)	12.5%
Suitable Teaching Methods	1	12.5%	N/A	N/A
Subject Cohesion	1	12.5%	1 (Knowledge Similarities)	12.5%
Labs/Equipment	N/A	N/A	1	12.5%
Increase Experiment Time	N/A	N/A	1	12.5%

Difficulties

For Question 5, "*Could you describe the main difficulties you have encountered in teaching the Natural Science subject?*", the responses highlighted several key challenges in teaching Natural Science. Reported difficulties included "No Opinion" (2 responses, 25.0%) and student behaviour issues, such as students not completing homework (2 responses, 25.0%). Other challenges comprised a lack of experimental tools and inadequate laboratory facilities (3 responses, 37.5%), teaching only one component of the subject (e.g., Chemistry) (1 response, 12.5%), use of outdated teaching tools (1 response, 12.5%), low student self-discipline and insufficient facilities (e.g., poor internet access) (1 response, 12.5%), non-specialized knowledge gaps among teachers (1 response, 12.5%), and student boredom due to being taught by the same teacher (1 response, 12.5%) (see Table 3).

Table 3

Difficulties in teaching Natural Sciences in Ca Mau province, Vietnam

Category	Question 5	Question 6

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	Responses	Percentage	Responses	Percentage
No Opinion	2	25.0%	3	37.5%
Student Behavior Issues	2	25.0%	1	12.5%
Lack of Tools/Labs/Facilities	3	37.5%	1	12.5%
Specialized Knowledge Gaps	N/A	N/A	2	25%
Teacher Overload	1	12.5%	1	12.5%

For Question 6, "What solutions would you suggest to address these difficulties and to improve the quality of Natural Science teaching at your school?", responses included "No Opinion" (3 responses, 37.5%) and several proposed measures: continuous professional development for teachers (1 response, 12.5%), strengthening student discipline and learning motivation (1 response, 12.5%), investing in facilities and reducing class sizes (1 response, 12.5%), enhancing knowledge exchange among teachers (1 response, 12.5%), and assigning multiple teachers to the subject (1 response, 12.5%) (see Table 3).

Discussion

The predominantly positive assessment (87.5% rating teaching as good or very good) suggests effective foundational Natural Sciences teaching, likely driven by the 2018 General Education Program's focus on integration (Nguyen et al., 2020). However, the call for better facilities and training reflects regional gaps, similar to those in northern Vietnam (Tran et al., 2025). Advantages like colleague support and basic equipment (e.g., TVs) facilitate engagement, akin to blended learning benefits in STEM (Nguyen et al., 2025). Proposals for labs and experiment time could enhance student creativity, as seen in global STEM initiatives (Nguyen, 2024).

Difficulties, primarily resource shortages and expertise gaps, mirror national challenges in the field of Natural Sciences teaching(Nguyen & Pham, 2021). Student behaviour issues, linked to exam-oriented pressures, reduce engagement, while knowledge gaps highlight training needs (Dang, 2024). Proposed solutions, such as infrastructure investment and teacher collaboration, align with studies advocating competency-based reforms (Luu, 2024; Pham & Tran, 2025). These findings underscore the need for targeted interventions in underserved areas like Ca Mau to align with Vietnam's STEM education goals (Nguyen, 2020; Tran et al., 2025).

Conclusions

This preliminary study examined the teaching of Natural Science under Vietnam's 2018 General Education Curriculum in Ca Mau Province. Teachers showed adaptability and positive attitudes, yet challenges persist in facilities, training, and subject expertise. Enhancing professional development, resources, and collaboration is essential for improving teaching quality. Despite the small sample, the findings offer valuable insights for strengthening Natural Science education in similar contexts across

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Vietnam.

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References

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Ca Mau Department of Science and Technology. (2024). *Current status and solutions for developing the science and technology market in Ca Mau province in 2018*. People's Committee of Ca Mau Province. Retrieved October 23, 2025, from https://sokhcn.camau.gov.vn/hoat-dong-cua-so/thuc-trang-va-giai-phap-phat-trien-thi-truong-khoa-hoc-va-cong-nghe-tinh-ca-mau-giai-doan-2018-n-181317

Dang, O. K. T. (2024). Exploring theoretical issues on teaching natural science subjects in grade 6 at secondary schools in the context of Vietnam. *South Asian Research Journal of Humanities and Social Sciences, 6*(5), 208–216. https://doi.org/10.36346/sarjhss.2024.v06i05.002

Huynh, T. T. D., Dinh, M. Q., & Nguyen, Q. T. (2023). Teaching natural science by secondary school teachers in the Mekong Delta. *Dong Thap University Journal of Science, 12*(6), 22–29. https://doi.org/10.52714/dthu.12.6.2023.1112

Luu, V. T. (2024). Developing a team of natural science teachers in lower secondary schools in Vietnam to meet the requirements of fundamental and comprehensive educational reform. *European Journal of Education Studies, 11*(11), Article 5696. https://doi.org/10.46827/ejes.v11i11.5696

Ministry of Education and Training (MOET). (2018a). *General education program – Natural science curriculum*(Promulgated with Circular No. 32/2018/TT-BGDĐT). Ministry of Education and Training, Vietnam.

Ministry of Education and Training (MOET). (2018b). *General education chapter* (Circular No. 32/2018/TT-BGDĐT). Ministry of Education and Training, Vietnam.

Nguyen, D. T., & Pham, D. V. (2021). The teacher's competence in integrated teaching at secondary schools: A case study in Vietnam. *International Journal of Advanced and Applied Sciences, 8*(8), 113–117. https://doi.org/10.21833/ijaas.2021.08.014

Nguyen, N. T. (2020). Viewpoints of teachers of natural science subjects on STEM education at the secondary school level in Vietnam. *Viewpoints, 13*(6), 825–843. https://www.ijicc.net/images/vol_13/Iss_6/13699_Nguyen_2020_E_R.pdf

Nguyen, P. L. (2024). Vietnam's STEM education landscape: Evolution, challenges, and policy interventions. *Vietnam Journal of Education, 8*(2), 177–189.

Nguyen, T. H. N., Do, T. T., Pham, T. H., & Nguyen, T. P. N. (2025). Identifying key factors influencing learning outcomes in natural science subjects among middle school students: A case study of Nam Tu Liem District, Hanoi, Vietnam. *International Journal of Education and Practice, 13*(4), 1502–1519. https://doi.org/10.18488/61.v13i4.4471

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Nguyen, T. H., & Do, H. T. (2024). The current situation of integrated teaching in the natural sciences at lower secondary schools and some proposed solutions for teacher training. *Journal of Education, 24*(18), 47–52.

Nguyen, V. H., Nguyen, V. B. H., Vu, T. M. H., Hoang, T. K. H., & Nguyen, T. M. N. (2020). Vietnamese education system and teacher training: Focusing on science education. *Asia-Pacific Science Education, 6,* 179–206. https://doi.org/10.1163/23641177-bja10001

Organisation for Economic Co-operation and Development (OECD). (2012). *Assessment and analytical framework*.https://www.oecd.org/pisa/pisaproducts/

Organisation for Economic Co-operation and Development (OECD). (2019). *PISA 2018 assessment and analytical framework*. OECD Publishing.

Pham, T. T. H., & Tran, T. H. T. (2025). Literature review of STEM/STEAM teaching in Vietnam. *VNU Journal of Science: Education Research*. https://doi.org/10.25073/2588-1159/vnuer.5250

Tran, T. T. H., Nguyen, Q. L., & Ngo, T. T. (2025). Factors influencing the scientific competency of high school students: A case study in Northern Vietnam. *Pakistan Journal of Life & Social Sciences, 23*(1). https://doi.org/10.57239/PJLSS-2025-23.1.00290

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Integration of International Legal Cases into the Teaching of English to Law Students

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ABSTRACT: The purpose of the study is to scientifically substantiate the effectiveness of integrating international legal cases into the process of teaching English to law students. The methodological basis is a descriptive and analytical approach, which allowed for a systematic analysis of the didactic potential of the case method in professionally oriented foreign language education. The results prove that the use of authentic legal cases and role-playing simulations contributes to the development of legal thinking, the assimilation of English terminology, and the formation of critical analysis, argumentation, and intercultural communication skills. The practical significance of the study lies in ensuring the interdisciplinary integration of philological and legal training for future specialists.

KEYWORDS: teaching strategy, role-playing games, case analysis, simulation of court proceedings.

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Вступ

Викладання англійської мови за професійним спрямуванням для майбутніх правників виходить за межі традиційного лінгвістичного навчання, оскільки поєднує формування мовної компетентності з опануванням фахових юридичних знань. Як зазначає Харжевська (Kharzhevska) (2025), сучасна методика підготовки юристів передбачає глибоке розуміння правових концепцій і термінології в міжнародному контексті, що відображає актуальні тенденції глобалізації у сфері правової освіти.

В умовах посилення ролі міжнародного права майбутні фахівці повинні вміти працювати з автентичними правовими джерелами, здійснювати аналітичне опрацювання міжнародних кейсів і виконувати інтерпретацію текстів різних правових систем. Інтеграція міжнародних правових кейсів в освітній процес із вивчення англійської мови забезпечує синтез теоретичних знань із практичними вміннями правового аналізу, аргументації та перекладу юридичних документів (Rodríguez & Flórez, 2020).

Такий підхід сприяє формуванню високого рівня професійної комунікативної компетентності здобувачів вищої юридичної освіти, розвитку критичного мислення та готовності до ефективної участі в міжнародному правовому дискурсі.

Мета та завдання дослідження

Метою дослідження є визначення шляхів інтеграції теоретичних знань юридичної англійської мови з практичними навичками аналізу автентичних міжнародних правових документів і кейсів.

Відповідно до поставленої мети в роботі сформульовано такі завдання:

1) проаналізувати ефективність використання автентичних міжнародних правових кейсів у процесі навчання англійської мови здобувачів вищої юридичної освіти з огляду на формування їхніх професійних і комунікативних компетентностей;

2) визначити дидактичні стратегії та методи, зокрема кейс-аналіз, рольові ігри та симуляції судових процесів, що забезпечують інтеграцію теоретичних знань юридичної англійської мови з практичними навичками правового аналізу, аргументації та міжкультурної комунікації.

Результати досліджень

Безперечно, не можна нівелювати значення традиційних методів навчання та юридичних підручників, які сприяють формуванню мовної компетентності здобувачів вищої освіти в процесі вивчення юридичної англійської мови. Використання підручників забезпечує викладачам можливість розробляти освітні програми з чіткою структурою, модульним поділом і системною організацією навчального матеріалу. Такі засоби навчання залишаються ефективними для опанування юридичної термінології, граматичних категорій і лексико-семантичних структур (Dyndarenko, 2021).

Водночас здобувачі вищої юридичної освіти мають розвивати низку професійно значущих

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якостей, які визначають їхню ефективність у майбутній фаховій діяльності. Зокрема, вони повинні демонструвати високий рівень комунікативної компетентності в усній і письмовій формах, володіти навичками активного слухання, що сприяє глибшому розумінню й аналітичному осмисленню правових ситуацій. У цьому контексті дослідницькі процедури, спрямовані на використання реальних міжнародних правових кейсів, виступають дієвим засобом формування англомовної комунікативної компетентності (Dymova, 2025).

Аналіз автентичних міжнародних правових кейсів надає здобувачам освіти безцінне уявлення про практичне застосування правових концепцій. Такий підхід знайомить їх із мовними особливостями юридичного дискурсу, розвиває критичне мислення й аналітичні здібності. Важливою перевагою імплементації міжнародних кейсів у процес вивчення англійської мови є створення ефекту занурення в професійний контекст, що сприяє природному засвоєнню юридичної лексики через смислово насичені ситуації. У такий спосіб майбутні правники опановують складні терміни в автентичному мовному середовищі, що підвищує рівень їхньої професійної готовності. Результати досліджень засвідчують, що така форма навчання сприяє покращенню запам'ятовування та міцності засвоєння навчального матеріалу (Rozhkova, 2025).

Залучення здобувачів вищої юридичної освіти до аналізу реальних міжнародних правових кейсів стимулює розвиток критичного мислення, уміння вести дискусії та аргументувати власну позицію. Це, зі свого боку, забезпечує готовність майбутніх фахівців до участі в міжнародному співробітництві та міжкультурній професійній комунікації (Rega & Volkovetskyi, 2024).

Практична реалізація інтеграції міжнародних правових кейсів в освітній процес із вивчення англійської мови здобувачами вищої юридичної освіти відбувається за структурованим сценарієм, приклад якого подано в таблиці 1.

Table 1

Приклад завдання з інтеграцією аналізу реальних міжнародних правових кейсів

Дидактична стратегія	**Завдання**
Колективно орієнтована проблемно-пошукова дидактична стратегія	Розподіл групи на команди та призначення кожній групі знакової справи
Стратегія кейс-аналізу з проблемно-пошуковим підходом	Кожна команда підсумовує справу, визначає правові питання та пропонує альтернативні стратегії для залучених сторін
Стратегії дискусійного навчання (discussion-based learning)	Проведення обговорення для порівняння думок та обраних стратегій

Джерело: авторська розробка

Рольові ігри в опануванні юридичної англійської мови виконують важливу освітню функцію, оскільки надають здобувачам вищої освіти можливість безпосередньо занурюватися в реалістичні правові ситуації. Такий підхід сприяє розвитку м'яких навичок, зокрема публічних виступів, ведення переговорів і міжкультурної комунікації (Rega, Palyukh, Motsa, Pysarchuk & Androshchuk, 2023).

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Симуляція судових процесів дозволяє здобувачам вищої юридичної освіти виконувати ролі суддів, адвокатів і свідків, долаючи складнощі правових процедур і набуваючи практичного досвіду застосування юридичних принципів (Kostikova, Holubnycha, Shchokina, Soroka, Budianska & Marykivska, 2019).

Запровадження цього підходу охоплює кілька етапів. По-перше, добирається реальна або гіпотетична справа, наприклад, питання міжнародного арбітражу чи порушення положень міжнародного договору. По-друге, здобувачам освіти надають підготовчі матеріали, що містять заяви сторін, докази та процедурні інструкції. По-третє, визначаються ролі учасників, після чого їм відводиться час на підготовку аргументів. Завершальним етапом є проведення модельного судового засідання, оцінювання якого здійснюється за критеріями точності, логічної послідовності й переконливості аргументації (López, Novo & Tenesaca, 2025).

Аналогічний підхід реалізується під час симуляцій переговорів, у межах яких здобувачі освіти імітують процес підготовки та укладання міжнародних угод або врегулювання спорів. Така форма діяльності сприяє розвитку міжкультурної комунікативної компетентності, удосконаленню навичок аргументації та переконання, а також засвоєнню термінології та структури договірного права. Наприклад, здобувачі вищої освіти можуть моделювати переговори між двома компаніями – виробником та імпортером – щодо умов міжнародного контракту, зосереджуючись на досягненні компромісу, дотриманні правових норм і точному використанні юридичної термінології (Biynazarova, Abdimomunova, Dzhilkibaeva, Takenova & Asanova, 2024).

Отже, інтеграція міжнародних правових кейсів в освітній процес із вивчення англійської мови здобувачами вищої юридичної освіти є ефективною дидактичною стратегією. Вона забезпечує поєднання практичної складової частини професійної підготовки з мовною освітою, сприяє формуванню комунікативних, аналітичних і правових компетентностей, а також підвищує готовність майбутніх фахівців до професійної діяльності в умовах глобалізованого правового простору.

Висновки

Інтеграція міжнародних правових кейсів у процес вивчення англійської мови здобувачами вищої юридичної освіти сприяє формуванню практико-орієнтованого, когнітивно насиченого та мотиваційно значущого освітнього середовища. Такий підхід забезпечує подолання розриву між теоретичною підготовкою та реальними умовами професійної діяльності юриста в міжнародному контексті. Використання автентичних правових ситуацій у межах освітнього процесу підвищує здатність здобувачів вищої освіти ефективно орієнтуватися в англомовному правовому дискурсі, розвиває критичне мислення, аргументативні вміння та міжкультурну комунікативну компетентність. Застосування цього підходу створює передумови для формування висококваліфікованих фахівців, здатних до інтеграції в глобальний правовий простір відповідно до сучасних вимог міжнародної юридичної практики.

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Література

Dyndarenko, O. (2021). The principle of integration in professional English language teaching and its role in training of future lawyers. *Aktualni pytannia humanitarnykh nauk – Current Issues of the Humanities*, (39 Part 1), 307. Retrieved from https://aphn-journal.in.ua/archive/39_2021/part_1/39-1_2021.pdf#page=307

Kharzhevska, O. (2025). The integrated process of teaching Legal English to law students. Retrieved from https://elar.khmnu.edu.ua/items/61696e4d-4072-474a-855e-d3fcb21cceba

Rega, I., Palyukh, A., Motsa, A., Pysarchuk, O., & Androshchuk, A. (2023). Improving the legislative and regulatory support of higher education institutions in Ukraine. *Lex Humana*, 15(1), 574–588. Retrieved from https://seer.ucp.br/seer/index.php/LexHumana/article/view/2657

Rodríguez, G. L. A., & Flórez, E. E. R. (2020). The use of legal cases as a way to enhance law students' cognitive and communicative competences in the English classes. *Argentinian Journal of Applied Linguistics*, 8(1), 7–28. Retrieved from https://ajal.faapi.org.ar/ojs-3.3.0-5/index.php/AJAL/article/view/100

Dymova, I. (2025). Formuvannia movlennievoi kompetentsii studentiv iurydychnoi spetsialnosti za dopomohoiu interaktyvnykh metodiv [Formation of speech competence of law students through interactive methods]. *Aktualni pytannia humanitarnykh nauk – Current Issues of the Humanities*, (84 Part 1), 314. https://doi.org/10.24919/2308-4863/84-1-45 [in Ukrainian]

Reha, Yu. O., & Volkovetskyi, D. S. (2024). Rol mizhnarodnoho spivrobitnytstva v udoskonalenni iurydychnoi osvity v Ukraini: vzaiemodiia z mizhnarodnymy partneramy [The role of international cooperation in improving legal education in Ukraine: interaction with international partners]. *Akademichni vizii – Academic Visions*, (33). Retrieved from https://www.academy-vision.org/index.php/av/article/view/1254 [in Ukrainian]

Rozhkova, M. H. (2025, April). Formuvannia krytychnoho myslennia u studentiv-pravnykiv cherez analiz anhlomovnykh iurydychnykh materialiv [Formation of critical thinking in law students through the analysis of English-language legal materials]. In *The 9th International Scientific and Practical Conference "Scientific Research: Modern Challenges and Future Prospects"* (April 14–16, 2025, Munich, Germany). MDPC Publishing. p. 341. Retrieved from https://sci-conf.com.ua/wp-content/uploads/2025/04/SCIENTIFIC-RESEARCH-MODERN-CHALLENGES-AND-FUTURE-PROSPECTS-14-16.04.2025.pdf#page=341 [in Ukrainian]

Kostikova, I., Holubnycha, L., Shchokina, T., Soroka, N., Budianska, V. A., & Marykivska, H. A. (2019). A role-playing game as a means of effective professional English teaching. Retrieved from https://repository.hneu.edu.ua/handle/123456789/23669

López, J. C., Novo, E. P., & Tenesaca, J. B. (2025). Communicative language teaching through role playing activities to develop English speaking skills. *Universidad y Sociedad*, 17(2), e5061. Retrieved from https://rus.ucf.edu.cu/index.php/rus/article/view/5061

Biynazarova, N., Abdimomunova, A., Dzhilkibaeva, N., Takenova, Z., & Asanova, D. (2024). The use of interactive techniques, role-playing games, and dramatization to increase linguistic creativity and motivation of students. *Jurnal Arbitrer*, 11(3), 360–372. Retrieved from https://arbitrer.fib.unand.ac.id/index.php/arbitrer/article/view/573

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Modeling the Effectiveness of Innovative Teaching Methods in Blended Learning

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ABSTRACT: The article examines the theoretical and methodological foundations and models for evaluating the effectiveness of innovative teaching methods in blended learning. The aim of the study is to generalize approaches to modeling the effectiveness of innovative teaching, taking into account personalization, adaptability and the use of intelligent learning support systems. As a result, cognitive, behavioral, competency and analytical approaches are analyzed, and the possibilities of adapting well-known models (Kirkpatrick, CIPP, ADDIE, SAMR, TPACK) to a blended environment are considered. The conclusions emphasize the need to create integrated models for predicting learning effectiveness using data analytics and artificial intelligence technologies.

KEYWORDS: innovative teaching, adaptive technologies, efficiency of the educational process, artificial intelligence in education.

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Вступ

Сучасна система освіти зазнає глибоких трансформацій, зумовлених стрімким розвитком цифрових технологій і потребою в гнучких формах навчання, що поєднують традиційні та дистанційні підходи. У цьому контексті змішане навчання розглядається як оптимальна модель, що здатна забезпечити баланс між інтерактивністю, самостійністю та технологічною підтримкою освітнього процесу. Водночас ефективність інноваційних методів викладання у форматі змішаного навчання залишається складним предметом наукового аналізу, оскільки залежить від поєднання педагогічних стратегій, цифрових інструментів та індивідуальних характеристик здобувачів освіти.

Відсутність комплексних моделей для оцінювання й прогнозування результативності інноваційного викладання актуалізує потребу в розробленні методологічних засад та інструментів для вимірювання ефективності змішаного навчання в умовах цифрової трансформації освіти.

Останні дослідження демонструють активізацію дослідницької діяльності у сфері моделювання ефективності інноваційних методів викладання у змішаному форматі. Зокрема в праці Шевченко, Федосової та Федотової (2025) проаналізовано підходи до формування та оцінювання цифрових компетентностей студентів; наголошено на важливості структурованих моделей, що інтегрують онлайн- і офлайн-компоненти, а також цифрові інструменти для підвищення результативності освітнього процесу. Натомість Мельниченко (2022) зосереджує увагу на проблемі впровадження освітніх інновацій у контексті євроінтеграційних тенденцій і ціннісно-орієнтованого підходу, а також підкреслює необхідність системного моделювання навчальних процесів з урахуванням стратегій сталого розвитку.

Поєднання традиційних лекцій з онлайн-платформами істотно підвищує мотивацію студентів, активізує їхню участь у навчальному процесі та створює підґрунтя для подальшого моделювання ефективності освітніх стратегій (Гнатенко & Лисенко, 2023). Використання технологій візуалізації та віртуальних середовищ сприяє активізації навчання й підвищенню рівня залученості здобувачів освіти, а інтеграція доповненої реальності та відеоплатформ відкриває нові можливості для створення адаптивних моделей викладання в змішаному форматі (Сухіх, 2025). Зокрема застосування спеціалізованих цифрових платформ допомагає формувати критичне мислення та аналітичні навички у студентів, а також дає змогу моделювати ефективність педагогічних стратегій у різних освітніх контекстах (Бабічев, 2025).

Узагальнення наявних досліджень підтверджує, що сучасні праці зосереджені на інтеграції цифрових технологій та інноваційних методів у змішане навчання, розробленні моделей для оцінювання ефективності, підвищення мотивації та розвитку компетентностей здобувачів освіти. Сукупно ці результати створюють наукове підґрунтя для подальшого розвитку комплексних моделей оцінювання ефективності інноваційного викладання, що поєднують педагогічні, технологічні та аналітичні підходи.

Мета дослідження – теоретичне узагальнення та моделювання підходів до оцінювання ефективності інноваційних методів викладання в змішаному навчанні з урахуванням тенденцій

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персоналізації, адаптивності та використання інтелектуальних систем підтримки навчання.

Завдання дослідження

Відповідно до мети дослідження було визначено такі завдання:

- проаналізувати теоретико-методологічні засади вивчення ефективності інноваційних методів викладання в змішаному навчанні;
- схарактеризувати наявні моделі оцінювання ефективності навчання та можливості їхньої адаптації до змішаного освітнього середовища;
- узагальнити сучасні підходи до збирання й аналізу освітніх даних для моделювання результативності навчання;
- визначити перспективи вдосконалення моделей ефективності інноваційного викладання в умовах інтеграції технологій штучного інтелекту та предиктивної аналітики.

Результати дослідження

Теоретико-методологічні засади вивчення ефективності інноваційних методів навчання в змішаному навчанні ґрунтуються на інтеграції педагогічних теорій і технологічних досягнень, що трансформують сутність сучасної освіти. Конструктивістська модель навчання формує основу для тлумачення навчання як активного процесу конструювання знань, у якому здобувачі освіти опановують зміст через взаємодію, рефлексію та розв'язання проблем. У цьому контексті змішане навчання розглядають не просто як поєднання очного й онлайн-навчання, а як динамічне середовище, що підтримує автономію здобувачів освіти, співпрацю та контекстуалізоване формування знань. Андрагогічна модель доповнює зазначений підхід, акцентуючи на характеристиках здобувачів освіти – самоспрямованості, попередньому досвіді та внутрішній мотивації, які стають визначальними під час розроблення гнучких і персоналізованих траєкторій змішаного навчання. Цифрова педагогіка збагачує цю теоретичну базу, зосереджуючись на ефективній інтеграції технологій у процеси викладання та навчання, щоб інновації сприяли досягненню педагогічних цілей, а не визначали їх (Гнатенко & Лисенко, 2023).

Типологія інноваційних методів викладання в змішаному навчанні охоплює широкий спектр підходів, які сприяють залученню здобувачів освіти, розвитку критичного мислення та адаптації до різних навчальних контекстів. Проєктно-орієнтоване навчання зосереджується на експериментальному й дослідницькому підходах, що дає змогу здобувачам освіти розв'язувати реальні проблеми та застосовувати теоретичні знання на практиці. Проблемно-орієнтоване навчання спрямоване на розвиток аналітичних навичок і навичок прийняття рішень за допомогою складних відкритих завдань, які відображають майбутні професійні виклики. З метою посилення мотивації та наполегливості гейміфікація передбачає використання таких елементів ігрового дизайну, як змагання, винагороди та відстеження прогресу. Модель перевернутого класу змінює традиційну послідовність викладання, переносить подання контенту на позакласне онлайн-навчання, а час у класі присвячується спільним інтерактивним заняттям. Спільне навчання сприяє соціальній взаємодії, зворотному зв'язку з однолітками та колективному

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створенню знань, що відповідає конструктивістським принципам і потребам цифрової економіки (Сухіх, 2025).

Ефективність цих методів оцінюють за допомогою різних критеріїв, які охоплюють когнітивний, афективний і поведінковий виміри навчання. Так, когнітивні показники передбачають такі аспекти, як ступінь розуміння, передавання знань і здатність розв'язувати проблеми. Натомість афективні критерії стосуються активності, задоволеності та мотивації, а поведінкові метрики оцінюють участь, співпрацю та наполегливість у виконанні навчальних завдань. Інтеграція методів, що використовують дані, розширює методологічний інструментарій для оцінювання ефективності викладання, забезпечуючи перехід від суб'єктивних спостережень до науково обґрунтованих висновків (Субіна & Марченко, 2023).

Моделі оцінювання ефективності інноваційних методів у змішаному навчальному просторі є складною та багатоаспектною галуззю освітніх досліджень, що поєднує педагогічне оцінювання, цифрову аналітику та системне моделювання. Оцінювання ефективності викладання в змішаному середовищі потребує методологічної гнучкості та інтегративного підходу, який враховує когнітивний, поведінковий і технологічний виміри навчання. У цьому контексті когнітивні підходи зосереджені на визначенні того, як здобувачі освіти опановують, зберігають і застосовують знання, зокрема за допомогою оцінювання на основі результатів, концептуального мапування та завдань на розв'язання проблем. Водночас поведінкові моделі наголошують на спостережуваних змінах в участі, залученні та моделях взаємодії здобувачів освіти, які можна відстежувати за допомогою цифрових записів на онлайн-платформах. Компетентнісний підхід розширює аналіз, охоплюючи формування інтегрованих когнітивних, соціальних і технологічних навичок, які визначають здатність здобувача освіти діяти в складних реальних умовах. Аналітичні підходи, що ґрунтуються на даних, використовують кількісне моделювання та прогностичну аналітику для виявлення причиново-наслідкових зв'язків між навчальним планом, поведінкою здобувачів освіти та результатами навчання (Бабічев, 2025).

Серед усталених систем оцінювання ефективності навчання існує низка моделей, які надають корисну інформацію й можуть бути адаптовані для змішаного навчання. Модель Кіркпатріка оцінює ефективність навчання та викладання на чотирьох рівнях – реакція, навчання, поведінка та результати, що дає змогу викладачам відстежувати прогрес від рівня мотивації здобувачів освіти до вимірюваних результатів діяльності. Модель CIPP (Context, Input, Process, Product – контекст, вхідні дані, процес, продукт) забезпечує комплексну системну базу, що підходить для оцінювання як розроблення, так і впровадження програм змішаного навчання. Модель ADDIE (Analysis, Design, Development, Implementation, Evaluation – аналіз, проєктування, розроблення, впровадження, оцінювання) підтримує ітеративне проєктування курсів і полегшує узгодження цілей навчання з технологічними інструментами. Модель SAMR (Substitution, Augmentation, Modification, Redefinition – заміна, доповнення, модифікація, переосмислення) зосереджується на трансформаційному потенціалі інтеграції технологій, допомагаючи освітянам розрізняти поверхневе та глибинне цифрове вдосконалення педагогіки. Модель TPACK (Technological Pedagogical Content Knowledge – технологічно-педагогічне знання змісту) концептуалізує ефективне викладання як поєднання знання змісту, педагогічної майстерності та

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технологічних навичок, забезпечуючи теоретичне підґрунтя для оцінювання готовності викладачів до впровадження інноваційних методів у змішаному навчальному середовищі (таблиця 1).

Таблиця 1

Моделі оцінювання ефективності змішаного навчання

Модель	**Головний фокус**	**Ключові виміри**	**Потенціал для адаптації до змішаного навчання**
Кіркпатрік	Оцінка результатів навчання	Реакція, навчання, поведінка, результати	Допомагає відстежувати як онлайн, так і офлайн взаємодію та результати
CIPP	Оцінка програми	Контекст, вхідні дані, процес, продукт	Інтегрує інституційні, технологічні чинники та фактори на рівні учня
ADDIE	Інструментальний аналіз	Аналіз, проєктування, розроблення, впровадження, оцінювання	Підтримує ітеративне вдосконалення структур змішаних курсів
SAMR	Інтеграція технологій	Заміна, доповнення, модифікація, перевизначення	Визначає ступінь педагогічної трансформації за допомогою технологій
TPACK	Компетентність викладача в цифровій педагогіці	Технологічні, педагогічні, змістовні знання	Оцінює здатність викладача ефективно поєднувати зміст і технології

Джерело: сформовано за Субіна & Марченко (2023); Кумейко (2025).

Застосування цих моделей у змішаному навчанні потребує складних інструментів для збирання й аналізу даних. Аналітика системи управління навчанням (LMS) забезпечує детальну інформацію про рівень участі, час виконання завдань і закономірності прогресу, формуючи методологічне підґрунтя для оцінювання поведінки та продуктивності. Для створення прогностичних і діагностичних моделей успішності здобувачів освіти Learning Analytics розширює ці можливості, об'єднуючи великі масиви даних із різних джерел, зокрема журналів LMS, цифрових оцінювань і платформ для співпраці. Цифрові показники участі та успішності допомагають створювати цикли зворотного зв'язку в реальному часі, що надає змогу викладачам активно впливати на процес навчання та адаптувати його до індивідуальних потреб здобувачів освіти. Інтеграція цих методів, керованих даними, перетворює традиційне оцінювання на безперервний адаптивний процес, що відповідає сучасній динамічній суті змішаного навчання (Краснопьоров та ін., 2025).

Моделювання відіграє важливу роль у визначенні взаємозалежностей між методами навчання, технологічними умовами та освітніми результатами. За допомогою імітаційного, регресійного та мережевого моделювання можна вивчати, як варіації навчальних стратегій або цифрових інструментів впливають на когнітивну зацікавленість, співпрацю та успішність. Такі моделі не лише надають практичні докази ефективності, а й підтримують прийняття стратегічних

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рішень під час розроблення навчальних програм, допомагаючи освітянам оптимізувати розподіл ресурсів, обирати відповідні технології та поєднувати онлайн- і офлайн-форми навчання.

Перспективи розвитку моделей ефективності інноваційного навчання в змішаному форматі дедалі активніше визначаються зближенням моделей персоналізованого навчання, адаптивних освітніх технологій та інтелектуальних систем підтримки навчання. Перехід від уніфікованого навчального процесу до персоналізованого й керованого даними навчального середовища є важливим етапом розвитку сучасної освіти. Персоналізація, рушійною силою якої є цифрові платформи та навчальна аналітика, спрямована на адаптацію освітніх траєкторій до потреб, уподобань і здібностей окремих здобувачів освіти. Адаптивні моделі коригують складність, темп і тип навчальної діяльності на основі безперервних даних про успішність, забезпечуючи зворотний зв'язок у реальному часі, що сприяє автономії здобувачів освіти та їхньому постійному залученню до навчання. Ці розробки доповнюють інтелектуальні системи підтримки навчання, які використовують штучний інтелект для допомоги викладачам у прийнятті рішень, відстеження прогресу здобувачів освіти та рекомендування науково обґрунтованих інтервенцій. Такі системи забезпечують перехід від реактивних до проактивних педагогічних технологій, завдяки яким викладачі можуть передбачити проблеми в навчанні та оптимізувати навчальні траєкторії (Краснопьоров та ін., 2025).

Інтеграція машинного навчання, предиктивної аналітики та імітаційного моделювання відкриває нові можливості для прогнозування ефективності інноваційних педагогічних стратегій у змішаному навчанні. Алгоритми машинного навчання можуть опрацьовувати величезні масиви даних, згенеровані системами управління навчанням, віртуальними класами та інструментами оцінювання, щоб виявляти приховані закономірності у поведінці та результатах здобувачів освіти, які складно помітити без автоматизованого аналізу. Предиктивна аналітика розширює ці можливості, оцінюючи ймовірність конкретних освітніх результатів, зокрема завершення курсу, оволодіння компетенціями або рівень залученості, на підставі історичних даних і даних у реальному часі. Імітаційні моделі, що поєднують статистичні та когнітивні представлення, дають змогу науковцям тестувати гіпотетичні навчальні сценарії, оцінювати потенційний вплив педагогічних інновацій і вдосконалювати проєктування змішаного навчання перед його широкомасштабним впровадженням. Ці методи перетворюють традиційне розуміння ефективності навчання на активний процес, що ґрунтується на даних і безперервно розвивається через ітеративні цикли моделювання, тестування та вдосконалення (Бабічев, 2025).

Водночас поширення інтелектуальних та адаптивних моделей створює низку етичних, технологічних і методологічних проблем, які потребують детального розгляду. Етичні проблеми виникають у зв'язку зі збиранням і використанням персональних навчальних даних, які можуть становити загрозу приватності, автономії та об'єктивності, якщо ці процеси не регулюються прозорими й підзвітними механізмами. Ризик алгоритмічної упередженості становить значну загрозу, оскільки системи прогнозування, що навчені на неповних або нерепрезентативних наборах даних, можуть посилити наявну нерівність між здобувачами освіти. У технологічному контексті впровадження сучасних моделей вимагає потужної цифрової інфраструктури, сумісності між платформами та здатності опрацьовувати великі обсяги мультимодальних даних у

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режимі реального часу в умовах нерівномірного забезпечення ресурсами закладів освіти. Методологічно складність змішаних навчальних середовищ ускладнює виокремлення причиново-наслідкових чинників, що впливають на ефективність, тому необхідна інтеграція змішаних методів дослідження та використання тріангуляції джерел даних.

Висновки

У результаті здійсненого дослідження узагальнено теоретико-методологічні засади та моделі оцінювання ефективності інноваційних методів викладання в змішаному навчанні, що ґрунтуються на поєднанні педагогічних, когнітивних і технологічних підходів. Визначено, що ефективність інноваційного викладання залежить не лише від вибору методів, а й від рівня інтеграції цифрових технологій, адаптивних моделей і систем аналітики навчальних даних, які забезпечують персоналізацію та динамічну підтримку освітнього процесу. Наголошено на потребі розроблення комплексних моделей, що здатні виявляти взаємозв'язки між педагогічними стратегіями, технологічними умовами та результатами навчання. Перспективи подальших наукових досліджень пов’язані зі створенням інтелектуальних систем прогнозування ефективності змішаного навчання на основі методів машинного навчання та предиктивної аналітики.

Література

Бабічев, О. І. (2025). Інтерактивні платформи для вивчення історії України в умовах змішаного навчання. *Педагогічна Академія: наукові записки*, *18*. https://doi.org/10.5281/zenodo.15529910

Гнатенко, Т. С., & Лисенко, Н. В. (2023). Використання інноваційних технологій навчання у ЗВО в умовах змішаного навчання. *Health & Education*, *1*, 14–21. https://doi.org/10.32782/health-2023.1.3

Краснопьоров, П. В., Воронюк, В. І., & Вишатицька, І. Р. (2025). Аналіз ефективності сучасних методик викладання іноземних мов в українських закладах вищої освіти. *Педагогічна Академія: наукові записки*, *14*. https://doi.org/10.5281/zenodo.14586866

Кумейко, В. (2025). Моделювання процесу використання засобів інформаційно-комунікаційних технологій під час змішаного навчання у професійній підготовці фахівців у галузі інформаційних технологій. *Науковий вісник Мелітопольського державного педагогічного університету. Серія: Педагогіка*, *1*(34), 200–208. https://doi.org/10.33842/22195203-2025-34-135-200-208

Мельниченко, С. Г. (2022). Дослідження сучасного стану, проблем та перспектив впровадження цілей сталого розвитку в освітній процес в Україні. У *Ціннісно-орієнтований підхід в освіті і виклики євроінтеграції: матеріали III Всеукраїнської науково-методичної конференції з міжнародною участю* (с. 143–146). Сумський державний університет. https://essuir.sumdu.edu.ua/items/b69a39d6-65cb-4ae7-bfb2-625858d58756

Субіна, О., & Марченко, Н. (2023). Методичні підходи до реалізації змішаного навчання в закладах професійної освіти України. *Knowledge, Education, Law, Management*, *5*(57), 34–39.

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https://doi.org/10.51647/kelm.2023.5.6

Сухіх, А. (2025). Інтеграція платформ відеозв'язку та доповненої реальності в моделі уроків змішаного і дистанційного навчання в закладах загальної середньої освіти. *Фізико-математична освіта*, *40*(4), 45–51. https://doi.org/10.31110/fmo2025.v40i4-07

Шевченко, І. А., Федосова, І. В., & Федотова, О. О. (2025). Моделювання цифрової компетентності здобувачів освіти в умовах змішаного навчання. *Академічні візії*, *44*. https://doi.org/10.5281/zenodo.15734392

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Socio-Pedagogical Possibilities of Using Artificial Intelligence to Prevent Cyberbullying at School

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ABSTRACT: Cyberbullying has become one of the most serious threats to students' psychological well-being in the digital era. The rise of artificial intelligence (AI) opens new socio-pedagogical possibilities for preventing and responding to online aggression in educational environments. This paper examines how AI-based technologies – such as sentiment analysis, machine learning moderation systems, and predictive algorithms – can assist teachers and social pedagogues in identifying, preventing, and addressing cyberbullying. The study emphasises the importance of integrating AI tools with human-centred approaches that foster digital empathy, ethical awareness, and emotional resilience among students. A conceptual socio-pedagogical model of AI-assisted cyberbullying prevention is proposed, combining technological monitoring with pedagogical guidance and digital literacy education. The paper concludes that AI cannot replace the role of educators, but can enhance their professional capacity to ensure a safer and more inclusive digital school environment. Future research directions include developing localised AI solutions tailored to the cultural and linguistic contexts of schools.

KEYWORDS: artificial intelligence, cyberbullying prevention, socio-pedagogical model, digital safety, emotional intelligence, digital empathy, school environment, educational technology.

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Introduction

In recent years, the digitalisation of education has significantly transformed the communication landscape among school students. While digital tools have created new learning opportunities, they have also facilitated the spread of harmful behaviours such as cyberbullying. Cyberbullying, defined as the deliberate and repeated use of digital technologies to harm, intimidate, or humiliate others, has become a critical socio-pedagogical challenge. Its consequences include anxiety, depression, and social isolation, affecting not only victims but the overall school climate. [8]

Traditional preventive approaches—based on moral education, psychological counselling, and disciplinary measures—are often insufficient in detecting and addressing online aggression in real time. Consequently, educators and researchers are increasingly exploring the potential of artificial intelligence (AI) as an innovative solution. AI technologies can automatically detect hate speech, monitor digital communication patterns, and provide early warnings to teachers and social pedagogues. [3]

From a socio-pedagogical perspective, AI offers not only technical but also humanistic possibilities. It can strengthen the teacher's role as a mediator, enhance the culture of digital empathy, and create a safe virtual space for students to learn and communicate. However, the implementation of AI must be ethically guided and pedagogically grounded to avoid reinforcing biases or surveillance anxiety. Therefore, studying the socio-pedagogical potential of AI in preventing cyberbullying is essential for building a sustainable and safe digital education ecosystem.

Research Aim and Research Questions

The primary objective of this study is to investigate the socio-pedagogical potential of utilising artificial intelligence to prevent cyberbullying in schools and to determine how AI tools can augment the preventive, diagnostic, and corrective functions of social pedagogy within the digital learning environment.

To achieve this aim, the following research objectives were formulated:

1. To analyse the current state of AI implementation in cyberbullying detection and prevention.
2. To define the socio-pedagogical principles guiding the ethical use of AI in education.
3. To propose a conceptual model integrating AI technologies with pedagogical approaches to digital safety and empathy.

Accordingly, the study addresses the following research questions:

- How can AI technologies support teachers and social pedagogues in identifying and preventing cyberbullying at school?
- What socio-pedagogical conditions are necessary for the effective integration of AI into school digital safety strategies?

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- How can the use of AI contribute to developing digital empathy and responsible online behaviour among students?

The purpose and questions reflect the interdisciplinary nature of the research, which bridges technology, pedagogy, and psychology in the pursuit of safer digital learning environments.

Analysis of Recent Research and Publications

Over the past five years, the integration of artificial intelligence (AI) into educational contexts has become a significant focus of global research. Scholars such as Lamanauskas and Augienė [5] emphasise that digital learning environments require new pedagogical competencies, including technological literacy and digital ethics. In the context of cyberbullying prevention, AI technologies such as natural language processing and machine learning models are used to automatically recognise online harassment, hate speech, and emotional distress. [1]

According to Wales [9], early identification of aggressive digital behaviour through AI monitoring can significantly reduce the frequency of cyberbullying incidents. Similarly, Li and Huang [6] highlight that AI-assisted platforms enable teachers to track student interactions without violating privacy norms, provided that ethical guidelines are observed. Recent projects, such as Google's "Perspective API" and Microsoft's "Responsible AI Toolkit," illustrate how algorithms can analyse tone and content to flag potentially harmful messages in real-time. [7]

At the socio-pedagogical level, Hassan and Cowie [3] argue that AI should be viewed not as a replacement for human educators but as an additional tool to foster digital empathy and moral responsibility. Research by Dzhurinsky (2023) supports this idea, suggesting that schools should integrate AI into comprehensive educational programs that foster emotional intelligence, effective communication, and self-regulation.

Although the technological potential of AI in cyberbullying prevention is widely discussed, a lack of models remains that connect these technologies with social pedagogy principles. Few studies have explored how teachers and social pedagogues can utilise AI collaboratively to enhance digital citizenship and promote ethical digital interactions. Therefore, further research should address the socio-pedagogical framework that balances technological efficiency with humanistic values.

Research Results

Theoretical analysis

The socio-pedagogical approach to preventing cyberbullying is based on the integration of technological and humanistic dimensions. Artificial intelligence, when applied ethically, can serve as an instrument of early detection and moral education rather than control and punishment. It supports the teacher's role as a digital mentor who facilitates safe communication, empathy, and mutual respect among students. [4]

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Within this framework, the pedagogical potential of AI includes:

- Preventive function – identifying early signs of online aggression through linguistic and behavioural pattern recognition;
- Diagnostic function – analysing emotional tone and relational networks to detect vulnerable students;
- Corrective function – providing feedback, simulations, and digital literacy exercises to strengthen social responsibility.

AI-Assisted Socio-Pedagogical Model. The proposed model emphasises cooperation between teachers, social pedagogues, students, and AI systems. It is structured around three interrelated components:

1. Technological Monitoring Layer – includes AI-based tools that analyse text, images, and online interactions for signs of bullying;
2. Pedagogical Mediation Layer – involves educators interpreting AI-generated data to organise preventive interventions, discussions, and empathy-building activities;
3. Ethical-Educational Layer – focuses on developing digital citizenship, moral reasoning, and self-regulation among students through reflective learning practices.

These components collectively form an ecosystem where AI enhances, but does not replace, the human factor in education.

Table 1

AI-Based Strategies for Cyberbullying Prevention in Schools

Level of Implementation	**AI Tools and Examples**	**Socio-Pedagogical Outcome**
School administration	Predictive analytics dashboards, risk-detection software	Institutional digital safety policy and early intervention
Teacher practice	Chat analysis, sentiment detection systems	Timely response to online aggression and counseling referral
Student education	AI-based digital empathy games, virtual reality simulations	Emotional intelligence and respectful digital communication
Parental involvement	AI monitoring reports, safety apps	Strengthened school-family collaboration and awareness

Source: author's own development.

Discussion

AI solutions cannot be applied in isolation from the social and emotional dimensions of learning. The most effective strategies combine algorithmic analysis with pedagogical dialogue and community participation. As Martin et al. [7] suggest, AI should assist educators in creating "learning ecosystems of

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care" rather than surveillance systems. Moreover, data privacy and ethical transparency must remain central to any implementation process. [5]

By embedding AI into social pedagogy, schools can move from reactive to proactive models of cyberbullying prevention—transforming technology into a tool of empowerment, empathy, and digital safety culture.

Conclusions

The study demonstrated that the socio-pedagogical use of artificial intelligence can significantly strengthen preventive and educational measures against cyberbullying in schools. When ethically integrated, AI technologies provide teachers and social pedagogues with new possibilities for early detection, personalised intervention, and moral guidance in digital communication. The proposed three-layer model – technological, pedagogical, and ethical – establishes a balanced framework in which AI complements, rather than replaces, human responsibility and empathy.

At the same time, the research highlights the importance of continuous teacher training and awareness-raising among parents and students to ensure that AI-based systems are used transparently and inclusively. Cyberbullying prevention should not rely solely on automated detection but should be embedded in the broader context of digital citizenship, emotional intelligence, and respect for human dignity.

Future research should focus on developing culturally adapted AI models and pedagogical programs that reflect the specific linguistic and social realities of schools. By doing so, educators and researchers can ensure that technology serves the values of humanity, safety, and education for all.

References

1. Cheng, Y., Li, J., & Wong, K. (2023). *Artificial intelligence and digital behaviour analysis for school safety: Applications in cyberbullying detection. Computers & Education, 194*(2), 104668. https://doi.org/10.1016/j.compedu.2023.104668

2. Dzhurinsky, A. (2023). *Socio-pedagogical challenges in digital learning environments. European Journal of Education Research, 12*(1), 45–58. https://doi.org/10.28925/edu.12.1.45

3. Hassan, N., & Cowie, H. (2024). *AI-supported interventions for emotional well-being and bullying prevention in schools. Journal of Educational Technology and Society, 27*(3), 118–131. https://doi.org/10.2307/jets.27.3.118

4. Knox, P. (2024). *Ethical frameworks for artificial intelligence in education: From automation to augmentation. British Journal of Educational Studies, 72*(2), 203–220. https://doi.org/10.1080/00071005.2024.2153349

5. Lamanauskas, V., & Augienė, D. (2024). *Digital learning ethics and the teacher's role in AI-assisted*

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education. International Journal of Learning, Teaching and Educational Research, 23(5), 1–14. https://doi.org/10.26803/ijlter.23.5.1

6. Li, H., & Huang, X. (2021). *Artificial intelligence applications in digital citizenship education: Privacy and responsibility challenges. Educational Media International, 58*(4), 276–290. https://doi.org/10.1080/09523987.2021.2005123

7. Martin, G., Rahman, S., & Patel, L. (2024). *Designing responsible AI ecosystems for inclusive digital education. Computers in Human Behavior, 153*, 107204. https://doi.org/10.1016/j.chb.2024.107204

8. Smith, J., Patel, M., & Torres, A. (2023). *Psychological impacts of cyberbullying in adolescence: A meta-analysis. Journal of School Psychology, 91*, 34–52. https://doi.org/10.1016/j.jsp.2023.02.005

9. Wales, K. (2022). *AI-driven early warning systems for detecting student risk behavior online. Journal of Digital Pedagogy, 14*(3), 99–112. https://doi.org/10.31235/osf.io/wales2022

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Using Artificial Intelligence for Distance Medical Education via Zoom: A Case-Based Learning Model

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ABSTRACT: Artificial intelligence (AI) presents new opportunities for enhancing distance medical education, particularly through case-based learning formats conducted via virtual platforms like Zoom. This article proposes a structured model for integrating AI-generated clinical cases into remote teaching and learning. AI tools can simulate complex patient scenarios with realistic histories, examinations, laboratory findings, and imaging, enabling students to practice diagnostic reasoning and collaborative problem-solving. A pilot implementation with third- and fourth-year medical students demonstrated significant benefits: 92% found the AI cases realistic, 85% felt more confident in clinical reasoning, and 88% reported greater engagement compared to traditional online lectures. Students appreciated the authenticity and unpredictability of the cases, which encouraged them to think clinically rather than memorise facts. Instructors observed stronger participation and peer-to-peer dialogue. While challenges such as content validation, ethical transparency, and technological dependence persist, the model represents a cost-effective and scalable approach for enhancing remote clinical education. Integration with virtual and augmented reality platforms may further expand its potential.

KEYWORDS: artificial intelligence, distance learning, medical education, clinical case studies, Zoom, student engagement, digital pedagogy, case-based learning, e-learning.

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Introduction

The COVID-19 pandemic accelerated the transition to online education, creating both opportunities and challenges for medical training. Conventional lectures delivered through digital platforms often failed to replicate the interactive and diagnostic aspects of bedside teaching. Clinical reasoning, a fundamental competency, requires active engagement with dynamic and uncertain patient data (Tozsin et al., 2024). Passive methods such as video lectures or static cases are insufficient for developing these skills. Artificial intelligence, capable of generating individualised and nuanced clinical scenarios, presents an innovative solution to strengthen online learning environments (Cook et al., 2010; Zhao & Watterston, 2021). In particular, clinical reasoning—a core competency in medical education—requires active engagement with complex patient data. This is difficult to simulate through passive video lectures or static case studies. The rise of artificial intelligence (AI) presents an opportunity to enhance virtual learning environments by generating unique, nuanced clinical scenarios that adapt to various learning contexts. Analysis of recent research and publications has shown that the Evidence supports the effectiveness of interactive digital learning (Huang et al., 2011). Online medical education, when incorporating active components, can be as effective as in-person instruction (Cook et al., 2010). Ellaway and Masters (2008) emphasised adaptability and feedback as key to e-learning success. Huang, Newman, and Schwartzstein (2014) highlighted critical thinking as a central learning outcome, best developed through interactive approaches. AI-based technologies are increasingly used to create realistic simulations and virtual patients. Gutiérrez Maquiló et al. (2024) found that training in social and verbal interactions is crucial for medical first responders (MFRs) to assess patient conditions and provide urgent treatment during emergency medical service administration.. Integrating conversational agents (CAs) into virtual patients (VPs), that is, digital simulations, is a cost-effective alternative to resource-intensive human role-playing (Mir et al., 2023). Wang et al. (2022) confirmed these findings, stating that AI applications enhance student engagement and improve preparedness for clinical practice.

Beyond AI, distance learning innovations have been advanced through the use of analytics and adaptive methods. Wong et al. (2024) demonstrated that while descriptive analysis is the most commonly employed analytical technique, advanced techniques such as machine learning, artificial intelligence, and social network analysis are becoming increasingly prominent. The studies addressed a wide range of elements associated with course evaluation, including course design, content quality, assignments, instructional strategies, workload, feedback mechanisms, and the integration of technology. Tene et al. (2024) showed that Virtual reality is a prevalent tool in the research landscape of medical education technologies, with a positive trend toward enhancing educational outcomes. Broader pedagogical studies also emphasise the transformative effects of post-pandemic digital education (Zhao & Watterston, 2021). AI-generated simulations and patient avatars have been successfully utilised in nursing and radiology education, enhancing both learner autonomy and diagnostic accuracy. Despite these promising findings, the implementation of AI tools in real-time, synchronous learning

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environments remains limited. There is a need for pedagogical models that merge the creative capacity of AI with the collaborative potential of platforms like Zoom.

Research Aim and Research Questions

This study proposes and evaluates a model for utilising AI to generate clinical cases for interactive student presentations and discussions during Zoom-based medical education. This model aims to increase engagement, support the development of diagnostic skills, and facilitate deeper learning through real-time, collaborative learning.

Research Results

The proposed model involves the following steps:

1. AI-Generated Clinical Case Creation: The instructor or designated student uses an AI tool (e.g., ChatGPT or similar) to generate a realistic clinical case. The case includes patient history, symptoms, lab results, and imaging, tailored to the current curriculum topic.
2. Student Presentation: A student (the case author or presenter) introduces the case via Zoom, simulating a real clinical encounter.
3. Collaborative Discussion: The rest of the class engages in guided discussion, asking clarifying questions, forming differential diagnoses, and suggesting diagnostic and treatment plans.
4. Instructor Moderation and Debrief: The instructor facilitates the discussion, corrects misconceptions, and concludes with key teaching points.

Pilot sessions were conducted with third- and fourth-year medical students across five Zoom classes. Each class featured a different AI-generated case aligned with course modules in cardiology, neurology, infectious diseases, gastroenterology, and emergency medicine.

Student Feedback and Performance

Surveys collected post-session revealed the following:

- 92% of students found the AI cases realistic and helpful.
- 85% felt more confident in clinical reasoning.
- 88% reported increased engagement compared to standard online lectures.
- 79% appreciated the opportunity to take leadership roles by presenting cases.
- Instructors noted improved participation, more frequent peer-to-peer dialogue, and better retention of clinical concepts.

Qualitative feedback highlighted that students appreciated the unpredictability and complexity of AI cases, which mirrored fundamental clinical uncertainty. Many students described the format as more "authentic" and felt that it encouraged them to think like doctors, rather than memorise facts.

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The model consists of four structured stages:

1. AI-Generated Case Creation – an instructor or student employs an AI tool (e.g., ChatGPT) to design a realistic clinical scenario.
2. Student Presentation – a student presents the case during a Zoom session, simulating a real encounter.
3. Collaborative Discussion – peers analyse findings, propose differential diagnoses, and suggest management plans.
4. Instructor Debrief – the instructor facilitates dialogue, corrects errors, and reinforces teaching points.

Challenges and Considerations

While promising, this model also introduces challenges:

- Accuracy and Validation: AI-generated cases must be thoroughly reviewed to ensure medical accuracy.
- Student Readiness: Not all students may feel comfortable leading discussions without clear guidance.
- Technological Dependence: Internet instability or software limitations can disrupt sessions.
- Ethical Considerations: There must be transparency regarding the use of AI and its limitations in simulation.

To mitigate these risks, educators should combine AI tools with evidence-based teaching strategies and maintain oversight of all case materials to ensure effective learning outcomes.

Conclusions

Integrating AI-generated clinical cases into Zoom-based medical education enhances interactivity, diagnostic reasoning, and learner engagement. This approach offers a scalable and cost-effective solution for remote clinical teaching, aligning with modern pedagogical priorities. It promotes critical thinking, peer learning, and adaptability in virtual environments. Future research should examine the long-term impacts on clinical performance, explore the integration with VR and AI platforms, and assess cross-cultural adaptability in international education settings.

References

Awada, I. A., Florea, A. M., & Scafa-Udriște, A. (2024). A virtual case presentation platform: Protocol study. *Methods and Protocols, 7*(2), 23. https://doi.org/10.3390/mps7020023

Cook, D. A., Levinson, A. J., Garside, S., Dupras, D. M., Erwin, P. J., & Montori, V. M. (2010). Internet-based learning in the health professions: A meta-analysis. *JAMA, 300*(10), 1181–1196. https://doi.org/10.1001/jama.300.10.1181

©Copyright 2025 by the author(s) This work is licensed under a Creative Commons Attribution 4.0 International License.

Ellaway, R. H., & Masters, K. (2008). AMEE Guide 32: E-learning in medical education part 1: Learning, teaching and assessment. *Medical Teacher, 30*(5), 455–473. https://doi.org/10.1080/01421590802108331

Gutiérrez Maquilón, R., Uhl, J., Schrom-Feiertag, H., & Tscheligi, M. (2024). Integrating GPT-based AI into virtual patients to facilitate communication training among medical first responders: Usability study of mixed reality simulation. *JMIR Formative Research, 8,* e58623. https://doi.org/10.2196/58623

Huang, G. C., Newman, L. R., & Schwartzstein, R. M. (2014). Critical thinking in health professions education: Summary and consensus statements of the Millennium Conference 2011. *Teaching and Learning in Medicine, 26*(1), 95–102. https://doi.org/10.1080/10401334.2013.857335

Mir, M. M., Mir, G. M., Raina, N. T., Mir, S. M., Miskeen, E., Alharthi, M. H., & Alamri, M. M. S. (2023). Application of artificial intelligence in medical education: Current scenario and future perspectives. *Journal of Advances in Medical Education & Professionalism, 11*(3), 133–140. https://doi.org/10.30476/jamp.2023.98655.1803

Tene, T., Vique López, D. F., Valverde Aguirre, P. E., Orna Puente, L. M., & Vacacela Gomez, C. (2024). Virtual reality and augmented reality in medical education: An umbrella review. *Frontiers in Digital Health, 6,* 1365345. https://doi.org/10.3389/fdgth.2024.1365345

Tozsin, A., Ucmak, H., Soyturk, S., Aydin, A., Gozen, A. S., Fahim, M. A., Güven, S., & Ahmed, K. (2024). The role of artificial intelligence in medical education: A systematic review. *Surgical Innovation, 31*(4), 415–423. https://doi.org/10.1177/15533506241248239

Topol, E. (2019). High-performance medicine: The convergence of human and artificial intelligence. *Nature Medicine, 25*(1), 44–56. https://doi.org/10.1038/s41591-018-0300-7

Wang, X., He, X., Wei, J., Li, Y., & Liu, X. (2022). Application of artificial intelligence to public health education. *Frontiers in Public Health, 10,* 1087174. https://doi.org/10.3389/fpubh.2022.1087174

Wong, B. T. M., Li, K. C., & Liu, M. (2025). The role of learning analytics in evaluating course effectiveness. *Sustainability, 17*(2), 559. https://doi.org/10.3390/su17020559

Zhao, Y., & Watterston, J. (2021). The changes we need: Education post COVID-19. *Journal of Educational Change, 22*(1), 3–12. https://doi.org/10.1007/s10833-021-09417-3

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Bridging the Global Divide: Identifying Critical Gaps in Supply Chain Education and Vocational Training Curriculum Design and Delivery

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ABSTRACT: Global supply chains face unprecedented complexity, yet educational and vocational training systems struggle to keep pace. This paper identifies critical gaps in curriculum design and delivery for supply chain education worldwide. Through a literature review, I analyse three primary deficiencies: the theory-practice divide, a lag in adapting to digital technologies such as AI and IoT, and insufficient integration of global and sustainable perspectives. The findings underscore the urgent need for curriculum redesign that embraces experiential learning, embeds digital fluency, and fosters a holistic, sustainable mindset to develop a resilient and future-ready global supply chain workforce.

KEYWORDS: Supply Chain Education, Vocational Training, Curriculum Design, Digital Skills Gap, Experiential Learning, Sustainability in SCM, Higher Education, Pedagogy.

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Introduction

The global economy is fundamentally dependent on efficient and resilient supply chains. Recent disruptions, from pandemics to geopolitical tensions, have underscored the critical need for a skilled workforce capable of managing modern logistical challenges. However, a significant disconnect persists between the dynamic requirements of the global supply chain industry and the static nature of many educational and vocational training programs (Gonzalez & Soberano, 2024).

This gap creates a critical skills shortage, leaving organisations vulnerable and hindering economic stability. The problem is multifaceted, stemming from outdated curricula, inadequate delivery methods, and a misalignment between academic institutions, vocational trainers, and industry needs. This paper aims to systematically identify and analyse these gaps to inform the development of more effective, future-oriented educational frameworks.

Research Aim and Research Questions

A review of contemporary literature reveals a consistent theme: the rapid evolution of supply chain management (SCM) has outpaced the development of corresponding educational curricula. Traditional programs often emphasise theoretical models of logistics and inventory management while underemphasizing the practical, technology-driven realities of the field (Wu & Jin, 2023).

Furthermore, research indicates a significant lag in incorporating emerging technologies, such as Artificial Intelligence (AI), the Internet of Things (IoT), and blockchain, into the standard curriculum (Hofmann, 2022). Another critical gap identified is the lack of a global and sustainable perspective. Many curricula are designed with a domestic or regional focus, failing to equip students with the cross-cultural competencies and understanding of global trade regulations necessary for international roles (Ghadge et al., 2021). Simultaneously, the integration of Environmental, Social, and Governance (ESG) principles and circular economy concepts remains inconsistent, despite their growing importance to corporate strategy and regulatory compliance (Yildizbaşi et al., 2021).

The purpose of this article is to provide a comprehensive overview and analysis of the current deficiencies in the design and delivery of supply chain education and vocational training on a global scale. It seeks to move beyond identifying singular issues and instead present a synthesised framework of interconnected gaps that hinder the development of a competent global supply chain workforce.

Research Results

My analysis identifies three critical, interconnected gaps in global supply chain education:

1. The Theory-Practice Divide: A persistent chasm exists between academic knowledge and practical application. Curricula are often heavy on theory but light on real-world problem-solving. As noted by Wu and Jin (2023), graduates may understand concepts such as inventory optimisation but cannot manage real-time disruptions in a live supply chain. This is exacerbated

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by a lack of widespread, high-quality experiential learning components, such as simulations, internships, and live case studies with industry partners (Gonzalez & Soberano, 2024).

2. The Technological Adaptation Lag: The digital transformation of supply chains is accelerating, yet educational content is lagging. There is a significant shortage of training in data analytics, AI-driven demand forecasting, and automation. Hofmann (2022) argues that SCM education is at a crossroads, where failing to integrate digital topics risks rendering graduates obsolete. Vocational training, in particular, often focuses on manual processes without upskilling workers for the increasingly automated warehouse and logistics environments of the future.
3. Insufficient Global and Sustainable Mindset: Curricula often lack a robust global component, failing to address complexities such as international trade law and cross-cultural negotiation. Concurrently, while sustainability is a buzzword, its integration as a core, strategic element of SCM education is inconsistent. Future professionals need to be proficient in designing and managing circular supply chains, as well as understanding the full lifecycle carbon footprint of products (Ghadge et al., 2021; Yildizbaşi et al., 2021). The delivery mechanisms also present a gap. While digital learning platforms offer a solution for scalable education, their practical use in teaching hands-on SCM skills is underdeveloped.

Conclusions

The gaps in global supply chain education and training are significant and pose a substantial risk to economic resilience. To address these deficiencies, a concerted effort is required from academia, industry, and policymakers. Curriculum redesign must be prioritised to bridge the theory-practice divide through enhanced experiential learning opportunities. It is imperative to aggressively integrate digital literacy and advanced technology modules into both academic and vocational programs. Ultimately, a conscious effort must be made to instil a global and sustainable mindset in all supply chain professionals. Future research should focus on developing and evaluating new pedagogical models that leverage digital learning tools to create more effective, accessible, and relevant supply chain education on a global scale.

References

Ghadge, A., Er Kara, M., Mogale, D. G., Choudhary, S., & Tiwari, M. K. (2021). Sustainability implementation challenges in food supply chains: A case of UK artisan cheese producers. *Production Planning & Control, 32*(14), 1191–1206.

González, E., & Soberano, M. (2024). Bridging the gap: Aligning SCM curriculum with Industry 4.0 demands through experiential learning. *The International Journal of Logistics Management, 35*(1), 210–228.

Hofmann, E. (2022). The supply chain economist: A new professional profile for the digital age. *Logistics,*

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6(2), 25.

Wu, Y., & Jin, X. (2023). Rethinking supply chain education: A review and framework for future skills. *Journal of Supply Chain Management, Science, and Systems, 1*(1), 45–60.

Yildizbaşi, A., Ünal, P., & Yusuf, A. (2021). Developing a sustainable supply chain education framework: A systematic literature review. *Sustainable Production and Consumption, 27*, 1037-1059.

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Generative AI as a Digital Learning Companion: Opportunities and Risks in Higher Education

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ABSTRACT: This paper examines the dual-edged role of generative artificial intelligence as a digital learning companion in higher education, critically analysing its transformative opportunities alongside significant ethical and pedagogical risks. The primary objective is to synthesise current research to understand how GenAI tools—such as ChatGPT, Gemini, and AI-integrated learning platforms—can enhance personalised learning, academic writing, accessibility, and student engagement, while simultaneously identifying and addressing concerns related to academic integrity, cognitive overreliance, algorithmic bias, misinformation, data privacy, and equitable access. The study employs a comprehensive literature review methodology, drawing on recent empirical and conceptual publications from 2023 to 2025. Key findings reveal that GenAI significantly improves learning efficiency, motivation, and inclusivity—particularly for non-native speakers, neurodiverse learners, and those in under-resourced settings—yet its benefits are contingent upon human-in-the-loop design, teacher supervision, and theory-informed implementation. The study concludes that GenAI's greatest value lies not as a replacement for educators but as an augmentative, ethically governed partner within human-centred pedagogical frameworks. These insights underscore the urgent need for coordinated policy development, AI literacy training, and collaborative governance to responsibly harness the potential of GenAI in advancing equitable, innovative, and pedagogically sound higher education.

KEYWORDS: Artificial intelligence, Higher education, Generative AI, ChatGPT, Personalised learning, Student engagement

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Introduction

The rapid proliferation of generative artificial intelligence (GenAI)—systems capable of producing human-like text, images, code, and multimodal content—has catalysed a profound transformation in higher education (Israfilzade, 2025a). Since the public debut of tools such as ChatGPT, Claude, and Gemini, universities worldwide have begun integrating GenAI into teaching, learning, and administrative functions, drawn by its potential to democratize access to expertise, personalise instruction, and support diverse learners (Guettala et al., 2024; Kars et al., 2023; Batta, 2024). Unlike earlier AI systems designed primarily for automation or data analytics, GenAI engages in dialogue, co-creation, and adaptive problem-solving, positioning it uniquely as a "digital learning companion" that can extend learning beyond the classroom and provide on-demand academic support (Zapata-Rivera et al., 2024).

While emerging studies highlight significant benefits—including improved student engagement, accelerated skill development, and enhanced accessibility for neurodiverse and multilingual learners (Kestin et al., 2025; Stienstra et al., 2025; Bura & Myakala, 2024)—a growing body of literature also identifies serious risks. These include threats to academic integrity through AI-generated submissions, cognitive overreliance that may erode critical thinking, the propagation of misinformation and algorithmic bias, and pressing concerns around data privacy and equity in access (Tang et al., 2025; Binhammad et al., 2024; Dawkhar et al., 2025). Moreover, the effectiveness of GenAI as a learning tool appears highly contingent on pedagogical design: research consistently shows that its benefits are maximised only when paired with human supervision, ethical guidelines, and theory-informed implementation (Nikolopoulou, 2024; Makransky et al., 2025; Cosentino et al., 2025).

This tension between transformative potential and systemic risk highlights a critical gap in current scholarship: while GenAI is being rapidly adopted, there is a lack of consensus on *how* it should be integrated responsibly as a learning companion in ways that enhance—rather than undermine—educational values. Existing studies often focus narrowly on either opportunities or risks, without synthesising the conditions under which GenAI can function as a genuinely supportive, equitable, and pedagogically sound partner in learning.

Accordingly, this paper seeks to address this gap by critically reviewing recent empirical and conceptual literature to answer the following research questions:

1. *How is GenAI currently being conceptualised and deployed as a digital learning companion in higher education?*
2. *What evidence-based opportunities does GenAI offer for personalised, inclusive, and engaging learning experiences?*
3. *What are the most pressing ethical, pedagogical, and systemic risks associated with its use—and how can they be mitigated?*
4. *What pedagogical frameworks and policy mechanisms are necessary to ensure GenAI augments, rather than replaces, human-centred education?*

By examining these questions through a synthesis of recent findings, this study aims to provide a balanced, evidence-based foundation for the responsible integration of GenAI in higher education—ensuring that its role as a digital learning companion advances both innovation and integrity in teaching and learning.

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Literature Review

This literature review examines how GenAI is being positioned as a digital learning companion in higher education. It outlines the core features of GenAI tools and their current use in academic settings, followed by a discussion of the opportunities they provide for personalised learning, writing support, and accessibility. The review also highlights key risks, including concerns about academic integrity, misinformation, and data privacy issues, and concludes by considering the pedagogical and policy measures necessary for responsible implementation.

Conceptualising Generative AI as a Digital Learning Companion

Recent research (Guettala et al., 2024) indicates that higher education is transitioning from Education 4.0 to Education 5.0, where GenAI facilitates not only personalised learning but also social-emotional learning and human connection. This evolution emphasises comprehensive student development beyond traditional academic metrics.

A digital learning companion is defined as a tool that assists students in idea development, practising skills, providing feedback, and extending learning beyond the classroom. Unlike traditional educational technologies, GenAI offers dialogue-based, responsive, and personalised interaction, which simulates tutor-like support. This makes it qualitatively different from earlier forms of automation or e-learning tools.

GenAI functions as an "ever-present mentor" that offers learning aids beyond class hours, facilitating continuous learning and immediate clarification of doubts (Zapata-Rivera et al., 2024). This companion model represents a fundamental shift from viewing AI as merely a tool to understanding it as an interactive learning partner capable of dynamic adaptation to individual student needs. Higher education institutions are increasingly adopting these tools for content generation, personalised learning experiences, administrative efficiency, and enhanced student engagement (Mittal, 2024)

The digital learning companion concept encompasses several key features:

- AI companions analyse learner proficiency levels, learning styles, and pace to tailor study materials accordingly
- Through sophisticated conversational interfaces, these systems promote engaging, customised learning journeys that mimic human tutoring relationships.
- Unlike human tutors, AI companions offer 24/7 support, which is crucial for learners who encounter obstacles during self-study periods.
- Real-time adjustment of instructions and feedback based on each learner's progress and emotional state
- Increasingly supports text, code, visual, and spoken inputs/outputs.

Standard tools and platforms in higher education encompass a range of GenAI applications. The most widely adopted GenAI tools include:

- ChatGPT and other large language models (e.g. Claude, Microsoft Copilot, Cohere, Groq, PERPLEXITY) for explanation, writing support, and reasoning.
- Copilot and Google Gemini for programming assistance and task automation.
- AI-integrated LMS tools (Canvas, Moodle plugins).

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- AI writing assistants such as Grammarly, QuillBot, and Wordtune.

These platforms vary in complexity, but all share the ability to generate coherent responses tailored to user input, positioning them as potential learning companions.

Specialised academic applications of GenAI are emerging in targeted areas, and their use is increasing across various courses. Research identifies specific academic use cases (Zapata-Rivera et al., 2024):

- ChatGPT supporting pre-service mathematics teachers in creating geometric proofs
- AI mentors like Google Gemini are integrated into platforms such as MyIDP for career development
- LLMs are generating automated listening tasks and personalised educational assessments

The landscape includes established models like DALL-E and Midjourney for visual content creation (Israfilzade, 2025b), alongside Bard and DeepMind for various educational applications (Kars et al., 2023). These tools collectively demonstrate AI's capacity to generate human-like text, images, and interactive simulations across diverse educational contexts.

GenAI exhibits promising potential to outperform traditional tutoring methods, with multiple studies demonstrating significant improvements in learning. Authors (Kestin et al., 2025) found that students learn more than twice as much in less time using an AI tutor compared to active learning classes, with increased engagement and motivation. Furthermore, research revealed that AI-powered teaching assistants can reduce study time by approximately 27% (Möller et al., 2024).

However, the effectiveness is nuanced: the study emphasises that teacher supervision is critical, significantly increasing learning engagement and knowledge mastery when integrated with GenAI (Batta, 2024; Tang et al., 2025). The research suggests AI is most effective as a complementary tool rather than a complete replacement for traditional instruction, with the potential to personalise and accelerate learning when properly implemented.

Opportunities Offered by Generative AI in Higher Education

1. *Personalised Learning and Adaptive Support*. GenAI enables students to receive instant, customised explanations that match their pace of learning. Unlike instructors constrained by time and classroom size, GenAI can deliver an endless supply of practice questions, step-by-step reasoning, and alternative explanations. Students who previously hesitated to ask questions in class can do so privately with AI, reducing anxiety and improving confidence. For example, a learner struggling with statistical concepts can request simplified analogies or step-by-step walkthroughs of problems.

Research has shown that AI-generated, personalised learning materials can improve student performance, as technology is capable of creating content tailored to individual learning objectives and needs (Binhammad et al., 2024). Authors found that theory-informed AI chatbots significantly enhanced conceptual knowledge and student trust compared to generic AI systems (Makransky et al., 2025).

Technology can adapt content generation strategies to meet distinct preferences and learners' needs, increasing student engagement and comprehension while transforming traditional teaching methodologies (Zapata-Rivera et al., 2024). AI tutors offer continuous mentorship beyond traditional classroom hours, providing learning aids during self-study periods and clarifying doubts immediately. This creates opportunities for 24/7 educational support and intervention.

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2. Enhanced Academic Writing, Feedback, and Tutoring. GenAI supports iterative writing processes by offering real-time grammar checks, structural suggestions, and alternative phrasings. It can simulate peer or tutor feedback, helping students refine arguments before formal submission. In STEM fields, AI tools assist with debugging code or modelling problem-solving pathways. While not replacing human mentors, they serve as low-stakes practice partners that reduce cognitive load and encourage revision. GenAI tools can help students:

- Brainstorm research ideas
- Structure essays
- Improve grammar and academic tone
- Analyse existing literature

While the extent of AI-generated content varies, many students report using AI as a *feedback and revision* tool rather than a whole content generator. For educators, this opens opportunities to teach *writing as a critical thinking process*, encouraging transparency and reflective learning.

According to the authors (Guettala et al., 2024), significant opportunities exist in the field of automated content generation.

- AI can analyse curricula and generate diverse assessment materials, ensuring alignment with learning objectives.
- Creation of simulations, diagrams, and interactive educational aids that adapt to different learning modalities
- Transformation of text-based lessons into visual, audio, or interactive formats to accommodate various learning preferences

Research found that AI-generated feedback can support learning effectively while reducing cognitive load, particularly when integrated with human instruction in hybrid approaches (Cosentino et al., 2025). GenAI revolutionises evaluation processes through:

- Objective assessment of both multiple-choice and complex written responses, eliminating subjective bias
- Individual, targeted feedback that addresses specific areas needing improvement, rather than generic responses
- Immediate evaluation and guidance during learning activities

3. Increased Engagement and Accessibility. Multiple studies report improved student satisfaction and engagement. Therefore, the study by Kestin et al. (2025) found that students felt more engaged and motivated when interacting with AI tutors. Authors Stienstra et al. (2025) noted that most first-year computer science students preferred AI tutors over human tutors due to convenience, accessibility, and a stress-free learning environment. GenAI significantly lowers barriers for neurodiverse learners, non-native speakers, and students with disabilities. Text-to-speech, summarisation, and plain-language translation functions enhance comprehension. Multilingual models enable students to engage with academic content in their preferred language and translate outputs into English for submission. This supports inclusive pedagogy and global classroom participation.

For international students and learners with disabilities, GenAI can reduce barriers to participation. It can:

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- Translate academic content
- Simplify complex texts
- Provide text-to-speech and speech-to-text support
- Offer tutoring in multiple languages

This supports more inclusive learning environments and reduces inequities linked to language proficiency. Technology offers solutions that maintain quality and personalisation even when serving millions of students, ensuring consistent educational experiences across large audiences (Guettala et al., 2024). This democratizes access to high-quality, personalised education regardless of institutional size or resources.

In addition to the commonly discussed applications, GenAI offers other significant opportunities in Higher Education. One key area is Equity and Innovation, where research emphasises AI's potential as a catalyst for addressing existing equity gaps while fostering creative engagement and innovation in educational delivery, as noted by Chiranjeevi Bura et al. (2024). This enables institutions to provide high-quality, personalised education regardless of resource constraints. Another crucial opportunity lies in Future-Ready Skills Development, where GenAI integration prepares students for technologically advanced careers while simultaneously developing the digital literacy and critical thinking skills essential for the modern workforce, as noted by Sirine Bouguettaya et al. (2025) and other researchers, including Batta (2024).

Risks and Challenges of Generative AI Integration

1. Academic Integrity and Overreliance. A primary concern is that students may submit AI-generated work as their own, bypassing genuine learning. Overreliance on GenAI may reduce students' ability to:

- Think critically
- Solve problems independently
- Engage in academic struggle, which is key to deep learning

Researcher Stienstra et al. (2025) observed students' misuse and overreliance on AI tutors, highlighting concerns about dependency. Authors (Tang et al., 2025) specifically noted concerns about over-reliance, particularly among adolescents, emphasising that these risks require careful management.

Scholars (Binhammad et al., 2024) found that, despite overall improvements in test scores, some students did not benefit from AI-generated study materials, indicating that effectiveness varies based on factors such as students' interest, prior knowledge, and the quality of the AI model. While other studies (Stienstra et al., 2025) also noted variability in prompt effectiveness, suggesting inconsistent learning experiences. Institutions are still developing detection tools and policies, and many acknowledge that purely punitive approaches are insufficient.

2. Pedagogical and Human-Centred Concerns. Pedagogical and human-centred concerns remain central when integrating GenAI into higher education. One major issue is the risk of over-dependence, whereby students and even educators may rely too heavily on AI systems, reducing active engagement and weakening core learning skills (Gupta et al., 2025). Additionally, the human element of education—including empathy, mentorship, and interpersonal connection—cannot be replicated by AI, raising concerns that teaching and learning may become transactional rather than relational (Nikolopoulou, 2024; Guettala et al., 2024). At the same time, the widespread availability of GenAI tools introduces new challenges to academic integrity, as students may use AI to produce work that is not genuinely their own, thereby complicating traditional notions of authenticity and assessment (Guettala

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et al., 2024; Francis et al., 2025).

3. Potential Bias and Misinformation. GenAI systems reflect the limitations and biases inherent in the data on which they are trained (Israfilzade, 2025a, 2025b). This can lead to:

- Incorrect or fabricated information
- Reinforcement of stereotypes
- Limited representation of minority perspectives

Authors (Tang et al., 2025) identified misinformation as a key concern when integrating GenAI into education, noting that without proper oversight, AI systems may provide students with inaccurate or misleading information.

GenAI models are trained on vast, often uncurated internet datasets, which may embed societal biases or factual inaccuracies—so-called "*hallucinations*." In disciplines such as history, sociology, or public health, an uncritical reliance on AI-generated narratives can propagate misinformation or reinforce stereotypes. Educators must emphasise source verification and critical AI literacy.

AI models trained on historical datasets may perpetuate societal biases, potentially generating educational content that reinforces exclusions or distorts information (Manel Guettala et al., 2024). This can result in biased educational resources that fail to provide comprehensive or unbiased perspectives on various subjects Chiranjeevi Bura et al., 2024.

Quality and accuracy issues also pose significant challenges in the application of GenAI for education. While these systems can produce large volumes of material quickly, this may come at the expense of precision and reliability, leading to misinformation and misunderstandings that negatively affect student learning outcomes (Guettala et al., 2024; Yadav et al., 2024). Additionally, AI models may face overfitting and generalisation limitations, performing effectively with familiar or well-structured content but struggling to respond appropriately to new topics or diverse learner contexts (Guettala et al., 2024). Another concern is the lack of model interpretability, as educators and learners often struggle to fully understand how AI-generated outputs are produced, thereby complicating efforts to ensure transparency, accountability, and an accurate representation of learner needs (Zapata-Rivera et al., 2024).

Finally, students may lack the skills to evaluate the credibility of AI-generated outputs, which highlights the need for AI literacy education.

4. Privacy, Data Security, and Institutional Concerns. Using GenAI tools often requires sharing text, assignments, or personal information (Israfilzade, 2025b). This raises concerns about:

- Data is being stored and reused by AI providers
- Compliance with privacy regulations
- Loss of academic intellectual property

Universities must establish clear guidelines to protect student data and ensure its ethical use.

Ethical and privacy issues have become increasingly prominent as AI-powered educational platforms rely on extensive data collection and continuous tracking of student interactions. This raises significant concerns regarding data ownership, storage security, informed consent, and institutional data governance, as noted by Guettala et al. (2024), Binhammad et al. (2024), and Dawkhar et al. (2025). Effective and ethical implementation also requires

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proper supervision and instructional design, as teacher oversight plays a crucial role in guiding meaningful AI use and preventing misuse (Tang et al., 2025). Moreover, Makransky et al. (2025) highlight the necessity of applying principles from educational psychology and human-centred design to ensure that AI systems genuinely support learning rather than simply automate tasks. Finally, equity and accessibility remain central concerns, as AI may unintentionally widen the educational divide if access to tools, digital infrastructure, and training is uneven across student groups (Dawkhar et al., 2025).

5. Implementation and Systemic Challenges. Implementation and systemic challenges also influence the effective use of GenAI in higher education. Unequal access to reliable technology and digital resources contributes to a digital divide, potentially widening disparities between well-resourced and under-resourced institutions as well as among students from different socioeconomic backgrounds (Yadav et al., 2024). Additionally, the technical infrastructure required to support AI tools—including computational capacity, software maintenance, and financial investment—can be complex for many institutions to sustain (Yadav et al., 2024). Another critical issue involves educator preparedness, as many instructors lack adequate training in AI literacy, which limits their ability to integrate GenAI effectively and ethically into teaching practices (Kars et al., 2023). Furthermore, maintaining the pedagogical integrity of AI-generated content requires continuous validation and oversight to ensure quality, relevance, and alignment with learning outcomes (Guettala et al., 2024; Francis et al., 2025).

Addressing these challenges requires coordinated, strategic mitigation efforts. Research emphasises the importance of collaboration between educators, technologists, and institutional leaders to develop shared implementation frameworks and best practices (Alali et al., 2024). Establishing ethical guidelines and transparency standards for AI operations is essential to ensure that students understand when and how AI is being used. Finally, adopting human-in-the-loop approaches, where educators remain actively involved in reviewing AI output and guiding its use, offers a balanced pathway that retains human judgment while leveraging the efficiency and adaptability of AI tools.

Pedagogical and Policy Considerations

Rather than banning GenAI, educators are increasingly adopting a guided use approach, in which students are taught to critically evaluate AI outputs and use these tools as learning supports rather than replacements for academic effort. This shift requires designing assessments that highlight reasoning, process, and reflection on how AI was used, while encouraging transparency and accountability in student work. In this context, the role of educators evolves from being primary content deliverers to facilitators of AI literacy, which includes modelling ethical engagement, integrating critical AI analysis into coursework, and developing assignments that require human insight. To enable this transition, sustained professional development is necessary to build instructor confidence and capability in managing student–AI interactions. Overall, the effective pedagogical and policy integration of GenAI requires comprehensive frameworks that uphold educational integrity while leveraging technological innovation in a human-centred and pedagogically meaningful manner.

1. Pedagogical Framework Development. Human–AI collaboration in education highlights that GenAI should augment, rather than replace, human instruction. AI is best positioned to support routine or repetitive tasks, provide personalised explanations, and offer data-driven insights. At the same time, educators continue to play a crucial role in fostering critical thinking, mentoring students, and facilitating a deep conceptual understanding that AI cannot replicate (Hashmi & Bal, 2024; Guettala et al., 2024). To achieve this balance, institutions are encouraged to

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adopt adaptive teaching methodologies that leverage AI's personalisation capabilities while maintaining academic rigour. Hybrid instructional models, in which AI-generated content is reviewed and contextualised by educators, ensure that learning materials remain accurate, meaningful, and aligned with course objectives (Zapata-Rivera et al., 2024). Central to these approaches is the intentional development of students' critical thinking skills by teaching them to interpret, question, and evaluate AI outputs rather than passively accept them.

Teacher supervision and hybrid intelligence models have been shown to enhance learning outcomes significantly. Tang et al. (2025) demonstrated that students engaging with AI under teacher guidance exhibited higher levels of engagement and knowledge retention compared to those using AI independently. Cosentino et al. (2025) further advocate for human–AI co-feedback systems, where both educators and AI support learners in complementary ways rather than substituting one for the other. Moreover, theory-informed design is crucial to the effective integration of AI. Makransky et al. (2025) and Kestin et al. (2025) highlight that AI tools grounded in educational psychology and human-centred design principles outperform generic systems, producing higher conceptual understanding and greater student trust. These findings underscore the importance of pedagogically aligned, human-supervised, and theory-based AI implementation in higher education.

2. Policy and Governance Frameworks. Effective policy development is essential for the responsible integration of GenAI in higher education. Institutions must establish ethical guidelines and standards that address data privacy, algorithmic bias, and responsible use, while also providing educators with the training necessary to navigate these challenges (Dhagare et al., 2024). In parallel, academic integrity policies need to move beyond prohibition and instead clearly define acceptable uses of AI that support learning without replacing authentic student effort or original thought (Guettala et al., 2024). Additionally, quality assurance mechanisms are required to ensure that AI-generated educational content remains accurate, pedagogically sound, and aligned with course objectives. This includes ongoing validation processes, regular review, and human-in-the-loop approaches to maintain educational integrity and uphold instructional standards (Alali et al., 2024).

Developing ethical and regulatory frameworks is crucial to ensure that GenAI is adopted in a manner that promotes trust, transparency, and equitable access, supporting human instruction rather than replacing it (Cosentino et al., 2025). This includes careful attention to quality assurance, where the selection and implementation of AI models must prioritise accuracy, pedagogical value, and human-centred design (Binhammad et al., 2024; Dawkhar et al., 2025). Equally important is the systematic assessment of AI's role in the classroom, with evidence indicating that teacher supervision significantly influences the effectiveness of AI-supported learning (Tang et al., 2025). Looking forward, adaptive hybrid models that integrate both AI-generated guidance and human feedback offer a pathway toward inclusive, personalised, and effective educational practice (Cosentino et al., 2025). In this evolving landscape, the instructor's role shifts from being solely a content provider to a learning facilitator who guides students in critically and responsibly engaging with AI tools.

3. Best Practices for Responsible AI Adoption. Best practices for responsible AI adoption in higher education require comprehensive frameworks that integrate pedagogical excellence with ethical governance, stakeholder collaboration, and continuous quality assurance. Effective institutional strategies include implementing clear disclosure rules for AI-assisted work, developing training programs on AI literacy for students and faculty, and incorporating reflective assignments that explain how AI was used (Hashmi & Bal, 2024; Alali et al., 2024). Furthermore, foundational best practices underline human-in-the-loop implementation, which involves maintaining

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human oversight in AI decision-making processes and ensuring educators review and enhance AI-generated content (Alali et al., 2024). Concurrently, institutions must establish ethical guidelines and transparency by addressing data privacy, algorithmic bias, and ensuring accountability in AI operations (Dhagare et al., 2024; Francis et al., 2025). These approaches, which also include redesigning assessments to focus on process and originality and developing clear institutional policies co-created with stakeholders, collectively preserve academic integrity while enabling students to benefit from GenAI tools responsibly.

Pedagogical integration is central to successful adoption, requiring that AI deployment be aligned with specific pedagogical goals rather than technology-first approaches (Alali et al., 2024). This involves clearly defining how AI tools support learning objectives and enhance, rather than replace, human instruction. A key strategy is using AI to develop students' critical thinking and analytical skills by teaching them to strategically evaluate AI-generated content, understand its limitations, and maintain intellectual independence (Zapata-Rivera et al., 2024). While leveraging AI's personalisation capabilities, best practices also ensure that human educators interpret and contextualise AI-generated insights about student performance (Hashmi & Bal, 2024; Guettala et al., 2024). Promoting critical digital literacy is essential, as it empowers students to interrogate AI outputs and advocate for ethical design.

For sustainable implementation, a measured and resource-conscious approach is vital. This involves implementing AI tools gradually, starting with pilot programs, gathering feedback, and scaling successful approaches while learning from challenges (Alali et al., 2024). Sustainable resource planning is also critical, ensuring adequate technical infrastructure, ongoing maintenance capabilities, and the long-term viability of AI implementations. These best practices, from piloting AI-integrated pedagogies with formative evaluation to ensuring equitable access, collectively ensure that AI adoption enhances educational quality while upholding ethical standards and preserving a human-centred learning approach.

Conclusions

Generative artificial intelligence is rapidly reshaping higher education by functioning as a dynamic digital learning companion—offering personalised support, enhancing academic writing, and increasing accessibility for diverse learners. This literature review demonstrates that when integrated thoughtfully, GenAI can significantly enhance learning outcomes, promote engagement, and democratise access to high-quality educational resources. Students benefit from 24/7 tutoring, adaptive feedback, and multimodal learning experiences, while educators gain powerful tools for automating routine tasks and focusing on higher-order pedagogical goals.

However, this transformation is not without critical challenges. Risks related to academic integrity, overreliance, algorithmic bias, misinformation, and data privacy necessitate careful and proactive management. Importantly, GenAI should not replace human instruction but rather augment it—serving as a supplement within a human-centred educational framework. Evidence consistently shows that the most effective implementations involve teacher supervision, theory-informed design, and hybrid models that blend AI capabilities with human insight and mentorship.

To harness the full potential of GenAI responsibly, higher education institutions must adopt comprehensive strategies that include: (1) pedagogical frameworks grounded in educational psychology, (2) clear and adaptive academic integrity policies, (3) robust data governance and ethical guidelines, and (4) sustained faculty and student training in AI literacy. Only through collaborative, transparent, and equity-focused approaches can universities

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ensure that GenAI catalyses inclusive innovation—enhancing learning without compromising the core human values of education.

References

Alali, R., Wardat, Y., Al-Saud, K., & Alhayek, K. A. (2024). Generative AI in Education: Best practices for Successful implementation. *International Journal of Religion*, *5*(9), 1016–1025. https://doi.org/10.61707/pkwb8402

Batta, A. (2024). Transforming higher education through generative AI: Opportunity and challenges. *Paradigm*, *28*(2), 241–243.

Binhammad, M. H. Y., Othman, A., Abuljadayel, L., Mheiri, H. A., Alkaabi, M., & Almarri, M. (2024). Investigating how generative AI can create personalised learning materials tailored to individual student needs. *Creative Education*, *15*(07), 1499–1523. https://doi.org/10.4236/ce.2024.157091

Bura, C., & Myakala, P. K. (2024). Advancing Transformative Education: Generative AI as a Catalyst for equity and innovation. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2411.15971

Cosentino, G., Anton, J., Sharma, K., Gelsomini, M., Giannakos, M., & Abrahamson, D. (2025). Generative AI and multimodal data for educational feedback: Insights from embodied math learning. *British Journal of Educational Technology*, *56*(5), 1686–1709. https://doi.org/10.1111/bjet.13587

Dawkhar, N. A., Chandekar, N. A., Panchal, N. N., & Ghatte, N. S. (2025). Beyond the blackboard: AI-Driven virtual tutors and the evolution of digital learning. *International Journal of Scientific Research in Science Engineering and Technology*, *12*(3), 125–131. https://doi.org/10.32628/ijsrset25122204

Francis, N. J., Jones, S., & Smith, D. P. (2025). Generative AI in higher education: Balancing innovation and integrity. *British Journal of Biomedical Science*, *81*, 14048.

Guettala, M., Bourekkache, S., Kazar, O., & Harous, S. (2024). Generative Artificial Intelligence in Education: Advancing Adaptive and Personalized learning. *Acta Informatica Pragensia*, *13*(3), 460–489. https://doi.org/10.18267/j.aip.235

Gupta, A., Agrawal, N., & Agrawal, H. (2025). GENERATIVE AI IN EDUCATION: A REVIEW REPORT ON CURRENT AND FUTURE TRENDS. *International Journal of Engineering Applied Sciences and Technology*, *09*(11), 96–99. https://doi.org/10.33564/ijeast.2025.v09i11.015

Hashmi, N., & Bal, A. S. (2024). Generative AI in higher education and beyond. *Business Horizons*, *67*(5), 607–614.

Israfilzade, K. (2025a). Perspective Chapter: The Impact of Generative AI in Shaping Customer Engagement – Humanising Conversational Marketing. In *Business, management and economics*. https://doi.org/10.5772/intechopen.1010894

Israfilzade, K. (2025b). The role of Generative Artificial intelligence in E-Commerce: Trends, challenges and opportunities. *The Eurasia Proceedings of Educational and Social Sciences*, *42*, 1–20. https://doi.org/10.55549/epess.906

Kars, M. E. (2023). Generative AI in education. *London Journal of Social Sciences*, *6*, 144–151. https://doi.org/10.31039/ljss.2023.6.114

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Kestin, G., Miller, K., Klales, A., Milbourne, T., & Ponti, G. (2025). AI tutoring outperforms in-class active learning: an RCT introducing a novel research-based design in an authentic educational setting. *Scientific Reports*, *15*(1), 17458. https://doi.org/10.1038/s41598-025-97652-6

Makransky, G., Shiwalia, B. M., Herlau, T., & Blurton, S. (2025). Beyond the "Wow" factor: using generative AI for increasing generative Sense-Making. *Educational Psychology Review*, *37*(3). https://doi.org/10.1007/s10648-025-10039-x

Mittal, U., Sai, S., Chamola, V., & Devika, N. (2024). A Comprehensive Review on Generative AI for Education. *IEEE Access*, *12*, 142733–142759. https://doi.org/10.1109/access.2024.3468368

Möller, M., Nirmal, G., Fabietti, D., Stierstorfer, Q., Zakhvatkin, M., Sommerfeld, H., & Schütt, S. (2024). Revolutionising Distance Learning: A Comparative Study of Learning Progress with AI-Driven Tutoring. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2403.14642

Nikolopoulou, K. (2024). Generative artificial intelligence in higher education: Exploring ways of harnessing pedagogical practices with the assistance of ChatGPT. *International Journal of Changes in Education*, *1*(2), 103-111.

Stienstra, L., Mohamed, A., & Mohamed, M. (2025, June). Exploring GenAI as a Tutoring Tool: A Case Study in First-Year Computer Programming. In *Proceedings of the 30th ACM Conference on Innovation and Technology in Computer Science Education V. 1* (pp. 452-457).

Tang, Q., Deng, W., Huang, Y., Wang, S., & Zhang, H. (2025). Can Generative Artificial Intelligence be a Good Teaching Assistant?—An Empirical Analysis Based on Generative AI -Assisted Teaching. *Journal of Computer Assisted Learning*, *41*(3). https://doi.org/10.1111/jcal.70027

Yadav, A. B. (2024). The Development of AI with Generative Capabilities and Its Effect on Education. *International Journal of Science and Research (IJSR)*, *13*(5), 854–860. https://doi.org/10.21275/sr24509232318

Zapata-Rivera, D., Torre, I., Lee, C., Sarasa-Cabezuelo, A., Ghergulescu, I., & Libbrecht, P. (2024). Editorial: Generative AI in education. *Frontiers in Artificial Intelligence*, *7*, 1532896. https://doi.org/10.3389/frai.2024.15328

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From Observation to Innovation: The Lasting Impact of Bandura's Theory in Today's Classrooms

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ABSTRACT: Albert Bandura's theory has several implications for contemporary instructional practices. Bandura emphasises the importance of learning through observation/imitation/modelling, as well as self-regulation. These attributes are vital and fundamental components of collaborative learning contexts and technology-enhanced learning experiences. A review of the literature examining Bandura's work reveals that self-efficacy is predictive of both academic and occupational success, thereby enhancing motivation and determination. The review also comments on the significance of learning within the socio-cultural contexts. Some concerns exist regarding the socio-cognitive theory's emphasis on self-efficacy, particularly in relation to Bandura's metaphor about human behaviour and reciprocal determinism. However, the theory works well for developing inclusive educational communities that foster student resilience in today's classrooms.

KEYWORDS: Social cognitive theory, self-efficacy, observational learning, motivation in education, teacher modelling.

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Introducción

En el ámbito de la psicología educacional, muy pocas teorías han dejado una estela tan profunda como la del aprendizaje social y su progreso hasta llegar a la Teoría Social-Cognitiva (SCT) de Albert Bandura. Desde mediados del siglo XX, Bandura transformó la manera de comprender el aprendizaje al orientar su atención hacia la observación, el aprendizaje por imitación, la autorregulación y la autoeficacia, que se dan en los procesos de construcción del propio aprendizaje

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(Bandura, 2001). Su enfoque educativo se ha convertido en uno de los paradigmas fundamentales de la psicología contemporánea y aún dirige la investigación educativa actual (Schunk & Di Benedetto, 2021).

Según Bandura, el proceso de aprendizaje se produce a partir de la observación, la imitación y el modelado, procesos mediados por una pluralidad de componentes emocionales, cognitivos y ambientales. Sus propuestas teóricas son completamente contemporáneas, situadas en aulas cada vez más cooperativas y tecnológicas (Schunk, 2020). Para obtener prácticas educativas eficaces, inclusivas y centradas en el alumno, es necesario considerar el aprendizaje como una construcción cognitiva y social (Zimmerman & Kitsantas, 2014). A lo largo del artículo se lleva a cabo un estudio de la validación de la teoría sociocognitiva y del impacto de la autorregulación, la motivación y la autonomía en el contexto de la educación que se imparte.

Método

Se realizó una revisión bibliográfica exhaustiva de la literatura científica en bases de datos como Scopus, ERIC y Google Scholar, mediante la selección de 20 artículos, de tipo empírico y teórico, que abordaron la aplicación de la teoría sociocognitiva en distintos contextos educativos. Las investigaciones que abarcaron la autorregulación, la autoeficacia, el modelado docente y la motivación académica fueron consideradas criterios de inclusión (Bandura, 2001; Usher, Heng y Chu, 2023). Se utilizó un enfoque analítico-cualitativo para identificar tendencias teóricas, hallazgos reiterados y vacíos en la investigación.

Objetivo de la investigación

Analizar cómo la teoría sociocognitiva de Bandura influye en los procesos actuales de enseñanza-aprendizaje. Se pretende mostrar cómo la autoeficacia, el aprendizaje por observación y el modelado favorecen el desarrollo de habilidades académicas, emocionales y digitales (Schunk & Di Benedetto, 2021). También intenta impulsar la reflexión sobre la incorporación de esta en las políticas educativas y en la formación del profesorado.

Preguntas de investigación

1. ¿De qué forma se pone en práctica la teoría de Bandura actualmente en el aula?
2. ¿Cómo influye la autoeficacia en la motivación y el rendimiento académico?
3. ¿Qué modo tienen el modelado y la observación para favorecer el aprendizaje colaborativo?
4. ¿Qué hacen las tecnologías digitales para el aprendizaje sociocognitivo?

Resultados de la investigación

Bandura concibe la autoeficacia como la propia convicción de una persona sobre el modo en que puede llevar a cabo de manera eficaz tareas o comportamientos determinados (Bandura, 2001). Las creencias de autoeficacia desempeñan un papel importante en la dirección de la conducta, la perseverancia y la resistencia ante las dificultades. En consecuencia, las personas con alta autoeficacia tienden a fijarse metas más ambiciosas, a esforzarse más y a sortear obstáculos con mayor facilidad.

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Además, la conducta, los factores personales —como pensamientos y emociones— y las influencias ambientales interactúan entre sí (Bandura, 2018). Estas creencias no solo están influidas por el entorno, sino que también permiten a los individuos modificarlo mediante sus acciones. Los datos de la revisión muestran que la autoeficacia predice el éxito académico y laboral. Estudios recientes (Artino & Jones, 2012; Klassen et al., 2013) hallan que los estudiantes con alta autoeficacia son más persistentes, más comprometidos y más satisfechos con sus estudios. Para el profesorado, la autoeficacia implica la capacidad de innovar y de mantener un ambiente de aula favorable (Safiek & Abdullah, 2025).

Según Hadwin et al. (2017), en los contextos de aprendizaje colaborativo, los educadores pueden organizar situaciones que, cuando se ejecutan de manera medible, pueden replicarse por los aprendices. Además, podría emplearse en situaciones de tipo organizacional con el fin de activar y potenciar el crecimiento del liderazgo, la actividad de grupo y el comportamiento en el trabajo, así como que los trabajadores puedan sentir una motivación elevada y aumentar su productividad (Bandura, 2013).

De manera más precisa, la administración podría modelizar competencias de liderazgo, como, por ejemplo, la comunicación positiva, la resolución de problemas y la gestión del tiempo, para los subordinados. Con ello, podría permitir la modificación en los trabajadores para que estos pudiesen ver y reproducir los comportamientos de sus superiores, lo cual podría tener un efecto en la cultura organizacional (Bandura, 2013).

La teoría de Bandura también puede aplicarse a los entornos virtuales. İnceçay & Dikilitaş (2022) señalan que las plataformas de observación entre pares y colaborativas imitan el modelado social. Videos, foros y simulaciones en los que se ven estudiantes modelo que utilizan estrategias, comportamientos y soluciones, reforzando el aprendizaje vicario (Foster, 2023). Estudios latinoamericanos (López Angulo et al., 2023) también señalan que la teoría sociocognitiva sustenta los ambientes de aprendizaje inclusivos y participativos.

Finalmente, puede concluirse que la aplicación de esta teoría constituye una herramienta útil para condicionar positivamente la conducta y motivar a las personas a adoptar conductas deseadas. A través de las conductas modeladas y las contingencias de refuerzo positivo, las personas y las organizaciones pueden permitir crear una cultura sólida que promueva prácticas saludables y propicie un buen rendimiento (Allan, 2017).

Críticas y Limitaciones

Pese a la validez de la teoría de Bandura, algunos autores señalan que su uso pone demasiado énfasis en la autoeficacia y descuida otros elementos de la teoría (Woreta et al., 2025). Por otro lado, el determinismo recíproco resulta difícil de operar empíricamente porque, en términos teóricos, se deben medir a la vez las tres fuerzas: las personales, las conductuales y las ambientales (Panadero, 2017).

Discusión

El hecho de aplicar la teoría de Bandura en la actualidad demuestra que el aprendizaje no

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puede limitarse a un proceso individual, sino que se estructura como un aprendizaje social. La observación y la interacción podemos verlas como determinantes del tipo de aprendizaje. El concepto de la autoeficacia resulta especialmente importante para el desarrollo de la motivación y de la resiliencia académica. Para Allan (2017), es muy importante tener en cuenta el papel del entorno y los aspectos sociales o las normas culturales como estructuradores de la conducta individual. Además, esta perspectiva tiene consecuencias importantes a la hora de entender el origen de conductas anormales o socialmente inaceptables, así como para diseñar estrategias que tiendan a la prevención o la contención de estas. Schunk & Usher (2019) indican que cuando los alumnos perciben que saben hacer cosas, aumentan su esfuerzo, persistencia y estrategias autorreguladoras. También el aprendizaje observacional ha cobrado un nuevo significado con la irrupción de las tecnologías digitales. Los escenarios virtuales o de educación a distancia permiten ahora un modelado ampliado, en el que los alumnos pueden observar ejemplos, practicar habilidades y recibir retroalimentación de forma inmediata (Yot-Domínguez & Marcelo, 2017). Adicionalmente, el papel del docente se vuelve más pronunciado, ya que pasa de ser transmisor de contenido a ser modelo, guía y facilitador en la experiencia de aprendizaje (Heng & Chu, 2023).

Conclusiones

La teoría propuesta por Albert Bandura sigue vigente en el contexto educativo actual. Todos sus principios (aprendizaje observacional, modelado y autoeficacia) son fundamentales para comprender el proceso de aprendizaje humano. Los trabajos de investigación revisados coinciden en que mejorar la autoeficacia y promover modelos positivos tienen un impacto directo en el rendimiento académico, el nivel de motivación y la convivencia escolar (Schunk y Usher, 2019). En un mundo cada vez más interconectado por la tecnología, incluir la teoría sociocognitiva en la implementación de la práctica pedagógica supone una gran oportunidad para construir comunidades de aprendizaje activas, inclusivas y resilientes.

Referencias bibliográficas

Allan, J. (2017). *An analysis of Albert Bandura's aggression: A social learning analysis*. CRC Press.

Artino, A. R., & Jones, K. D. (2012). *Exploring The Complex Relations Between Achievement Emotions and Self-Regulated Learning Behaviours in Online Learning*. https://www.scribd.com/document/228557150/exploring-the-complex-relations-between-achievement-emotions-and-self-regulated-learning-behaviors-in-online-learning.

Bandura, Albert. (2001). Social Cognitive Theory: An Agentic Perspective. *Annual review of psychology, 52*, 1-26. 10.1146/annurev.psych.52.1.1.

Bandura, A. (2013). The role of self-efficacy in goal-based motivation. In E. A. Locke & G. P Latham (Eds.), *Development in goal setting and task performance* (pp. 147-157). Taylor & Francis.

Bandura, A. (2018). Toward a psychology of human agency: Pathways and reflections. *Perspectives on Psychological Science, 13*(2), 130–136. https://doi.org/10.1177/1745691617699280

Foster, M. (2023). *Vicarious learning through dialogic scripted and unscripted videos: Orientations and problem-solving behaviors* (Doctoral dissertation, University of California San Diego). https://escholarship.org/uc/item/4np0n7j2

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Hadwin, A., Jarvelä, S., & Miller, M. (2017). Self-regulation, co-regulation, and sharedregulation in collaborative learning environments. In *Handbook of self-regulation of learning and performance* (pp. 83-106). Routledge.

Heng, Qingzhi & Chu, Lina. (2023). Self-efficacy, reflection, and resilience as predictors of work engagement among English teachers. *Frontiers in Psychology. 14*. 10.3389/fpsyg.2023.1160681.

İnceçay, V., & Dikilitaş, K. (2022). Online peer observation: Reflections on a process-based job-embedded professional development activity through video recordings. *Teaching and Teacher Education, 120,* 103901. https://doi.org/10.1016/j.tate.2022.103901.

Klassen, R., & Durksen, T. & Tze, V. (2013). Teachers' self-efficacy beliefs: Ready to move from theory to practice? https://www.researchgate.net/publication/263279794_Teachers'_self-efficacy_beliefs_Ready_to_move_from_theory_to_practice

López-Angulo, Y., Sáez-Delgado, F., Mella-Norambuena, J., Bernardo, A. B., & Díaz-Mujica, A. (2023). *Predictive model of the dropout intention of Chilean university students. Frontiers in Psychology, 13*, 893894. https://doi.org/10.3389/fpsyg.2022.893894

Panadero Ernesto. (2017). *A Review of Self-regulated Learning: Six Models and Four Directions for Research*. *Frontiers in Psychology*, 8, 422. DOI: 10.3389/fpsyg.2017.00422

Pérez-González, J.C. (2008). Propuesta para la evaluación de programas de educación socioemocional. Electronic Journal of Research in Educational Psychology, 6(15), 523- 546. https://doi.org/10.25115/ejrep.v6i15.1285.

Safiek Mokhlis & Abdul Hakim Abdullah (2025). School innovation climate as a driver of teachers' innovative work behavior: the mediating role of self-efficacy. *International. Journal of Evaluation and Research in Education, 14*(5). doi: 10.11591/ijere.v14i5.3275

Schunk, D. H., & Usher, E. L. (2019). Social cognitive theory and motivation. In R. M. Ryan (Ed.), *The Oxford Handbook of Human Motivation* (2nd ed., pp. 13–27). Oxford University Press.

Schunk, D. H. (2020). *Learning theories: An educational perspective (8th ed.).* Pearson.

Schunk, D. H., & Di Benedetto, M. K. (2021). Motivation and social cognitive theory. *Contemporary Educational Psychology 60,* 101832. https://doi.org/10.1016/j.cedpsych.2019.101832

Usher, E. L., & Pajares, F. (2008). Sources of Self-Efficacy in School: Critical Review of the Literature and Future Directions. *Review of Educational Research, 78*(4), 751-796. https://doi.org/10.3102/0034654308321456.

Woreta, G. T., Zewude, G. T., & Józsa, K. (2025). The Mediating Role of Self-Efficacy and Outcome Expectations in the Relationship Between Peer Context and Academic Engagement: A Social Cognitive Theory Perspective. *Behavioral Sciences, 15*(5), *681*. https://doi.org/10.3390/bs15050681.

Yot-Domínguez, C., Marcelo, C. (2017). University students' self-regulated learning using digital technologies. *Int J Educ Technol High Educ 14*, 38. https://doi.org/10.1186/s41239-017-0076-8.

Zimmerman, B. J., & Kitsantas, A. (2014). Comparing students' self-discipline and self-regulation measures and their prediction of academic achievement. *Contemporary Educational Psychology, 39*(2), 145-155. https://doi.org/10.1016/j.cedpsych.2014.03.004.

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Language, Identity, and Motivation in Albanian Sports Slogans: A Linguistic and Discourse Analysis

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ABSTRACT: This study investigates the linguistic and motivational strategies employed in sports slogans used by Albanian teams, federations, and fan groups. Drawing on a corpus of 10 recent slogans from official campaigns, national team mottos, club mottos, sponsor campaigns, and fan chants, the research combines qualitative syntactic and stylistic analysis to explore how language constructs collective identity, national pride, and motivation. Findings reveal that declarative structures dominate official and federation slogans, while imperatives are prevalent in fan and motivational campaigns, creating direct engagement and action-oriented appeals. Stylistic devices such as parallelism, metaphor, personification, and alliteration enhance memorability, emotional resonance, and identity expression. Lexical choices emphasise unity and belonging, with recurring words such as we, one, nation, and Albania. English is strategically used in federation slogans for international reach, whereas Albanian slogans evoke local pride and emotional attachment. Overall, Albanian sports slogans function as performative and motivational texts that inspire action, foster solidarity, and symbolically represent national and team identity.

KEYWORDS: sports discourse, motivational slogans, Albanian, linguistic analysis, ESP, national identity.

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Introduction

Sports slogans are a distinctive feature of the discourse surrounding teams, federations, and fan communities, serving both motivational and identity-constructing functions. They are concise, memorable, and rhetorically powerful, often combining lexical, syntactic, and stylistic strategies to inspire athletes, unify supporters, and promote national pride. Within the broader field of sports discourse, slogans serve as symbolic and affective tools that reinforce belonging and shared values within communities of practice (Lebedev & Tsybina, 2024). In Albania, football and other sports increasingly use slogans in both Albanian and English to convey values such as unity, perseverance, and national identity, addressing domestic audiences while also reaching international observers.

Previous research has shown that sports discourse constitutes a distinctive linguistic genre characterised by its emotional intensity, ritualised expressions, and persuasive power (Lebedev & Tsybina, 2024). Within this genre, slogans serve as high-impact linguistic units that encapsulate ideological and cultural messages. For instance, Wu and Liu (2014) analysed Olympic Games slogans from 1984 to 2012 and demonstrated how they communicate broader ideological frameworks such as excellence, peace, and global solidarity. Similarly, more recent work by Zhang (2025) revealed that short slogans play a significant role in constructing and reaffirming national identity through collective linguistic performance in sports microblog discourse. These findings highlight that slogans in sports contexts are not merely decorative linguistic elements but carriers of socio-cultural and ideological meaning.

Beyond the sporting domain, the study of slogans has been approached through various discourse-analytic frameworks. Research on educational and institutional slogans has shown how such expressions encode aspirational values and shape identity positions within their communities (Dabadi, 2024; Ricahyono, Nurkamto, & Marmanto, 2021). Similarly, studies of university slogans in Nigeria found that they linguistically represent "significant others" and promote institutional ideals through syntactic parallelism and metaphor (Udo et al., 2021). These analyses, although outside the sports field, demonstrate that slogans are effective vehicles for constructing and communicating identity through stylistic and structural linguistic choices.

However, while slogan studies have gained attention in domains such as education and branding, research on sports slogans as a specific linguistic phenomenon remains limited. Most existing studies focus on major international events, such as the Olympic Games (Wu & Liu, 2014), or global sports brands (e.g., Nike's motivational rhetoric; Pratiwi, 2022), leaving smaller national contexts underexplored. Moreover, there is a lack of attention to bilingual or multilingual sports slogans, particularly in countries such as Albania, where English serves as a global lingua franca for sports communication. The intersection of sports discourse and English for Specific Purposes (ESP**)**—primarily how slogans reflect communicative practices in sports management, marketing, and fan engagement—has received little scholarly attention.

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To address these gaps, the present study analyses a corpus of recent Albanian sports slogans in both Albanian and English. It investigates their lexical, syntactic, and stylistic features and examines how these linguistic elements contribute to the functions of motivation, unity, and identity construction in sports communication. By doing so, the study aims to contribute to the emerging intersection of sports discourse analysis and ESP research. Furthermore, it highlights the interplay among language, culture, and motivation in the Albanian sports context, offering insights relevant to sports linguistics, intercultural communication, and English for Specific Purposes teaching.

Research Aim and Methodology

The corpus for this study consists of 10 sports slogans collected from recent Albanian campaigns, official federation announcements, national team mottos, club slogans, sponsor campaigns, and fan chants. Sources include the Albanian Football Federation (FSHF), UEFA promotional materials, club websites, social media fan groups, and news coverage. Both Albanian and English slogans were included to examine domestic and international communicative strategies.

The study employs a qualitative linguistic approach, combining syntactic, lexical, and stylistic analyses to investigate the features and functions of the slogans.

Syntactic Analysis: Classification of slogans into declaratives, imperatives, and rhetorical questions to identify patterns related to motivation and identity.

Lexical Analysis: Examination of recurring words and semantic fields highlighting themes of unity, national pride, and motivation.

Stylistic Analysis: Identification of rhetorical devices, including parallelism, metaphor, personification, alliteration, and brevity to assess memorability and emotional resonance.

Pragmatic Analysis: Evaluation of intended audience (domestic vs. international) and communicative function (motivation, unity, national pride).

Each slogan was systematically reviewed, with linguistic features, syntactic structures, and stylistic devices coded. Findings were tabulated to identify patterns and relationships between form, function, and audience orientation.

Research Results

Table 1

Corpus analysis of selected slogans.

Slogan	Syntactic Pattern	Stylistic Device(s)	Function / Effect
Football unites us, Albania welcomes Europe	Declarative (compound)	Alliteration, Parallelism, Metaphor	Enhances rhythm, memorability, conveys football

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			as unifying force
Where is there anyone like you, my Albania?	Rhetorical question	Personification, Emotional appeal	Nation addressed as "you"; evokes reflection and pride
We are One	Declarative (simple)	Brevity / Ellipsis, Unity lexicon	Short, memorable; emphasizes collective identity
Forca Shqipëri! **(Go Albania!)**	Imperative	Motivational / Call to action	Directly mobilizes fans
Një Komb, Një Kombëtare. **(One nation, one national team.)**	Declarative with parallelism	Parallelism, Metaphor	Fuses nation and team identity; rhythmically memorable
Përjetë me ty, Partizon! **(Forever with you, Partizan!)**	Declarative / elliptical	Emotional appeal	Signals loyalty and long-term commitment
Një jetë, dy ngjyra, një skuader. **(One life, two colors, one team)**	Declarative with parallelism	Parallelism, Metaphor	Strengthens club identity and tradition
Albania welcomes Europe	Declarative	Simple structure, motivational	Internationally understandable; welcoming
Train insane or remain the same	Imperative / conditional	Motivational, Rhyme	Encourages effort and self-improvement
Dream big	Imperative	Motivational	Concise, aspirational, and memorable

Analysis of recurrent lexical items highlights themes of unity, pride, and collective identity**.** Words such as *we*, *one*, *nation*, *Albania*, *team*, and *together* appear across slogans, reflecting the overarching motivational and identity-building goals. English is strategically used in slogans aimed at international audiences, whereas Albanian is used to evoke local emotional resonance, particularly in fan chants and club mottos.

Slogans serve as performative acts that motivate both players and fans. They construct collective identity, connecting athletes, supporters, and the nation. Stylistic and syntactic choices are domain-specific, tuned to the purpose of each slogan: official/federation, team, sponsor, or fan. Parallelism, brevity, and metaphor ensure that slogans are memorable, emotionally engaging, and culturally resonant.

Discussions

The analysis of Albanian sports slogans demonstrates that language plays a crucial role in motivating athletes, engaging fans, and constructing collective identity. Declarative slogans dominate official and federation campaigns, emphasising national pride, unity, and identity. At the same time,

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imperatives are predominantly used in fan chants and motivational campaigns, directly mobilising audiences and fostering emotional energy. Rhetorical questions, although less frequent, are strategically deployed to evoke reflection and a personal connection to the nation or team.

Stylistically, slogans employ parallelism, metaphor, personification, alliteration, and brevity to maximise memorability and emotional impact. Parallelism structures slogans rhythmically, metaphors and personification link abstract concepts like nation and unity to tangible ideas, and brevity ensures slogans are concise and practical for both spoken and visual media. Lexical choices such as we, one, nation, and Albania reinforce inclusivity and solidarity, highlighting a consistent thematic focus on collective identity.

Moreover, the strategic use of English in federation slogans, such as "Football unites us, Albania welcomes Europe", illustrates a dual communicative function: appealing internationally while maintaining domestic resonance through Albanian-language slogans. These linguistic strategies underscore the performative nature of sports slogans: they do not merely describe, but actively motivate, unify, and symbolise the shared values of teams, supporters, and the nation.

Conclusions

This study reveals that Albanian sports slogans are carefully constructed linguistic tools that combine syntactic simplicity, lexical focus, and stylistic sophistication to achieve motivational and identity-building goals. Declaratives, imperatives, and rhetorical questions, alongside devices such as parallelism, metaphor, and personification, work together to inspire athletes, unite supporters, and convey national pride. The interplay of language and motivation in these slogans underscores the significance of discourse analysis in sports and ESP, offering insights for practitioners in sports communication, marketing, and language teaching.

Future research could expand the corpus to include a broader range of sports, sponsors, and fan campaigns, enabling quantitative analysis of frequency patterns and cross-cultural comparisons**.** Additionally, visual and multimodal features of slogans (e.g., social media graphics, stadium banners) could be incorporated to understand fully how language and imagery work together in sports discourse. Overall, Albanian sports slogans exemplify how concise linguistic forms can carry powerful motivational and symbolic weight, linking language, culture, and collective identity in the sports domain.

References

Flowerdew, J. (2015). *Corpus-based approaches to ESP research.* Routledge.

Dabadi, P. (2024). Discourse analysis of educational slogans: Shaping desires, aspirations, and social norms. *Sadgamaya Journal of Humanities and Social Sciences, 1*(1), 44–56. https://nepjol.info/index.php/sadgamaya/article/view/66889

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Hardy, L., Jones, G., & Gould, D. (2017). *Understanding psychological preparation in sports*. Routledge.

Holmes, J. (2015). *An Introduction to Sociolinguistics*. Routledge.

Lebedev, S., & Tsybina, E. (2024). *Features of English-language sports discourse in the context of its genre uniqueness*. International Research Journal, 7(145), 48–54. https://research-journal.org/en/archive/7-145-2024-july/10.60797/IRJ.2024.145.48

Pratiwi, S. (2022). *The stylistic features of Nike sports slogans*. The GIST Journal, 4(1), 22–31. https://journal2.unfari.ac.id/index.php/TheGIST/article/download/38/31

Ricahyono, E., Nurkamto, J., & Marmanto, S. (2021). *The discourse of brand slogans of the best 100 universities in Asia 2019*. International Journal of Social Science and Human Research, 4(12), 3358–3363. https://ijsshr.in/v4i12/70.php

Udo, A., Ekwueme, A., & Akpan, M. (2021). *Discourse representation of significant others in slogans of selected Nigerian universities*. Himalayan Journal of Humanities and Cultural Studies, 2(2), 40–50. https://himjournals.com/articles/333

UEFA. (2025). *Welcome to the 2025 UEFA European Under-17 Championship*. Retrieved from UEFA

Wu, C., & Liu, L. (2014). *Ideologies in the thematic slogans of the 1984–2012 Olympic Games*. English Language Teaching, 7(4), 89–96. https://files.eric.ed.gov/fulltext/EJ1128787.pdf

Zhang, J. (2025). *Constructing national identity through symbolic representations in Olympic microblog discourse*. Language and Semiotic Studies, 11(2), 112–134. https://www.degruyterbrill.com/document/doi/10.1515/lass-2025-006

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Robotics as a Tool for Early Career Orientation of Schoolchildren in Engineering and Technology

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ABSTRACT: The study is devoted to the impact of using robotics elements on the formation of STEM skills in primary school schoolchildren. The work substantiates the importance of STEM education as a tool that develops critical thinking, teamwork skills, and practical skills.

Two groups of third-grade schoolchildren were involved in the study: a control group and an experimental group. Over a period of six weeks, members of the experimental group learned using various elements of robotics, which contributed to a significant increase in their results – by 34.75% according to the author's assessment scale and by more than 32% according to the author's questionnaire. The control group showed only minimal changes within 5%.

Schoolchildren who studied using elements of robotics showed increased interest in learning, especially in programming robot movements and constructing models. The results confirm that the introduction of robotics into the educational process contributes to the development of knowledge, skills, and abilities, as well as motivation, and leads to an increase in schoolchildren' self-confidence and desire to solve non-trivial problems.

KEYWORDS: robotics, tools, engineering, career guidance, technology, communication skills, education.

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Introduction

At present, despite significant advances in science, engineering, and technology, there is a notable shortage of specialists in fields related to physics, mathematics, natural sciences, and computer science. Consequently, the preparation of highly qualified professionals capable of effectively utilizing modern technologies across various domains of human activity has become a pressing concern. These future professionals must also drive the continued development of technologies that contribute to societal welfare and human progress.

The current digital era necessitates that educators adopt new approaches to the educational process designed to engage schoolchildren not only in acquiring new knowledge and skills but also in their conscious practical application. It has been widely documented in Ukrainian media that, since the early 21st century, demand for humanities programs in universities has remained high, while technical specializations have been undersubscribed. This situation underscores the need to support and stimulate technical education; otherwise, within the next 10 to 20 years, Ukraine risks losing its engineering schools and becoming critically dependent on more technologically advanced nations that may impose unfavorable conditions.

Interactive teaching methods, which are increasingly being integrated into educational processes, are designed to ensure direct and active student participation in learning, thereby facilitating the acquisition of essential knowledge and skills (Tsekhmister et al., 2021). One such approach is STEM education, which integrates science, technology, engineering, and mathematics (Papadakis & Kalogiannakis, 2022). STEM education promotes not only systems thinking but also critical information processing, problem-solving skills, teamwork, and the ability to apply knowledge in diverse contexts. Moreover, STEM education serves as a foundational pathway to highly valued professions, including architect, geologist, data analyst, electrical engineer, mechanical engineer, chemical engineer, IT manager, software developer, data scientist, and physicist, among others.

During early childhood, cognitive activity is particularly pronounced, coinciding with heightened interest in natural and technical phenomena and sciences. Therefore, STEM education in general, and educational robotics in particular, are crucial for engaging schoolchildren in acquiring new knowledge and skills through the integration of playful and educational approaches, which also fosters critical thinking and the development of various models and experiments (Kakoulli & Evripidou, 2024).

Research Aim and Research Questions

Given the necessity for schoolchildren to acquire contemporary knowledge, the primary objective of this study was to establish the positive effect of using robotics as a significant tool for developing STEM skills in elementary school schoolchildren. To achieve this objective, the following research questions were addressed:

1. What level of STEM skills do schoolchildren possess prior to the implementation of a robotics

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course in the educational process?

2. What level of STEM skills do schoolchildren possess following instruction incorporating robotics?
3. Is there a statistically significant difference between schoolchildren who completed a robotics course and those who received instruction without one?

Research Results

The study involved two groups of third-grade schoolchildren, with 26 schoolchildren in each group. One group served as the control group, while the other was the experimental group. Prior to the experiment, it was established that both groups possessed equivalent levels of STEM skills. This was determined using an author-developed assessment method with a 20-point scale designed for this study.

During the six-week experiment (educational program), the group that utilized robotics in the instructional process demonstrated an overall improvement of 4.1 points (from 11.8 to 15.9, representing a 34.75% increase from baseline). The control group exhibited only minimal improvement (from 11.5 to 12.1, or 5.22%). These data are presented in Table 1 for clarity.

Table 1

Indicators of Schoolchildren' STEM Skills Before and After the Experiment

Group	Period	Mean (M)	%	Standard Deviation (SD)	t	p
Control	Before	11.5	100	2.1	1.62	0.11
	After	12.1	105.22	2.0		
Experimental	Before	11.8	100	2.3	6.74	<0.001
	After	15.9	134.75	1.8		

Source: author's own development

In addition to these tests, schoolchildren in both groups were asked to complete an author-developed questionnaire employing a 50-point scale. This questionnaire was based on the participants' own observations and enabled assessment of schoolchildren' attitudes toward STEM programs. As in the previous assessment, the group that did not use robotics elements showed only minimal improvement. The experimental group again demonstrated substantial growth in mean scores following course completion, with schoolchildren exhibiting enthusiasm during the learning process. These results are presented in Table 2.

The obtained data indicate increased subjective engagement, motivation toward learning, and confidence in their knowledge among schoolchildren in the experimental group. The most substantial improvements were associated with items related to teamwork, willingness to experiment, and heightened interest in programming. Thus, with continued use of robotics in instruction, schoolchildren

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will be motivated to progressively advance their knowledge level in order to achieve increasingly impressive results and construct more complex robotic systems. Consequently, there will emerge a need to master not only elementary programming of robot movements but also to learn to write programs for more complex tasks.

Table 2

Average Score on the Schoolchildren' Self-Observation Questionnaire Before and After the Experiment

Group	Period	M	%	SD	t	p
Control	Before	30.4	100	4.6	1.21	0.23
	After	31.2	102.63	4.2		
Experimental	Before	30.1	100	5.1	7.21	<0.001
	After	39.8	132.23	3.9		

Source: author's own development

The software being developed must function correctly, which requires learning to test it quickly for errors. Therefore, schoolchildren will concurrently acquire skills in software testing as a means of solving applied problems related to specific processes of robot interaction with the environment (Hunko, 2024). This is particularly confirmed by research demonstrating that robotics in education enables experimentation with physical phenomena and provides extensive opportunities for practical application of various technologies, implementation of engineering solutions, and resolution of a broad spectrum of applied problems (Terzieva et al., 2024). Consequently, it is logical to pursue activities focused on utilizing storage media in robotic systems and addressing data encryption issues, remote control via smartphones, transmission of sensor-acquired information to online platforms and cloud storage, data backup to servers for system recovery in case of failure, and related applications (Opirskyi et al., 2025). Furthermore, contemporary scientific literature demonstrates that robotics influences the development of critical and logical thinking, as robot programming requires algorithm construction, outcome prediction, error analysis and correction, and establishment of cause-and-effect relationships (Boltsi et al., 2024).

Conclusions

Thus, analysis of the data obtained regarding the impact of robotics integration on the educational process and development of STEM skills in elementary school schoolchildren revealed distinct elements of this innovative approach. It was established that robotics implementation in the experimental group's instruction resulted in elevated levels of STEM skills among participants. In contrast, the control group exhibited markedly minimal changes in such skills. This group demonstrated stability and weak variability in STEM competencies. Based on observations of student engagement, it was determined that the most compelling robotics elements for experimental group members were programming robot movements.

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Overall, children in this group demonstrated enthusiasm. Another significant aspect was model construction, primarily involving moving mechanisms. Schoolchildren were captivated by the opportunity to combine creativity with technology. This pertains to the possibility of fabricating structures and forming models from components. Furthermore, it was established that control group schoolchildren noted only marginal improvement in their skills, whereas in the experimental group, the mean score increased from 30.1 to 39.8 following the instructional course, representing an improvement exceeding 32% compared to baseline indicators.

Consequently, substantial growth in subjective engagement, motivation, and confidence was observed among experimental group schoolchildren. Overall, the study demonstrated enhancement of schoolchildren' general knowledge level and practical skills, leading to increased confidence in their knowledge and willingness to solve non-standard problems.

References

Boltsi, A., Kalovrektis, K., Xenakis, A., Chatzimisios, P., & Chaikalis, C. (2024). Digital tools, technologies and learning methodologies for Education 4.0 frameworks: A STEM oriented survey. *IEEE Access, 12*, 1–1. https://doi.org/10.1109/access.2024.3355282

Hunko, I. (2024). *How to effectively reduce software testing time: From requirements to regression*. Futurity Research Publishing. Retrieved from https://futurity-publishing.com/wp-content/uploads/2025/04/7П-29.03.25-3.pdf

Kakoulli, E., & Evripidou, S. (2024). Exploring the integration of educational robotics and the Internet of Things in learning environments. In *2024 20th International Conference on Distributed Computing in Smart Systems and Internet of Things (DCOSS-IoT)* (pp. 400–407). IEEE. https://doi.org/10.1109/dcoss-iot61029.2024.00066

Terzieva, V., Ilchev, S., & Djambozova, E. (2024). Integrated intelligent educational environment – Opportunities for STEM education. *IFAC-PapersOnLine, 58*(3), 94–99. https://doi.org/10.1016/j.ifacol.2024.07.132

Tsekhmister, Y., Konovalova, T., & Tsekhmister, B. (2021). Distance learning technologies in online and mixed learning in pre-professional education of medical lyceum schoolchildren. *Journal of Advanced Pharmacy Education & Research, 11*(4), 127–135. https://doi.org/10.51847/zly2idwa4f

Papadakis, S., & Kalogiannakis, M. (Eds.). (2022). *STEM, robotics, mobile apps in early childhood and primary education*. Springer Nature Singapore. https://doi.org/10.1007/978-981-19-0568-1

Opirskyi, I. R., Khokhlachova, Yu. Ye., Stefankiv, A. V., & Shevchuk, Yu. A. (2025). Analiz tekhnichnykh osoblyvostei realizatsii shyfruvannia danykh na SD-kartakh v Android [Analysis of technical features of data encryption implementation on SD cards in Android]. *Suchasnyi zakhyst informatsii, 1*(61), 219–228. https://doi.org/10.31673/2409-7292.2025.016526 [in Ukrainian]

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Algorithmization of the Process of Forming Professional Logistics Competence in Future Infocommunication Specialists Based on Blockchain Technologies

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ABSTRACT: The paper substantiates the expediency of algorithmizing the process of forming professional logistics competence in future information and communication specialists based on blockchain technologies. The aim of the study is to improve the efficiency and safety of professional training by formalizing educational procedures and ensuring the reproducibility of learning outcomes. The paper uses analytical and systematic approaches to summarize the current requirements of information and communication practice and the specifics of professional training. Key scientific and practical problems of developing logistics competence are identified, and an algorithmic approach using a blockchain environment is proposed. The practical significance of the results lies in the possibility of using them to modernize educational programs and train competitive information and communication specialists.

KEYWORDS: professional training, digital educational environment, logistics thinking, information and communication activities, decentralized technologies, data security, algorithmic learning, competence management.

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Вступ

Цифрова трансформація інфокомунікаційної сфери призводить до істотних змін у професійних функціях і ролях фахівців, діяльність яких дедалі більше пов'язується з проєктуванням, управлінням і оптимізацією складних логістичних процесів у розподілених цифрових середовищах. Логістика в сучасних інфокомунікаційних системах виходить за межі операційного складника та набуває рис інтегрованої управлінсько-аналітичної компетентності, що охоплює планування потоків даних і ресурсів, координацію взаємодії між суб'єктами цифрових ланцюгів постачання, забезпечення прозорості, надійності та кіберстійкості процесів. У цих умовах значно зростає потреба у формуванні в майбутніх фахівців інфокомунікацій логістичної професійної компетентності, орієнтованої на застосування сучасних цифрових технологій та формалізованих управлінських підходів. Основною науково-практичною проблемою є недостатня алгоритмізація процесу формування логістичної компетентності в системі професійної підготовки, що ускладнює узгодженість між прогнозованими навчальними результатами, актуальними вимогами ринку праці та реальними умовами функціонування цифрових логістичних мереж. Традиційні освітні моделі переважно не забезпечують чіткої послідовності та відтворюваності формування компетентностей, зокрема здатності до ухвалення рішень у розподілених середовищах, управління довірою між учасниками логістичних процесів та застосування інструментів децентралізованого контролю. Звернення до блокчейн-технологій є актуальним, оскільки вони мають потенціал для формування нового типу логістичного мислення, що ґрунтується на принципах децентралізації, незмінності даних, прозорості транзакцій та автоматизації управлінських процедур. Інтеграція блокчейн-рішень у процес професійної підготовки дає змогу не лише відтворювати реальні сценарії функціонування цифрових логістичних систем, а й створювати алгоритмізовані освітні траєкторії, де кожен етап формування компетентності логічно пов'язаний із попереднім та має формалізовані критерії досягнення. Актуальність проблеми полягає в необхідності розроблення теоретично обґрунтованих моделей алгоритмізації освітніх процесів, здатних забезпечити системність, керованість і вимірюваність результатів підготовки фахівців інфокомунікацій. Практичний аспект проблеми стосується підготовки конкурентоспроможних спеціалістів, здатних діяти в умовах цифрової економіки, упроваджувати блокчейн-орієнтовані логістичні рішення та ефективно управляти інформаційними й матеріальними потоками в складних мережевих структурах. Розв'язання цієї проблеми безпосередньо відповідає стратегічним завданням модернізації вищої освіти, розвитку цифрових компетентностей та сприяє інноваційному розвитку інфокомунікаційної галузі.

Мета роботи – обґрунтування алгоритмізації процесу формування логістичної компетентності в майбутніх фахівців інфокомунікацій на основі блокчейн-технологій для гарантування безпеки інфокомунікаційної взаємодії та відтворюваності результатів фахової підготовки.

Ускладнення інфокомунікаційної інфраструктури, підвищені вимоги до безпеки взаємодії, керованості потоків даних і відповідальності за управлінські рішення зумовлюють необхідність переходу від фрагментарного формування логістичних умінь до алгоритмізованого, контрольованого процесу підготовки. З огляду на це завданням статті є обґрунтування

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алгоритмізації процесу формування логістичної компетентності в майбутніх фахівців інфокомунікацій. Блокчейн-технології розглядаються як інструмент підвищення безпеки інфокомунікаційної взаємодії, а також забезпечення керованості й відтворюваності результатів фахової підготовки.

Результати дослідження

Сучасний стан досліджень у сфері застосування блокчейн-технологій у професійній підготовці, логістиці та інфокомунікаціях характеризується активним міждисциплінарним пошуком моделей, здатних гарантувати керованість, прозорість і безпеку складних цифрових процесів. Значна частина наукових праць присвячена інтеграції блокчейну в освітні середовища та цифрові екосистеми як інструменту формалізації та верифікації діяльності. Зокрема, дослідження, орієнтовані на концепцію «smart university», підкреслюють потенціал блокчейн-рішень для фіксації освітніх результатів, управління освітніми траєкторіями та підвищення довіри до академічних даних (Абугалала зі співавт. (Abougalala et al.), 2020; Космарський (Kosmarski), 2020). У цьому контексті блокчейн розглядається не лише як інформаційна технологія, а і як інфраструктурна основа для алгоритмізації процесів у складних організаційних системах, що підтверджується також узагальнювальними звітами щодо формування блокчейн-компетентностей і практик їхнього застосування (Дюддер зі співавт. (Duedder et al.), 2021).

Інший масив досліджень зосереджується на трансформації логістики та інфокомунікацій під впливом цифровізації, Індустрії 4.0 та розподілених платформ. На думку науковців, профіль логістичних компетентностей змінюється, висуваючи вимоги до здатності працювати в умовах цифрових ланцюгів постачання, оперувати потоками даних і взаємодіяти з кіберфізичними системами (Кох, Юен (Koh & Yuen), 2022; Меркерт зі співавт. (Merkert et al.), 2023). Розвиток IoT-орієнтованих і мультиагентних логістичних систем актуалізує завдання формалізації управлінських рішень, координації учасників і контролю операцій у режимі реального часу (Касван зі співавт. (Kaswan et al.), 2022; Козма, Варга (Kozma & Varga), 2020). Окремі дослідження демонструють прикладний потенціал цифрових інструментів для розв'язання просторових і галузевих логістичних задач, зокрема в управлінні геопросторовими даними та транспортною інфраструктурою, однак підкреслюють фрагментарність підходів до формування відповідних професійних навичок (Каптосв (Kaptosv), 2025; Порру зі співавт. (Porru et al.), 2020).

Водночас у сучасній науковій літературі чітко окреслено проблему безпеки й відтворюваності цифрових логістичних процесів, що є важливою для інфокомунікаційної галузі. Дослідження зосереджені на застосуванні блокчейну в системах кібербезпеки, критичній інфраструктурі, IoT- та V2X-комунікаціях, де незмінність даних і децентралізований контроль розглядаються як основні переваги (Данчук, Данчук (Danchuk & Danchuk), 2024; Рао зі співавт. (Rao et al.), 2023). Дослідники наголошують на відсутності освітніх моделей, які б системно поєднували підготовку фахівців, алгоритмізацію професійних дій і безпекові вимоги (Ханім зі співавт. (Haneem et al.), 2020; Ор (Or), 2024). Окремі дослідження, що аналізують інтеграцію блокчейну в складні цифрові ресурси та галузеві системи, підкреслюють потребу в підготовці фахівців зі сформованим алгоритмічним мисленням та відповідальною професійною поведінкою (Лю з колегами (Liu et al.), 2025; Султана та Алам (Sultana & Alam), 2024). Аналіз зазначених праць

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засвідчує, що проблема алгоритмізації процесу формування логістичної компетентності в майбутніх фахівців інфокомунікацій досі не має цілісного розв'язання. Це зумовлює актуальність подальших досліджень у цьому напрямі із залученням блокчейн-технологій як методологічної та інструментальної основи.

Професійна компетентність логістики в структурі фахової підготовки майбутніх фахівців інфокомунікацій має міждисциплінарний характер і забезпечує узгоджене управління інформаційними, технологічними та організаційними процесами в цифрових середовищах. Вона поєднує технічну підготовку з управлінськими рішеннями та безпековими вимогами, формуючи здатність майбутнього фахівця ухвалювати обґрунтовані рішення щодо розподілу ресурсів, координації учасників та оптимізації потоків даних у межах інфокомунікаційних систем (Лю зі співавт. (Liu et al), 2025). Урахування вимог безпеки інфокомунікаційної діяльності зумовлює зміщення акценту з локального виконання операцій на системний, наскрізний контроль логістичних процесів протягом усього життєвого циклу цифрових сервісів (табл. 1).

Таблиця 1

Місце професійної компетентності логістики в структурі фахової підготовки майбутніх фахівців інфокомунікацій

Структурний компонент підготовки	Функціональне наповнення	Зв'язок із логістичною компетентністю	Аспекти безпеки інфокомунікацій
Технічна підготовка	Проєктування мереж і цифрових сервісів	Управління потоками даних та інфраструктури	Захист каналів, цілісність передавання
Організаційно-управлінська підготовка	Планування та координація процесів	Оптимізація логістичних ланцюгів	Контроль доступу та відповідальності
Інформаційно-аналітична підготовка	Аналіз і прогнозування	Підтримка логістичних рішень	Виявлення ризиків
Безпекова підготовка	Забезпечення кіберстійкості	Інтеграція безпеки в логістику	Запобігання інцидентам
Практична підготовка	Проєктна та виробнича діяльність	Реалізація логістичних сценаріїв	Контроль надійності

Джерело: сформовано на основі (Кох, Юен (Koh & Yuen), 2022; Козма, Варга (Kozma & Varga), 2020; Меркерт зі співавт. (Merkert et al.), 2023; Ор (Or), 2024)

В умовах інфокомунікаційної діяльності така структура гарантує керованість та безпеку складних цифрових систем на етапах проєктування, розгортання та експлуатації. Наприклад, під час організації роботи центрів обробки даних логістична компетентність проявляється в здатності фахівця узгоджувати розміщення серверних ресурсів, маршрутизацію трафіку та резервування каналів з урахуванням безпекових вимог, що мінімізує ризики простоїв і витоку інформації. У проєктах із розвитку телекомунікаційних мереж вона реалізується через планування постачання обладнання, синхронізацію монтажних і налаштувальних робіт та контроль доступу до критичної інфраструктури (Кох, Юен (Koh & Yuen), 2022; Меркерт зі співавт. (Merkert et al.), 2023). В умовах експлуатації цифрових платформ і хмарних сервісів логістична компетентність забезпечує баланс між масштабованістю систем, ефективним використанням ресурсів і дотриманням політик інформаційної безпеки, підвищуючи стійкість

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інфокомунікаційних рішень та їхню відповідність сучасним вимогам цифрової економіки.

Доцільність застосування блокчейн-технологій у процесі формування логістичної компетентності майбутніх фахівців інфокомунікацій зумовлена потребою в чіткій алгоритмізації освітніх дій, прозорому контролі результатів і відтворенні логіки функціонування сучасних цифрових логістичних систем. Специфіка інфокомунікаційної діяльності передбачає роботу в розподілених середовищах, де кожне рішення має бути формалізованим, безпечним і верифікованим, що повністю відповідає принципам блокчейн-технологій. Їхнє впровадження в освітній процес дає змогу перевести формування логістичної компетентності в керований алгоритмічний формат, у якому послідовність навчальних кроків, умови їхнього виконання та результати є зафіксованими й доступними для аналізу (табл. 2).

Таблиця 2

Застосування блокчейн-технологій в алгоритмізації формування професійної компетентності логістики

Освітній елемент	Функціональне призначення блокчейн-технологій	Алгоритмізаційний ефект
Навчальні модулі	Фіксація послідовності опанування	Формування логічно впорядкованих дій
Оцінювання результатів	Автоматизована перевірка виконання	Прозорість і відтворюваність
Практичні завдання	Реалізація смартконтрактів	Формалізація професійних рішень
Проєктна взаємодія	Децентралізована координація	Узгодженість командної роботи
Облік компетентностей	Незмінність записів досягнень	Довіра до результатів підготовки

Джерело: сформовано на основі (Абугалала зі співавт. (Abougalala et al.), 2020; Данчук, Данчук (Danchuk & Danchuk), 2024; Дюддер зі співавт. (Duedder et al.), 2021; Касван зі співавт.(Kaswan et al.), 2022; Космарський (Kosmarski), 2020)

У сучасних умовах професійної підготовки блокчейн-орієнтована алгоритмізація забезпечує максимальне наближення освітнього процесу до реальних практик інфокомунікаційної галузі. Під час моделювання логістики цифрових платформ здобувачі освіти послідовно виконують серії дій з управління потоками даних, ресурсів і сервісів, де кожен етап закріплюється як транзакція з визначеними параметрами та обмеженнями. Такий підхід дає змогу формувати розуміння причинно-наслідкових зв'язків між ухваленими логістичними рішеннями та їхнім впливом на безпеку та стійкість систем. У проєктній діяльності блокчейн-технології застосовуються для фіксації відповідальності учасників за окремі логістичні операції, що особливо важливо для підготовки фахівців до роботи в розподілених командах операторів мереж, провайдерів хмарних сервісів або розробників інфокомунікаційних платформ. Кожне управлінське рішення, пов'язане з маршрутизацією трафіку, резервуванням ресурсів або синхронізацією етапів реалізації проєкту, може бути перевірене на відповідність заданому алгоритму без можливості несанкціонованої корекції результатів. У практиці експлуатації інфокомунікаційних систем сформована логістична компетентність проявляється в здатності випускників діяти відповідно до формалізованих процедур, дотримуючись вимог безпеки та

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оптимальності використання ресурсів (Касван зі співавт. (Kaswan et al.), 2022; Рао зі співавт. (Rao et al.), 2023). Алгоритмізація освітнього процесу на основі блокчейн-технологій забезпечує не лише засвоєння окремих знань чи навичок, а й формування професійної готовності до ухвалення відповідальних логістичних рішень у складних цифрових середовищах.

Формування логістичної компетентності майбутніх фахівців інфокомунікацій супроводжується комплексом науково-практичних проблем, зумовлених як особливостями сучасного цифрового середовища, так і обмеженнями наявних підходів до фахової підготовки. Однією з основних проблем є недостатня формалізація освітніх процедур, унаслідок чого процес побудови логістичних умінь і навичок має фрагментарний характер і залежить переважно від інтерпретацій викладачів, а не від чітко визначених алгоритмів професійної діяльності. Це ускладнює узгодженість між освітніми результатами та реальними вимогами інфокомунікаційної практики, де логістичні рішення повинні ухвалюватися за формалізованими правилами з урахуванням технологічних і безпекових обмежень.

Значною проблемою є обмежена відтворюваність результатів навчання, зумовлена відсутністю єдиних механізмів фіксації та перевірки досягнутих рівнів логістичної компетентності. У таких умовах складно забезпечити порівнюваність освітніх результатів між різними освітніми програмами, навчальними групами та етапами підготовки, що знижує довіру роботодавців до сформованих компетентностей та ускладнює інтеграцію випускників у професійне середовище інфокомунікацій (Кох, Юен (Koh & Yuen), 2022; Меркерт зі співавт. (Merkert et al.), 2023). Проблема посилюється тим, що логістична компетентність часто оцінюється за підсумковими результатами, не враховуючи послідовності ухвалених рішень і якості дотримання професійних алгоритмів.

Важливим науково-практичним викликом є ігнорування безпекових ризиків у цифрових логістичних процесах під час формування змісту та методів навчання. У реальній інфокомунікаційній діяльності логістика тісно пов'язана з управлінням доступом, цілісністю даних, надійністю взаємодії між учасниками та відповідальністю за наслідки управлінських рішень. В освітньому процесі ці аспекти часто розглядаються ізольовано від логістичних завдань, що призводить до формування професійних дій без урахування кіберзагроз, ризиків маніпуляції даними та порушення довіри в розподілених системах.

Додатковою проблемою є обмежена інтеграція практикоорієнтованих цифрових інструментів, здатних відобразити логіку функціонування реальних логістичних процесів в інфокомунікаціях. Відсутність середовищ, у яких навчальні рішення мають незворотні наслідки та фіксуються в цифрових журналах дій, зумовлює розрив між освітньою діяльністю та професійною відповідальністю, що актуалізує перехід до алгоритмізованих і безпековоорієнтованих моделей формування логістичної компетентності (Абугалала зі співавт. (Abougalala et al.), 2020; Дюддер зі співавт. (Duedder et al.), 2021).

Практичні рекомендації щодо алгоритмізації процесу формування логістичної компетентності в майбутніх фахівців інфокомунікацій доцільно реалізовувати через поєднання формалізованих освітніх процедур і блокчейн-технологій як середовища фіксації, контролю та верифікації професійних дій. Основною рекомендацією є перехід від фрагментарного засвоєння

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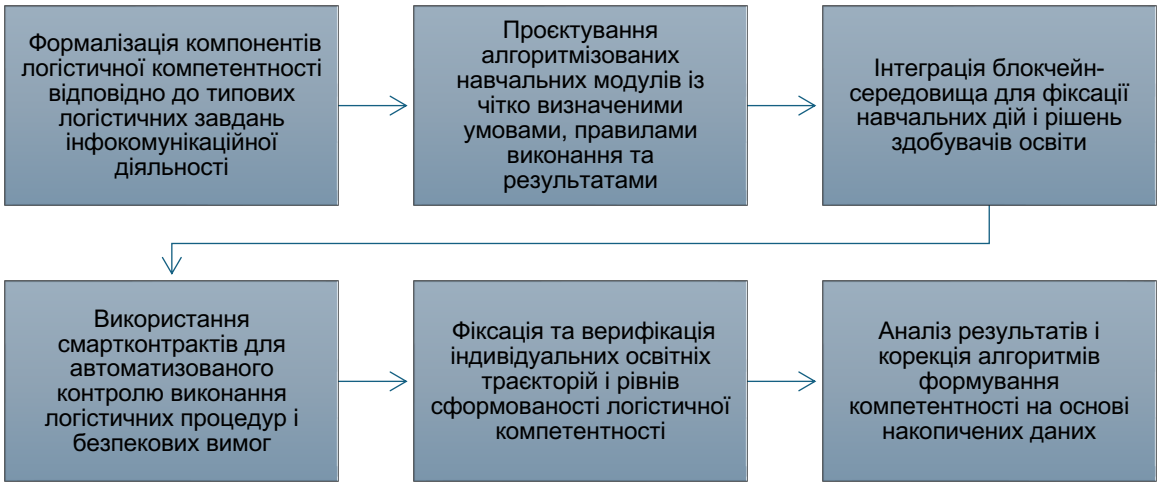
логістичних знань до побудови керованого алгоритмізованого процесу підготовки, у межах якого кожна навчальна дія відповідає певному логістичному етапу інфокомунікаційної діяльності та має верифікований результат. Додатково рекомендується інтегрувати блокчейн-інфраструктуру для забезпечення прозорості виконання завдань, незмінності освітніх даних і контролю дотримання вимог інформаційної безпеки, що створює умови для формування в здобувачів стійких професійних моделей поведінки. Алгоритмізація процесу формування логістичної компетентності в майбутніх фахівців інфокомунікацій на основі блокчейн-технологій може бути представлена послідовністю таких кроків (рис. 1).

Рисунок 1

Алгоритмізація процесу формування логістичної компетентності в майбутніх фахівців інфокомунікацій на основі блокчейн-технологій



Джерело: власна розробка авторів

Реалізація першого кроку передбачає чітке визначення, які саме логістичні дії повинен уміти виконувати майбутній фахівець інфокомунікацій у реальній професійній діяльності, з урахуванням управління потоками даних, ресурсів і доступів. Це дає змогу усунути розмитість освітніх цілей і забезпечити відповідність підготовки вимогам галузі. Другий крок сприяє структурованості освітнього процесу, оскільки кожен модуль відтворює конкретний логістичний сценарій, наприклад, планування розгортання мережі або координацію функціонування цифрової платформи.

На етапі інтеграції блокчейн-середовища формуються умови для прозорої фіксації професійних рішень, де кожна навчальна дія зберігається у формі цифрового запису без можливості несанкціонованого коригування. Застосування смартконтрактів допомагає автоматично перевіряти дотримання алгоритму логістичних рішень і вимог безпеки, що значно підвищує відповідальність здобувачів освіти за якість виконаних дій. Це особливо важливо під час підготовки фахівців, діяльність яких пов'язана з інфокомунікаційними системами.

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Фіксація індивідуальних освітніх траєкторій забезпечує об'єктивну оцінку не лише результатів навчання, а й послідовності та коректності ухвалених рішень, що підвищує відтворюваність результатів підготовки. Завершальний етап аналізу та корекції алгоритмів дає змогу закладам освіти адаптувати освітні програми до реальних змін інфокомунікаційної галузі, очікуваним результатом чого є підготовка фахівців зі сформованою алгоритмічною логістичною компетентністю, високим рівнем безпеки професійних дій та готовністю до роботи в складних цифрових середовищах.

Висновки

Встановлено, що логістична компетентність є системоутворювальним елементом фахової підготовки майбутніх фахівців інфокомунікацій, що забезпечує узгоджене управління інформаційними потоками, ресурсами та взаємодіями в умовах розподілених цифрових середовищ. Обґрунтовано, що в умовах цифрової трансформації логістика набуває інтегрованого управлінського змісту та безпосередньо пов'язана з вимогами безпеки, надійності й керованості інфокомунікаційних систем. Виявлено, що основними проблемами формування логістичної компетентності є недостатня формалізація освітніх процедур, фрагментарність логістичних умінь, низька відтворюваність результатів навчання та ізольоване врахування безпекових аспектів у підготовці фахівців. Доведено, що за таких умов логістична компетентність формується без чіткої алгоритмічної основи, що знижує її прикладну цінність і відповідність реальним вимогам інфокомунікаційної практики. Обґрунтовано доцільність застосування блокчейн-технологій як інструменту алгоритмізації процесу формування логістичної компетентності, що забезпечує прозорість, незмінність і верифікованість навчальних дій, а також інтеграцію безпеки в логіку освітнього процесу. Запропоновані рекомендації, спрямовані на побудову керованих алгоритмізованих моделей фахової підготовки, орієнтованих на формування відповідальної професійної поведінки майбутніх фахівців інфокомунікацій.

Перспективи подальших досліджень пов'язані з експериментальною перевіркою ефективності запропонованих підходів, розробленням індикаторів оцінювання рівнів сформованості логістичної компетентності та розширенням застосування блокчейн-орієнтованих моделей у підготовці фахівців для роботи з цифровими та критично важливими інфокомунікаційними системами.

References

Abougalala, R. A., Amasha, A., Areed, M. F., Alkhalaf, S., & Khairy, D. (2020). Blockchain-enabled smart university: A framework. *Journal of Theoretical and Applied Information Technology*, *98*(17), 3531–3543. https://www.jatit.org/volumes/Vol98No17/10Vol98No17.pdf

Danchuk, V., & Danchuk, M. (2024). Integration of blockchain technologies into cybersecurity systems for critical infrastructure facilities: Prospects and challenges. *Bulletin of Cherkasy State Technological University*, *29*(4), 43–52. https://doi.org/10.62660/bcstu/4.2024.43

Duedder, B., Fomin, V., Guerpinar, T., Henke, M., Ioannidis, P. A., Janaviciene, V., Pakka, V. H., Ricci, S., & Straub, N. (2021). Blocknet report: Exploring the blockchain skills concept and best practice use cases. *arXiv*. https://doi.org/10.48550/arXiv.2102.04333

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Haneem, F., Bakar, H. A., Kama, N., Mat, N. Z. N., Ghazali, R., & Mahmood, Y. (2020). Recent progress of blockchain initiatives in government. *International Journal of Advanced Computer Science and Applications*, *11*(11), 344–351. https://doi.org/10.14569/IJACSA.2020.0111144

Kaswan, K. S., Dhatterwal, J. S., Kumar, S., & Pandey, A. (2022). Industry 4.0 multiagent system-based knowledge representation through blockchain. In *Artificial Intelligence and Industry 4.0* (pp. 93–115). Academic Press. https://doi.org/10.1016/B978-0-323-88468-6.00009-7

Koh, L. Y., & Yuen, K. F. (2022). Emerging competencies for logistics professionals in the digital era: A literature review. *Frontiers in Psychology*, *13*, Article 965748. https://doi.org/10.3389/fpsyg.2022.965748

Kosmarski, A. (2020). Blockchain adoption in academia: Promises and challenges. *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(4), Article 117. https://doi.org/10.3390/joitmc6040117

Kozma, D., & Varga, P. (2020). Supporting digital supply chains by IoT frameworks: Collaboration, control, combination. *Infocommunications Journal*, *12*(4), 22–32. https://doi.org/10.36244/ICJ.2020.4.4

Liu, X., Dong, F., Shui, W., & Geng, G. (2025). Blockchain in digital cultural heritage resources: Technological integration, consensus mechanisms, and future directions. *npj Heritage Science*, *13*(1), Article 235. https://doi.org/10.1038/s40494-025-01818-4

Kaptosv, L. (2025). Applying PostGIS for storage and processing of geospatial data in logistics systems. *The American Journal of Engineering and Technology*, *7*(8), 318–327. https://www.theamericanjournals.com/index.php/tajet/article/view/6630

Merkert, R., Hoberg, K., & Mahadevan, K. (2023). Logistics and supply chain superpowers and skills for survival in the "new normal" globalized world. *Transportation Journal*, *62*(4), 369–396. https://doi.org/10.5325/transportationj.62.4.0369

Or, C. (2024). Advancing workforce competency: Singapore's integration of competency-based education. *Journal of Applied Learning and Teaching*, *7*(2), 421–432. https://doi.org/10.37074/jalt.2024.7.2.3

Rao, P. M., Jangirala, S., Pedada, S., Das, A. K., & Park, Y. (2023). Blockchain integration for IoT-enabled V2X communications: A comprehensive survey, security issues and challenges. *IEEE Access*, *11*, 54476–54494. https://doi.org/10.1109/ACCESS.2023.3281844

Porru, S., Misso, F. E., Pani, F. E., & Repetto, C. (2020). Smart mobility and public transport: Opportunities and challenges in rural and urban areas. *Journal of Traffic and Transportation Engineering (English Edition)*, *7*(1), 88–97. https://doi.org/10.1016/j.jtte.2019.10.002

Sultana, A., & Alam, S. (2024). Adaptation of blockchain technology into the letter of credit arrangement: An overview of sustainable business practice in Asia. In *Green management: A new paradigm in the world of business* (pp. 303–337). Emerald Publishing. https://doi.org/10.1108/978-1-83797-442-920241017

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