

Article type

Full paper, double-blind peer review.

Publication history

Received: 01 November 2024. Revised: 03 February 2025.
Accepted: 06 February 2025. Online: 17 March 2024.

Cover image

Badly Disguised Bligh via flickr.



Special issue Generative AI and education | **More at** <https://doi.org/10.21428/8c225f6e.0390b853>

Assessment of United Kingdom (UK) further education student perceptions of the significance of ChatGPT on learning experiences in business studies: An integrative literature review

Oga Chapwanya

Department of Educational Research, Lancaster University, Lancaster, United Kingdom

Keywords

generative artificial intelligence (GenAI); Chatbots; ChatGPT; student perceptions; business studies students; artificial intelligence (AI); technology-enhanced learning (TEL); education technology (EdTech); AI in education; AI-driven student engagement; user acceptance of AI

Citation

Chapwanya, O. (in press). Assessment of United Kingdom (UK) further education student perceptions of the significance of ChatGPT on learning experiences in business studies: An integrative literature review. **Studies in Technology Enhanced Learning**, 4(1), 1-32.

<https://doi.org/10.21428/8c225f6e.a48744da>

[10.21428/8c225f6e.a48744da](https://doi.org/10.21428/8c225f6e.a48744da)

Abstract

This integrative literature review uses an interdisciplinary approach to synthesise aspects of generative artificial intelligence-related studies from health sciences, meteorology, business, and higher education. The goal is to understand end-user perceptions of GenAI chatbots and integrate these insights into using ChatGPT in technology-enhanced learning (TEL) in teaching business studies courses in the United Kingdom's (UK's) further education sector. The study examines the benefits, such as personalised learning and access to knowledge resources, and limitations, like the inability to match human interaction. The review highlights a scarcity of research on student perceptions of GenAI chatbots in the UK. This paper employs an integrative literature review approach, analysing thirty-seven papers from the databases Google Scholar, ERIC, and Lancaster University's OneSearch. The author identifies five themes: benefits; limitations; factors influencing the effectiveness of GenAI chatbots; perceptions; and human-GenAI interaction. Findings reveal patterns in chatbot use and emphasise the need for further empirical research on student perspectives. The paper argues that understanding student perceptions is important when integrating GenAI tools like ChatGPT in TEL research and the teaching of business. This paper advocates for UK-specific studies to inform TEL researchers, educators, policymakers, and developers within the relevant context.

1. Introduction

With the rapid integration of artificial intelligence in educational settings (Kuhail et al., 2023; Molnár and Szűts, 2018), ChatGPT and similar chatbot technologies are positioned to reshape learning experiences in further education, particularly within United Kingdom (UK) business studies. This integrative literature review evaluates UK further education students' perceptions of ChatGPT's influence on their learning within business studies by synthesising aspects of GenAI-related research across different training contexts, like health sciences, meteorology, business, and higher education. This intersectoral approach provides a comprehensive understanding of chatbot adoption, as seen in various professional training environments, and contextualises how these insights might inform business studies teaching practices in UK further education.

Prior studies highlight a dual view of chatbots like ChatGPT. On the one hand, these technologies offer tailored, adaptive learning experiences that facilitate language acquisition and access to extensive knowledge resources, potentially enriching the educational landscape (Rudolph et al., 2023). Chatbots' ability to provide individualised responses at scale has proven useful in several fields, demonstrating their potential to help students interact with complex business concepts in a flexible, on-demand format. However, existing literature also cautions against over-reliance on chatbots, as these tools often struggle to replicate the detailed, responsive dynamics characteristic of human instruction and interactive learning methodologies (Cotton et al., 2023). Unlike a human educator, ChatGPT lacks the intuitive adjustment to student needs. This limits its capacity to engage students in a manner that aligns with the adaptive demands of business studies learning.

Despite the increasing presence of AI in education, there remains a notable gap in understanding UK further education students' perspectives on using ChatGPT within their studies. Previous research has focused heavily on the technological and pedagogical dimensions of chatbots (Okonkwo and Ade-Ibijola, 2021), but has often omitted the user-centred view specifically, how students perceive and engage with these tools in the learning process. Early insights indicate mixed perceptions. While some learners express enthusiasm about the accessibility and learning improvements chatbots provide, others remain sceptical or resistant, concerned about the impersonal nature of AI. The latter perceive potential limitations of AI in a collaborative educational setting.

This review, therefore, aims to address the gap in the literature by exploring how UK business studies students perceive ChatGPT's impact on their learning experiences. It will explore the perceived benefits, limitations, and factors influencing the effectiveness of GenAI chatbots, perceptions, and human-AI interaction. By integrating perspectives from multiple sectors, this review not only broadens the understanding of ChatGPT's role in education but also offers insights for technology-enhanced researchers, business educators, and policymakers on how they could improve student engagement and effectiveness in GenAI-driven learning environments.

1.1 Context

Integrating GenAI tools like ChatGPT into education has generated new interest in their impact on student learning (Dempere et al., 2023). This study, set within UK further education and focused on business studies, explores how chatbot technologies shape learning experiences. Positioned at the intersection of education and GenAI, it draws insights from education and training settings in health sciences, meteorology, business, and higher education to offer a broad view of how chatbots influence training environments. These fields were chosen for their established use of AI, providing valuable insights into educational and professional applications. Each field highlights unique aspects of chatbot interactions: knowledge access in health; precise communication in meteorology; adaptive learning in business; and scalable tutoring in higher education (Chen et al., 2023). This interdisciplinary angle deepens the review's perspective on ChatGPT's potential and limitations, clarifying its role in UK further education and potential use in the teaching of business courses.

The existing literature reveals optimism and caution about using chatbots in learning (Labadze, Grigolia, and Machaidze, 2023). On the one hand, studies highlight chatbots' potential to support adaptive, on-demand learning by offering learners instant feedback and accessible resources, which can be particularly valuable in fields like business studies that often require iterative concept development and practice. However, there is a critical discourse around their limitations, including concerns about loss of personal interaction, which is vital for deep, responsive learning processes. In business studies, ChatGPT helps draft business reports, generate case study analyses, and provide quick summaries of complex financial concepts. This reduces opportunities for interactive discussions with peers and instructors, which are essential for developing critical thinking and balanced, context-specific problem-solving skills. In fields like business

education, where understanding and adaptability are key, ChatGPT's limitations in adjusting to detailed student needs raise questions about its long-term success.

Given these mixed perspectives, this review addresses a notable gap in focusing directly on the student viewpoint. It seeks to understand UK business studies students' perceptions of ChatGPT, examining how it aids or challenges their learning experiences. Exploring student perspectives aims to provide actionable insights for educators and policymakers, intended to help them steer and improve the use of AI tools in education while keeping student engagement and learning effectiveness central to GenAI-driven teaching methods.

This integrative literature review draws on studies from nursing, meteorology, medicine, and other training contexts. It recognises that while there is limited literature specifically on GenAI in business studies, these fields provide valuable insights into the use of AI tools in education. These training-focused studies highlight the potential of AI to enhance adaptive learning, facilitate skills acquisition, and support professional development, which can inform similar applications within business education. By drawing on findings from these different education and training contexts, this review establishes a foundation for understanding how ChatGPT might be studied and implemented effectively in business education settings, despite scant relevant literature. It establishes itself as one of the pioneering reviews on the application of ChatGPT and similar GenAI technologies in business education

1.2 Rationale

This integrative review intends to understand student perceptions about the significance of chatbots on learning experiences and to extend these for conceptualising the contribution of ChatGPT in further education business studies and technology-enhanced learning (TEL) research. TEL entails using digital technologies to support and improve the learning process, emphasising both the quality of learning and the technical capabilities involved (Passey, 2019). The aim of this literature review is to explore students' perceptions of using ChatGPT in education and training. It focuses on ChatGPT's benefits, drawbacks, and effectiveness in meeting learning objectives. The review seeks to draw useful parallels for students in further education business studies. It also aims to identify factors influencing ChatGPT's impacts, to help guide its effective use in business education. The literature review also, incidentally, explores the methodological and theoretical constructs immanent in empirical literature to guide prospective research on implementing chatbots, particularly ChatGPT in education-specific

contexts, as this is critical for the effectual adoption of this innovation in further education and education in general. The academic landscape presents an opportunity, not just for an integrative literature review to tackle the ensuing investigative queries, but empirical research as well.

1.3 Research questions

This study and paper address the following research questions:

- (RQ1) What student-perceived benefits and drawbacks arise from using ChatGPT in learning business studies in further education institutions?
- (RQ2) What are the factors that influence the effectiveness of ChatGPT according to further education students who are studying business studies?
- (RQ3) To what extent do further education students studying business studies perceive that ChatGPT has helped them achieve their learning objectives?

By focusing on business education, this study will identify the unique ways in which ChatGPT can support business students' learning objectives, such as improving critical thinking and practical application of concepts. Also, the study will highlight any limitations or challenges, such as the potential for reduced personal interaction and adaptability (Limna et al., 2023), that may impact the effectiveness of ChatGPT in business studies education.

2. Review of related literature

This integrative literature review's findings thoroughly explore the recent understanding of chatbots in education. Through diligent analysis and synthesis of 37 scholarly articles, this study explores emerging patterns characterising the use of chatbots across different education and training contexts to draw parallels for business education.

2.1 Technology-enhanced learning area focus

According to Passey (2018), there are six elements of technology enhanced learning, namely: Technology Enhanced Learning (TEL); Technology Enhanced Management of Education (TEME); Technology Enhanced Education (TEE); Technology Enhanced Teaching (TET); Technology Enhanced Management of Teaching (TEMT); and Technology Enhanced Management of Learning (TEML). The analysed publications explore the first two, with over eighty-five percent of the papers tackling TEL and over twenty-two percent examining TEME. To categorise the scope of each

study within these areas, the researcher systematically classified each of the 37 papers reviewed according to the specific element of Passey's (2018) TEL research they addressed (see Appendix A). This gave a comprehensive analysis of the thematic focus across the literature.

2.2 Benefits of chatbots and ChatGPT

In recent times, researchers are exploring the efficacy of AI and chatbots. Okonkwo and Ade-Ibijola (2021) note that chatbots offer fast and customised services for staff and learners. Chatbots hold promise in revolutionising education through personalised learning activities and support for educators, but there is a paucity of research on evidence-based design techniques (Kuhail et al., 2023). Molnár and Szűts (2018) also subscribe to chatbot efficacy, positing that chatbots provide supplementary information and streamline administrative tasks for teachers. Topal et al. (2021) explore the outcome of an AI-based chatbot regarding the achievements and perspectives of 5th grade science students, concluding that while there was no significant difference in academic achievement, the chatbot had a constructive influence on the learners' online learning experience and was considered useful, fun, and helpful for learning beyond the classroom. ChatGPT, being a chatbot, shares the same benefits. In a qualitative instrumental case study, Tlili et al. (2023) realised that the social media debate concerning ChatGPT was positive among early adopters, with enthusiasm for its potential use in educational settings, although a section emphasised the need for caution in its use. The 'technological marvel' can be valuable in higher education student assessment, learning, and teaching as postulated by Rudolph et al. (2023).

2.3 Limitations of chatbots and ChatGPT

One of the most recent scoping reviews identifies challenges such as the lack of teacher knowledge, skills, and confidence, curriculum design, and teaching guidelines, as militating against the implementation of chatbots in early childhood education (ECE) (Jiahong et al., 2023). Okonkwo and Ade-Ibijola (2021) allude to the difficulties faced in the integration of the technology in education while Molnár and Szűts (2018) suggest that chatbots may not be suitable for addressing content-related issues in certain areas of education, and cause frustration due to ineffective communication or lack of expediency.

Rushabh (2023) cautions that ChatGPT's immediate feedback to complex questions, integrated with its emphatic confidence and susceptibility to bias, could be risky as users may not be able to assess the credibility of sources. Its

veracity weakens around complex topics and may protract existing biases. Gregorcic and Ann-Marie Pendrill (2023) underscore the capricious and inconsistent feedback from ChatGPT, to a basic-level physics question. Consequently, they observe how ChatGPT's inaccuracies render it valuable in training the assessment of student responses instead of serving as a cheating tool or a tutor for physics students - a typical case of 'sugaring the pill'.

There are opportunities and obstacles to using ChatGPT in higher education (Cotton et al., 2023). It can increase student engagement and accessibility but has issues regarding academic integrity and plagiarism. Concerns around cheating and honesty abound, while the academic integrity associated with the use of ChatGPT is queried by Tlili et al. (2023). Finally, they posit that scholars should investigate privacy concerns, and manipulation, to ensure a safe and responsible adoption of ChatGPT in education.

2.4 Student perceived factors influencing the effectiveness of chatbots and ChatGPT

Specific inquiries on the theme of determinants of the effectiveness of chatbots and ChatGPT in learning environments are notably absent in the literature. Nevertheless, the inherent significance of this theme to the second research question of this integrative review compels the writer to probe into this dimension within the broader context of assessing student perceptions.

In a study where male students demonstrated to be more ready to accept chatbots than female students, Nouraldeem (2022) contends that there is perceived usefulness, and perceived ease of use on AI adoption among accounting students, with a focus on gender moderation. Thus, gender features as a moderating variable. Regarding perceived factors influencing ChatGPT, effectiveness, functionality, interactivity, popularity, ease of use, accuracy, and teacher knowledge are deliberately selected from papers by Khan et al. (2023), Lundi et al. (2023), Rudolph (2023), Sallam (2023), Sinha (2023), and Tlili et al. (2023) respectively. By deducing and inferring insights from twenty of the tangentially connected papers, the following factors, though treated incidentally in the papers, also featured prominently in the said academic works: inclusivity; versatility; engagement; speed of response; quality of response; inclusivity; personalisation; interpersonal collaboration; direct remote collaboration; performance; applicability; trustworthy; teacher knowledge; perceived benefits; training; and ethical issues (Barret, 2019; Gregorcic, 2023; Chen et al., 2022). Appendix A provides a full list of articles on this aspect.

2.5 Perceptions and extent of user acceptance of chatbots and ChatGPT

Studies on user perceptions of chatbots are worthy of reporting from business practice. Employees perceive the potential replacement of their jobs by chatbots, according to Brougham and Haar (2018). Their study establishes that greater awareness of chatbots and associated technologies was inversely correlated to workers' organisational commitment and career satisfaction, and in contrast, positively correlated to employee turnover intentions, cynicism, and depression. In noteworthy marketing communications qualitative research, Chen et al. (2022) observe that consumers view chatbots in a multifaceted and relational way, emphasising functionality, emotional impact, and comparison with human abilities, and evaluate voice-assisted chatbots based on function, communication, adaptability, relationship, and privacy features, while regarding chatbots in marketing communication as inevitable, but having limited influence on their assessment of products and brands.

Rodriguez et al. (2022), in a qualitative descriptive study, explored the acceptability and feasibility of using a chatbot for clinical decision-making and patient safety from the perspective of final-year nursing students, with the findings indicating it is both acceptable and feasible. They recommend the chatbot's refinement to enhance its acceptance in nursing practice.

In higher education, Hew et al. (2023) explored the use of chatbots in two studies to aid student goal setting and social presence in web-based courses, finding positive learner experiences and providing suggestions for instructors to apply chatbots in teaching and learning. User context, quality of responses produced, learners' previous knowledge, and learning goals are aspects that can be connected to student perceptions of chatbots, as inferred from scholarly work by Durak (2022), Gonzalez et al. (2022), Lee et al. (2022) and Nouraldeem (2022). In scrutinising Japanese university students' perceptions of using chatbots, Gallacher et al. (2018) noted that the students viewed the chatbot as a novelty rather than a legitimate language-learning tool, pointing a need for educators to critically assess the integration of AI technology in the foreign language classroom.

3. Methods

This integrative literature review uses a thematic analysis framework (Clarke and Braun, 2017) to examine GenAI's impact on business studies students' learning experiences, focusing specifically on ChatGPT. The thematic framework

enables the identification and synthesis of key patterns and insights from different fields (Ryan and Bernard, 2003). Using a constant comparative analysis approach, findings from health sciences, meteorology, business, and higher education are continuously contrasted, uncovering common themes, benefits, and challenges linked to ChatGPT. A systematic coding process categorises data into themes such as ChatGPT's efficacy, benefits, limitations, challenges, influencing factors, and user acceptance. Finally, qualitative synthesis integrates insights (Saini and Shlonsky, 2012), creating a cohesive narrative that illuminates ChatGPT's potential and limitations across educational contexts.

3.1 Integrative literature review method

An integrated literature review can identify the scope of existing scholarly work and the areas in need of further investigation. It guides future research to tackle unresolved inquiries and gaps in knowledge. The integrative literature review detects patterns and consistencies observed across research and underscores academic discussions where there may be paradoxes or inconsistencies in the research literature (Toraco, 2016). Integrative literature reviews aim to address inconsistencies in the existing literature by providing meticulous analysis and evaluation, provoking the inception of uncommon takes on the theme. Cooper (1988) in Toraco (2016) posits that in an integrated literature review, scholars arrange their work conceptually, chronologically, or methodologically, and their envisaged readership can vary from experts to practitioners to laypeople, which impacts their tone and diction. The organisation of this integrated literature review is a combination of both the historical and conceptual to briefly chronicle the origins of AI in education and analyse how existing literature covers the concept in as far as it relates to technology enhanced learning (TEL).

An extensive methodological technique of reviews permits an examination of both experimental and non-experimental studies to adequately fathom an emerging phenomenon. It coalesces data from theoretical and evidential literature. It serves a broad spectrum of objectives, such as definition of constructs, assessment of concepts and research, and scrutiny of methodological hurdles in a certain domain (Boome, 1993). In conducting this integrated literature review, the investigator explores the different aims, methodology, sampling approaches, field of application, and the findings from previous scholarly research on chatbots and ChatGPT. Such critical appraisal of pre-existing literature in this study involved consulting a wide range of data repositories, largely from the education and training contexts of various fields that have previously explored

chatbots. An examination of the aims of previous scholarly work helped in identifying the glaring research gaps and methodological concerns that need scrutiny in future studies.

3.2 Search strategy

The databases used to identify relevant articles were Google Scholar, ERIC, and Lancaster University's OneSearch. Preliminary search terms included ChatGPT, artificial intelligence (AI), chatbots, business studies students' perceptions, and technology-enhanced learning. The initial search yielded 10,120 results - 3,882 from Google Scholar, 6,199 from OneSearch, and 39 from ERIC. Using the PRISMA approach, duplicates were removed, abstracts screened, and inclusion criteria applied, reducing the pool to 37 papers. Figure 1 provides an overview of the initial search findings, including duplicates, screened articles, and rejections. The refined key search terms were: Generative Artificial Intelligence (GenAI); Chatbots; ChatGPT; Student Perception; Business Studies Students; Artificial Intelligence (AI); Technology-Enhanced Learning (TEL); Education Technology (EdTech); AI in Education; AI-Driven Student Engagement; and User Acceptance of AI.

3.3 Inclusion criteria

Only research papers published in peer-reviewed journals between 2013 and 2023 were examined, except for papers or books by researchers at Carnegie Mellon University, on the Intelligent Tutoring System (ITS) in the 1970s, Hebert A. Simon and the 'Godfathers of AI', as these report original research findings on artificial intelligence or learning machines. Studies on chatbots in education and training in general, publications that probe student perceptions of chatbots in education or any training context were also scrutinised to allow the benefit of interdisciplinary knowledge through cross-pollination.

3.4 Exclusion criteria

Papers not written in English did not form part of this literature search, although well translated papers were considered. Studies compiled using insufficient data were not used since the quality of their sample size or methodology was viewed as compromised. Excluded also were studies focusing on AI/chatbot development, not related to the objective of this review, those of little contribution to the topic, and those in which it would be difficult to infer user perceptions of chatbots within education or training contexts.

3.5 Data extraction

Data were extracted manually using the completed template shown in Table 1. This gave the reviewer direct control over the collection of specific data and information meeting the precise needs of the research questions.

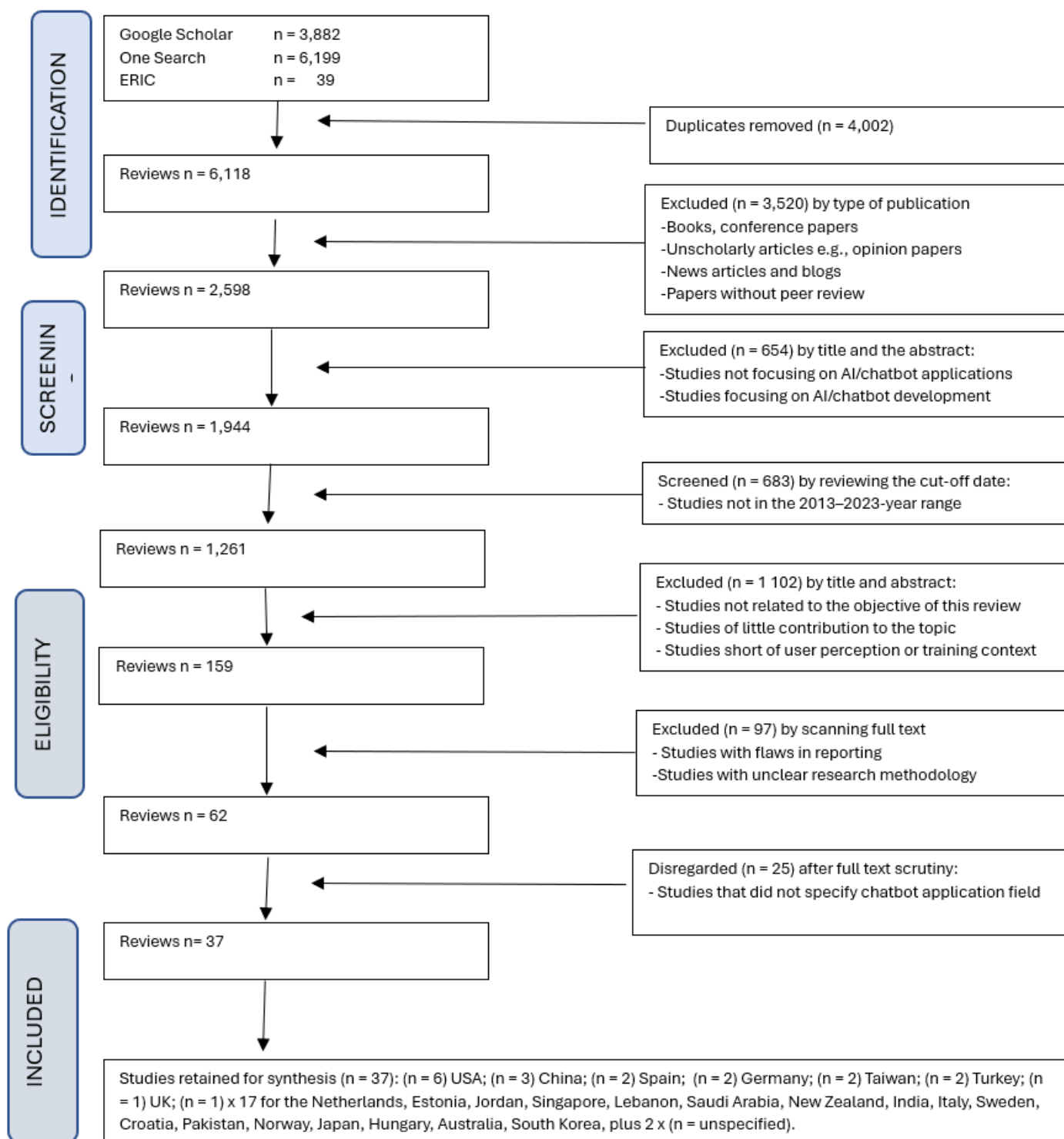
3.6 Data analysis

Data from quantitative, qualitative, and mixed method studies pertaining to the topic under review were analysed and synthesised in tabular form, enabling categorisation of information into themes of interest. (See Table 1 (themes of interest), Appendix A (study summaries), and Appendix B (research gaps extracted from studies).) Six themes aligned to the research questions were extracted from the studies as shown in Table 1. These were: benefits of chatbots; limitations of chatbots; factors influencing the effectiveness of chatbots; perception and extent of user perception of chatbots; methodological issues; and research gaps. These are tabulated in Table 1 where respective studies are identified by codes in square brackets [n].

4. Findings

Appendix A lists the reviewed publications, including their purpose of study, respective author(s) and country of publication, findings, and the Passey (2018) technology-enhanced area of classification they focused on. The literature review findings highlight various aspects of ChatGPT and chatbots in education. The usefulness of these technologies is well-documented, with 30 studies emphasising their role in improving engagement, collaboration, assessment, inclusivity, and personalised learning. Benefits include real-time responses, reduced teacher workload, ease of use, improved learning attitudes, and content creation. However, 30 papers also discuss limitations such as misinformation, plagiarism, ethical fears, cybersecurity risks, and limited interactivity. Challenges include over-reliance, privacy issues, and bias. Factors influencing chatbot effectiveness, identified in 20 of the studies, include accuracy, engagement, speed, trustworthiness, teacher knowledge, and perceived benefits. User acceptance, appearing in seven papers, is influenced by contextual use, response quality, prior knowledge, and learning goals. Methodological approaches vary, with 37 studies proposing future research on longitudinal studies, ethics, policies, and integrating chatbots with teaching methods. Sampling issues were noted, with 22 studies including students. Future research suggests optimising chatbot use,

Figure 1. Search strategy: PRISMA format used



merging GenAI with other technologies, and developing chatbot-driven teaching philosophies. The findings emphasise the potential of chatbots while acknowledging critical challenges that require further investigation and refinement.

4.1 Perceptions and extent of user acceptance of chatbots and ChatGPT

The reviewed papers offer insight into the use and perceptions of chatbots in education. They show gaps in the literature due to scant empirical research on student perceptions of ChatGPT and AI in business courses. The study incidentally observed methodological inconsistencies while identifying key themes in existing studies such as the limited focus on student perceptions in business studies. These are critically discussed as follows.

4.2 Scant research on student perceptions in education

The studies explored reveal a marked deficiency in research focused on student perceptions of chatbots in the broader educational context. This gap is notable given the increasing integration of GenAI tools in education worldwide. Understanding student attitudes and experiences with these tools is essential for informed implementation. These explored studies do not exhibit focused research on the student perceptions of chatbots in the generality of education, particularly those targeted at business studies students. Although the reviewed papers address various aspects of chatbot use, they appear fragmented and fail to comprehensively explore students' perspectives in the general field of education.

There is a notable absence of research within specific educational sectors, such as business studies in further education. This is disproportionately reflected within the United Kingdom. After scrutinising the studies, the researcher could neither locate any on the perceptions of UK business studies students, nor were there studies within the United Kingdom's further education sector. Business education is an interdisciplinary and practical field. It stands to benefit significantly from GenAI integration. However, studies in this domain are virtually absent. This gap underscores the need for targeted research. Such research should address the requirements and perspectives of business studies students regarding chatbots. This is an area that could yield insights into discipline-specific advantages and challenges.

One of the most glaring deficiencies in the literature is the limited focus of studies on ChatGPT (Sallam, 2023). The chatbot represents a recent innovation in GenAI. Moreso, on student perceptions of ChatGPT, the most recent, disruptive innovation is a conspicuous void within the current body of literature. ChatGPT and its sophisticated natural language capabilities and applicability across various learning domains could shift educational practices. Yet, student perceptions of ChatGPT remain understudied, particularly within the context of Western education systems, contrasting with studies conducted in Japan that have evaluated chatbots' effectiveness in language learning. The absence of specific studies investigating business studies students' perceptions of ChatGPT implies an important gap in understanding how students perceive and engage with this advanced tool in the United Kingdom. Its high level of adaptability and conversational depth are attributes that could improve personalised learning. Nevertheless, without focused research, there is limited empirical knowledge of its acceptance, usability, and overall impact on student learning outcomes.

Table 1. Identifiable themes of interest from the papers (both explicit and implied themes)

Theme	Sub-theme	Amount of papers	Respective paper codes (See Appendix A)
Efficacy of chatbots and ChatGPT Role, benefits, and positive impact	Engagement; collaboration; student assessment; inclusivity; personalised learning; user satisfaction; real time responses; access to information; reduced teacher load; ease of use; enhanced achievement; applicability; enhanced management; course satisfaction; time savings; automated scoring; teaching assistants; content creation; decision support; facilitating communication; research assistance; language translation; case generation; flexibility and supporting multiple devices; improved student learning attitude; motivation of students; essay writing; and improved vocabulary.	30	(8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37)

Table 1. (cont.) Identifiable themes of interest from the papers (both explicit and implied themes)

Theme	Sub-theme	Amount of papers	Respective paper codes (See Appendix A)
Limitations of chatbots and ChatGPT Challenges, drawbacks, and concerns	Misinformation; plagiarism; harmful content; ethics; legal issues; less interactivity; no direct remote collaboration; overreliance on technology; privacy concerns; safety issues; limited understanding; inaccurate responses; difficulties in assessing the quality of responses; bias; discrimination; negative effect on higher order cognitive ability; copyright issues; inaccurate information; cybersecurity issues; lack of teacher knowledge; impersonal; and lack of curriculum design.	30	(8) (9) (10) (11) (12) (13)) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37)
Factors influencing effectiveness of chatbots and ChatGPT (Also partly deduced by inference from papers)	Accuracy; inclusivity; versatility; engagement; speed of response; quality of response; ease of use; inclusivity; personalisation; interactivity; interpersonal collaboration; direct remote collaboration; performance; applicability; trustworthy; functionality; teacher knowledge; perceived benefits; training; and popularity.	20	(1) (3) (8) (9) (11) (12)) (13) (14) (15) (17) (20) (22) (23) (25) (27) (29) (32) (33) (35) (36)
Perception and extent of user acceptance of chatbots and ChatGPT (Also partly deduced by inference from papers)	Context use, quality of responses produced, learners' previous knowledge, and learning goals.	7	(4) (11) (12) (13) (16) (20) (25)
Methodological approaches and reviews	Quantitative methods Qualitative methods Mixed methods Systematic literature reviews Scoping literature reviews Narrative literature reviews. Unspecified/unclear/difficult to tell	9 8 4 6 2 1 7	(6) (7) (11) (20) (23) (25) (28) (29) (35) (3) (5) (8) (10) (13) (14) (32) (34) (4) (12) (16) (21) (19) (26) (27) (31) (36) (37) (30) (33) (24) (1) (2) (9) (15) (17) (18) (22)
Sampling-sample size expansion; sample size diversity	Sample includes students.	22	(6) (11) (12) (13) (15) (20)) (21) (25) (28) (34) (35)
Prospective investigations	Incorporate longitudinal studies; training; ethics; policies; prevention of cheating; <i>user perception of chatbots</i> ; research using robust samples; optimisation of chatbots use; merging ChatGPT with other technologies; integration of chatbots in current teaching methods; chatbot accuracy levels; develop new chatbot driven teaching philosophy; chatbot versus learning objective assessment; interdisciplinary curriculum.	37	ALL PAPERS SUGGEST FUTURE RESEARCH (Summarised in Appendices A and B)

4.3 Factors influencing the effectiveness of ChatGPT according to students

The researcher could not locate studies that specifically examine the factors influencing the effectiveness of chatbots and ChatGPT in education. However, this review infers these from the literature discussing such factors as accuracy, inclusivity, versatility, engagement, speed, quality, ease of use, personalisation, interactivity, collaboration, and teacher familiarity. While no research explicitly explores these factors about chatbots in education, their importance can be deduced from studies exploring other aspects of educational technology. For instance, accuracy and quality are identified in broader AI research as foundational for fostering trust and reliability in educational tools (Barret, 2019; Gregorcic, 2023; Chen et al., 2022). However, inconsistencies in response quality noted in various studies indicate potential reliability issues for chatbot implementation. In addition, inclusivity and ease of use are essential for student engagement, especially for different learning needs, yet no study specifically investigates whether chatbots can consistently meet these accessibility requirements across student populations. Moreover, personalisation and interactivity are acknowledged benefits in studies on technology-enhanced learning. Chatbots could support tailored learning experiences; however, achieving interactivity demands advanced programming and substantial resources, which few studies directly assess in the context of educational chatbots. Furthermore, collaboration and trustworthiness, highlighted in studies of online learning tools, appear crucial for chatbots to support group learning. This ensures data privacy, but specific evaluations of chatbots in this area are lacking (Khan et al., 2023; Lundi et al., 2023; Rudolph, 2023; Sallam, 2023; Sinha, 2023; Tlili et al., 2023). Similarly, while teachers' knowledge and training are known to impact technology use in classrooms, research specifically linking this to chatbots is sparse. The literature frequently recommends further research, yet current studies provide only indirect insights, leaving empirical gaps on how these factors, either individually or collectively, impact chatbot efficacy. A direct, focused approach is essential to validate each of these inferred factors, addressing the educational potential and challenges of chatbots more comprehensively.

4.4 Limited integration of AI concepts in literature

The reviewed literature indicates a deficiency in not taking forward the directions for most of the suggested opportunities for further research. Integrative reviews that consolidate older AI concepts with recent innovations, such as ChatGPT, could offer valuable new perspectives in technology-enhanced learning, yet no such studies were

located. The literature's failure to interweave foundational and emergent GenAI technologies limits its contribution to an all-encompassing understanding of chatbot potential in education. An integrative approach that combines classic AI principles with advanced models like ChatGPT could yield innovative applications tailored to different educational needs. This could improve collaborative learning, language acquisition, and self-directed learning. Most of the studies examined concluded with unanimous acknowledgement of the need to conduct 'further research' without advancing substantive knowledge on educational outcomes.

4.5 Methodological inconsistencies in the literature

Severe methodological inconsistencies characterised the reviewed studies, undermining the reliability and generalisability of findings, with sample sizes varying from 26 to 330 students. While certain studies used appropriately designed methodologies, the variance in sample composition, such as in Hew et al. (2023), poses questions about internal validity. Their study presented inconsistent gender representation across its samples, introducing a potential source of bias that complicates the interpretation of the results. In the first instance, twenty-six females and three males participated, followed by twenty-nine females and nine males in the succeeding instance. This inconsistency raises concerns about whether the sample truly reflects the study's population, particularly when extrapolated to broader educational settings like those in the United Kingdom, where gender distributions may differ significantly. Such skewed sample compositions weaken the applicability of the findings across varied educational demographics. This further diminishes the studies' contribution to understanding chatbot efficacy in different contexts. The narrow focus on specific online courses in the study by Hew et al. (2023) also limits its relevance, as student experiences and perceptions of chatbots may vary considerably across different academic disciplines.

4.6 Reliance on literature reviews without new empirical data

Approximately 24% of the reviewed articles were literature reviews. This limits the depth of empirical understanding in the field. Slightly above twenty-four percent of the articles were other literature reviews that synthesised existing research without contributing fresh empirical insights. This reliance on secondary data introduces potential publication bias, as selective inclusion of studies can skew interpretations and result in an incomplete picture of chatbot efficacy and perception. Although literature reviews are valuable for summarising trends and gaps, they cannot replace empirical studies that collect and analyse new data

directly from student populations. The over-reliance on secondary sources and synthesis rather than new investigation reflects a deficiency in the body of literature. This limits the development of grounded knowledge on the topic, especially within the context of emerging technologies like ChatGPT.

4.7 Fragmented and isolated studies leading to limited generalisability

The studies reviewed largely consisted of isolated, small-scale research efforts conducted in varied contexts, leading to concerns regarding generalisability. The existing literature were a collection of small-scale isolated studies from which scholars might be expected to make generalisations out of the varied contexts. Such fragmented research provides limited insights into broader patterns, making it challenging to derive reliable conclusions that could inform GenAI adoption policies across educational sectors. While these small-scale studies offered preliminary findings, they lack the coherence necessary to support substantial generalisations. The challenge with piecing together knowledge from these isolated studies is compounded by the variation in educational, cultural, and institutional contexts across the studies. It would be imprudent for academia to embrace broad generalisations from such uncoordinated small-scale studies, as these findings may not reflect the reality for a larger, more diverse student population. The literature's scattered nature underscores the importance of coordinated, large-scale studies with consistent methodologies to provide a solid foundation for evidence-based integration of chatbots and GenAI tools like ChatGPT in educational settings.

To sum up, the findings reveal critical gaps and inconsistencies in the current literature regarding student perceptions of chatbots, specifically ChatGPT in education. While the reviewed studies recognise the significance of chatbot technology, a considerable deficiency in scope and empirical rigour still exists. The absence of research on business studies students' perceptions, and an overreliance on literature reviews, highlights the need for targeted, empirical research. Such research should reflect the diversity of academic disciplines and educational contexts. The fragmented and inconsistent nature of methodologies from the different specialties limits the capacity to produce actionable insights for educators and policymakers. Future TEL research must address these deficiencies by undertaking integrated, large-scale studies. These should explore ChatGPT and similar AI innovations across different educational contexts. The studies should pay attention to representative sample compositions and balanced gender representation. When

this is done, the educational sector can better understand and leverage the potential of ChatGPT and other AI chatbots to improve student learning outcomes and experiences in business studies and other courses.

5. Discussion

This integrative literature review adds to the technology-enhanced learning (TEL) field as it addresses a significant knowledge gap regarding student perceptions of ChatGPT in further education. This contribution applies specifically to the context of UK business studies but needs to be verified through empirical studies. Although existing research emphasises the benefits (Ibijola, 2021) and limitations (Jiahong et al., 2023) of chatbots and AI in various fields, few studies specifically consider students' views on the effectiveness and impact of these tools on their learning outcomes. This represents a critical gap, as understanding student perspectives on chatbot effectiveness is essential for meaningful and learner-centred integration of AI tools in educational practices, and moreso in the subject of business studies. This review, therefore, contributes to the current discourse around AI in education. It shifts the focus from technological capabilities to student experience, which is essential for fostering adoption and engagement with GenAI tools in educational settings.

By focusing on students' perspectives, this paper highlights an overlooked area in TEL research - that is, the user experience of the learners themselves, especially within specific courses. Business studies students in UK further education represent a unique group. They have specific academic and professional aspirations that may influence their views on the relevance and effectiveness of ChatGPT as a learning aid. Their perspectives provide a foundational understanding, which can inform both pedagogical strategies and the development of GenAI tools tailored to meet the needs of students in an applied and practical field such as business education. This tailored insight contributes not only to the discipline of business studies, but it also serves as one of the preliminary studies of how AI tools can be effectively integrated across different educational contexts. It highlights both their strengths and limitations. Moreover, this study contributes to a detailed understanding of the ethical concerns and potential risks regarding ChatGPT's use in education. A notable part of the literature reviewed highlights concerns around academic honesty, data privacy, and student overdependency on AI tools. This review confirms the essence of regulatory and ethical factors that educational

institutions and policymakers need to consider. These findings are particularly relevant to the UK's educational landscape, which has unique regulatory frameworks and cultural expectations regarding academic integrity. The review thus provides a crucial starting point for discussions on how to implement ChatGPT and similar GenAI tools responsibly, ensuring they are used to complement rather than replace traditional learning and critical thinking skills.

In addition, this study's insight is practical for TEL researchers, AI developers, and policymakers. It offers an awareness of the specific expectations and challenges students encounter with ChatGPT in academic settings. Understanding students' real-world interactions and attitudes towards AI in their learning provides invaluable feedback for developers such as OpenAI. This enables them to refine chatbot functionalities to better serve educational contexts, especially for individual courses such as business studies. Insights from this review could guide developers to address critical student needs, such as improving ChatGPT's accuracy, interactivity, and contextual adaptability in academic applications. The review underscores the need for more comprehensive, context-specific research on the efficacy of chatbots in TEL. This study advocates for a UK-specific approach, illustrating the significance of contextualised research, acknowledging that factors such as cultural attitudes toward AI and local educational policies can significantly influence the impact of technology on learning. This contextual focus encourages further localised studies, which could lead to developing best practices and TEL frameworks, especially those that are sensitive to regional and disciplinary differences.

By drawing parallels from other training contexts, this integrative review advances knowledge in TEL by providing a foundational understanding of how business studies students are likely to perceive ChatGPT. This offers user specific actionable insights for business educators, policymakers, and AI developers. This focus on learner-centred perspectives can contribute to the broader field of TEL research by promoting responsible, effective, and context-aware adoption of GenAI in education.

6. Conclusion

This integrative review outlined a search strategy, eventually merging studies from different fields, though these works were performed using different research methodologies and sampling techniques and sizes. Thirty-seven studies were scrutinised for themes that dominate existing research. These included the benefits and limitations of chatbots. The

review deduced and inferred factors influencing the effectiveness of chatbots and ChatGPT, and highlighted the need for studies on the perception and extent of user acceptance of chatbots and ChatGPT as a gap for future research. A research gap of interest for TEL researchers is to assess UK further education student perceptions of the significance of ChatGPT on learning experiences in business studies.

Based on the articles reviewed, scholarly consensus indicates that ChatGPT and similar GenAI technologies improve learning experiences in various educational contexts. This could include UK business studies if a parallel is to be drawn. Across disciplines, researchers have noted AI's capacity to improve accessibility, engagement, and satisfaction among students, making it a valuable tool in further education. For example, ChatGPT has been associated with increased student engagement and critical thinking skills in nursing and healthcare contexts. Here, AI and ChatGPT have been shown to help in knowledge retention and understanding. These insights imply potential benefits in business studies, where critical thinking and engagement are equally crucial for student success.

However, several studies highlight significant limitations and caution against an overreliance on AI. Research has demonstrated that ChatGPT and similar tools, while capable of handling basic academic and practical tasks, may still lack the balanced understanding required for complex learning scenarios, such as higher-order reasoning in specific disciplines like physics or pathology. Additionally, the potential for AI tools to compromise academic honesty has been noted, particularly where ChatGPT's capacity for content generation could facilitate plagiarism if not carefully managed. This concern is pertinent in teaching business studies, where originality in analysis and strategic thinking are key to learning outcomes.

Financial accessibility and technical limitations also emerged as recurrent themes, limiting the ability of institutions and individuals to fully leverage AI technologies. In healthcare and higher education, there was a clear emphasis on ethical issues, the need for guidelines, and training to ensure that AI tools are used responsibly and effectively. Studies recommend integrating structured training and ethical guidelines to address students' misconceptions and instructors' concerns about the technology's role in learning and assessment. This aligns well with the needs of UK further education students, who may benefit from structured guidance in responsibly using ChatGPT as a supportive learning resource in business studies.

Sample size limitations across studies signal an important area of caution. Due to restricted participant diversity and sample representativeness, findings about AI's effectiveness prove difficult to generalise across the scrutinised disciplines. The small, homogeneous samples limited to specific fields, such as healthcare or regional contexts, suggest that more research is needed within the business studies field in the UK to capture the full range of student perceptions and experiences.

By drawing parallels from the examined works, the literature indicates that ChatGPT can improve the learning experiences of UK business studies students through engagement, accessibility, and satisfaction. However, limitations in GenAI's capabilities for detailed reasoning, combined with ethical issues and accessibility, suggest a prerequisite for careful integration, continuous monitoring, and setting clear guidelines in the educational environment. Future studies should aim to expand sample sizes and diversify participant backgrounds to ensure findings apply to a broader student base. This will provide a clearer picture of ChatGPT's role in improving the educational experience in business studies. Research on GenAI chatbots in business studies education should explore their role in improving teaching methods, student engagement, and learning outcomes. Studies should assess their effectiveness in business simulations, case study analysis, and decision-making exercises. Subsequent studies should also examine ethical concerns, such as academic integrity, data privacy, and responsible AI usage in business education.

More investigations should focus on integrating AI chatbots into business curricula. These should evaluate their impact on critical thinking, problem-solving, and entrepreneurial skills. Studies should explore how education institutions can prepare students for AI-driven workplaces by promoting digital literacy and GenAI adaptability. Research should also assess AI chatbots' potential in mentoring business students, supporting self-regulated learning, and personalising education through adaptive learning technologies. Future studies should examine the localisation of chatbots for different business education contexts, their usability in online and hybrid learning environments, and their role in promoting teamwork. Investigations should also address chatbot-assisted assessments, GenAI-driven feedback mechanisms, and their influence on student motivation and performance. Collaboration between academia and industry is crucial to the development of GenAI-driven business education models that align with workforce demands, ensuring that students gain practical, future-ready skills in an AI-supported business context.

6.1 Limitations

This integrative literature review was subject to several constraints. One of these was time, as the research scope required a broad and deep analysis of existing literature. With limited time, it was challenging to examine all potential sources in detail, which may have compromised the intended thoroughness of the review. The sample size of papers examined, and the accessibility of similarly relevant articles further restricted the study. Limited access to certain databases and journals meant the researcher had to work with a smaller and potentially less varied sample of articles, which may have affected the generalisability of the findings and the ability to capture a comprehensive perspective on the topic.

Financial constraints also played a role, as some databases and articles required subscriptions or paper purchase fees beyond the researcher's budget. This limited the range of studies that could be included. To address these constraints, the researcher implemented a targeted search strategy using carefully chosen keywords to maximise the relevance and number of accessible articles within the given timeframe. Open-access resources were prioritised, and in cases where full texts were inaccessible, abstracts or summaries were used to extract basic insights. While these constraints inevitably shaped the study's breadth and specificity, these strategies aimed to maintain rigour and relevance, acknowledging the limitations of scope and resources inherent to this project.

References

- Barrett, M., Branson, L., Carter, S., DeLeon, F., Ellis, J., Gundlach, C., & Lee, D. (2019). Using artificial intelligence to enhance educational opportunities and student services in higher education. *Inquiry: The Journal of the Virginia Community Colleges*, 22(1). <https://commons.vccs.edu/inquiry/vol22/iss1/11>
- Bollen, J., Eva, A. M., van Dis, R., van Rooij, W., Zuidema, W., & Bockting, C. L. (2023). ChatGPT: Five priorities for research. *Nature*, 614(7947), 224–226. <https://doi.org/10.1038/d41586-023-00288-7>
- Broughman, D., & Haar, J. (2018). Smart technology, artificial intelligence, robotics, and algorithms (STARA): Employees' perceptions of our future workplace. *Journal of Management & Organisation*, 24(2), 239–257. <https://doi.org/10.1017/jmo.2016.55>

- Cascella, M., Montomoli, J., Bellini, V., & Bignami, E. (2023). Evaluating the feasibility of ChatGPT in healthcare: An analysis of multiple clinical and research scenarios. *Journal of Medical Systems*, 47(1), 33. <https://doi.org/10.1007/s10916-023-01925-4>
- Chang, C.-Y., Kuo, S.-Y., & Hwang, G.-H. (2022). Chatbot-facilitated nursing education: Incorporating a knowledge-based chatbot system into a nursing training program. *Educational Technology & Society*, 25(1), 15–27.
- Chaoning, Z., Chenshuang, Z., Sheng, Z., Qiao, Y., Chenghao, L., Mengchun, Z., Sumit, K. D., Thwal, C. M., Ye, L. T., Le, L. H., Donguk, K., Sung, H. B., Lik, H. L., Yang, Y., Heng, T. S., Kweon, I. S., & Hong, C. S. (2022). A complete survey on generative AI (AIGC): Is ChatGPT from GPT-4 to GPT-5 all you need? *Computer Science: Artificial Intelligence*, 1(1), 56 pages. <https://doi.org/10.48550/arXiv.2303.11717>
- Chen, H., Chan-Olmsted, S., Kim, J., & Sanabria, I. M. (2022). Consumers' perception on artificial intelligence applications in marketing communication. *Qualitative Market Research: An International Journal*, 25(1), 125–142. <https://doi.org/10.1108/QMR-03-2021-0040>
- Chen, J., Guo, F., Ren, Z., Wang, X., & Ham, J. (2023). Human-chatbot interaction studies through the lens of bibliometric analysis. *Universal Access in the Information Society. Advance online publication*. <https://doi.org/10.1007/s10209-023-01058-y>
- Clarke, V., & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology*, 12(3), 297–298. <https://doi.org/10.1080/17439760.2016.1262613>
- Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*. <https://doi.org/10.1080/14703297.2023.2190148>
- Doshi, R. H., Bajaj, S. S., & Krumholz, H. M. (2023). ChatGPT: Temptations of progress. *The American Journal of Bioethics*, 23(4), 6–8. <https://doi.org/10.1080/15265161.2023.2180110>
- Dempere, J., Modugu, K., Allam, H., Lakshmana, K., & Ramasamy, K. (2023). The impact of ChatGPT on higher education. *Frontiers in Education*. <https://doi.org/10.3389/educ.2023.1206936>
- Durak, H. Y. (2022). Conversational agent-based guidance: Examining the effect of chatbot usage frequency and satisfaction on visual design self-efficacy, engagement, satisfaction, and learner autonomy. *Education and Information Technologies*, 28, 471–488. <https://doi.org/10.1007/s10639-022-11149-7>
- Gallacher, A., Thompson, A., & Howarth, M. (2018). “My robot is an idiot!” – Students’ perceptions of AI in the L2 classroom. In P. Taalas, J. Jalkanen, L. Bradley, & S. Thouësny (Eds.), *Future-proof CALL: Language learning as exploration and encounters – Short papers from EUROCALL 2018* (pp. 70–76). Research-publishing.net. <https://doi.org/10.14705/rpnet.2018.26.815>
- Gonzalez, C. R., Padilla, C. R., Roman, P., & Sanchez-Labraca, N. S. (2022). Experiences and perceptions of final-year nursing students of using a chatbot in a simulated emergency: A qualitative study. *Journal of Nursing Management*. <https://doi.org/10.1111/jonm.13630>
- Gregorcic, B., & Pendrill, A. M. (2023). ChatGPT and the frustrated Socrates. *Physics Education*, 58(3), 035021. <https://doi.org/10.1088/1361-6552/acc299>
- Harrer, S. (2023). Attention is not all you need: The complicated case of ethically using large language models in healthcare and medicine. *EBioMedicine*, 90, 104512. <https://doi.org/10.1016/j.ebiom.2023.104512>
- Haug, C. J., M.D., & Drazen, M. J. (2023). Artificial intelligence and machine learning in clinical medicine. *New England Journal of Medicine*, 388, 12018. <https://doi.org/10.1056/NEJMra2302038>
- Hew, K. E., Huang, W., Du, J., & Chengyuan, J. (2023). Using chatbots to support student goal setting and social presence in fully online activities: Learner engagement and perceptions. *Journal of Computing in Higher Education*, 35, 40–68. <https://doi.org/10.1007/s12528-022-09338-x>
- Homolak, J. (2023). Opportunities and risks of ChatGPT in medicine, science, and academic publishing: A modern Promethean dilemma. *Croatian Medical Journal*, 64, 1–3.
- Khan, R. A., Jawaid, M., Khan, A. R., & Sajjad, M. (2023). ChatGPT - Reshaping medical education and clinical management. *Pakistan Journal of Medical Sciences*, 39(2), 605–607. <https://doi.org/10.12669/pjms.39.2.7653>

- Kuhai, M. A., Alturki, N., Alramlawi, S., & Alhejori, K. (2023). Interacting with educational chatbots: A systematic review. *Education and Information Technologies*, 28, 973–1018. <https://doi.org/10.1007/s10639-022-11177-3>
- Labadze, L., Grigolia, M., & Machaidze, L. (2023). Role of AI chatbots in education: Systematic literature review. *International Journal of Educational Technology in Higher Education*, 20(56). <https://doi.org/10.1186/s41239-023-00426-1>
- Lee, Y.-F., Hwang, G.-J., & Chen, P.-Y. (2022). Impacts of an AI-based chatbot on college students' after-class review, academic performance, self-efficacy, learning attitude, and motivation. *Educational Technology Research and Development*, 70, 1843–1865. <https://doi.org/10.1007/s11423-022-10142-8>
- Leoste, J., Õun, T., Loogma, K., & San Martín López, J. (2021). Designing training programs to introduce emerging technologies to future workers-A pilot study based on the example of artificial intelligence-enhanced robotics. *Mathematics*, 9(22), 2876. <https://doi.org/10.3390/math9222876>
- Lund, B. D., Wang, T., Mannuru, R. N., Nie, B., Shimray, S., & Wang, Z. (2023). ChatGPT and a new academic reality: Artificial intelligence-written research papers and the ethics of large language models in scholarly publishing. *Association for Information Science and Technology*, 74, 570–581. <https://doi.org/10.1002/asi.24750>
- Michalski, R. S., Carbonell, J. G., & Mitchell, T. M. (Eds.). (2013). *Machine learning: An artificial intelligence approach*. Springer Science & Business Media.
- Mohammadreza, F., Banihashem, S. K., Noroozi, O., & Wals, A. (2023). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations in Education and Teaching International*. <https://doi.org/10.1080/14703297.2023.2195846>
- Molnár, G., & Szűts, Z. (2018). The role of chatbots in formal education. In *SISY 2018 IEEE 16th International Symposium on Intelligent Systems and Informatics* (pp. 1-6). IEEE.
- Nouraldeem, R. M. (2022). The impact of technology readiness and use perceptions on students' adoption of artificial intelligence: The moderating role of gender. *Development and Learning in Organisations: An International Journal*, Emerald Publishing Limited, 1-9. <https://doi.org/10.1108/DLO-07-2022-0133>
- Okonkwo, C. W., & Ade, A. A. (2021). Chatbots applications in education: A systematic review. *Computers and Education: Artificial Intelligence*, 2, 100033. <https://www.sciencedirect.com/journal/computers-and-education-artificial-intelligence>
- Passey, D. (2018). Technology enhanced learning: Rethinking the term, the concept, and its theoretical background. *British Journal of Educational Technology*, 50(3), 977–986. <https://doi.org/10.1111/bjet.12708>
- Pérez, J. Q., Daradoumis, T., Manuel, J., & Marquès Puig, M. (2020). Rediscovering the use of chatbots in education: A systematic literature review. *Computer Applications in Engineering Education*, 28, 1549–1565. <https://doi.org/10.1002/cae.22326>
- Ryan, G. W., & Bernard, H. R. (2003). Techniques to identify themes. *Field Methods*, 15(1), 85–109. <https://doi.org/10.1177/1525822X02239569>
- Qasem, M., Ghaleb, M., Mahdi, H. S., Khateeb, A. A., & Fadda, H. A. (2023). Dialog chatbot as an interactive online tool in enhancing ESP vocabulary learning. *Saudi Journal of Language Studies*. Emerald Publishing Limited. <https://doi.org/10.1108/SJLS-10-2022-0072>
- Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning & Teaching*, 6(1). <https://doi.org/10.37074/jalt.2023.6.1.9>
- Sadeghi, S. C. (2023). Artificial intelligence in technology-enhanced assessment: A survey of machine learning. *Journal of Educational Technology Systems*, 51(3), 372–386. <https://doi.org/10.1177/00472395221138791>
- Saini, M., & Shlonsky, A. (2012). *Systematic synthesis of qualitative research*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195387216.001.0001>
- Sallam, M. (2023). ChatGPT utility in healthcare education, research, and practice: Systematic review on the promising perspectives and valid concerns. *Healthcare*, 11(6), 887. <https://doi.org/10.3390/healthcare11060887>

- Sallam, M. (2023). The utility of ChatGPT as an example of large language models in healthcare education, research, and practice: Systematic review on the future perspectives and potential limitations. *MedRxiv*, 2023-02. <http://dx.doi.org/10.1101/2023.02.19.23286155>
- Sheikh, I., & Price, L. (2023, January 30). University responds to emergence of ChatGPT in education. *The Observer (MLA 9th Edition) UWIRE Text*, p. 1. <https://ndsmcobserver.com/2023/01/university-responds-to-emergence-of-chatgpt-in-education>
- Sinha, R. K., Deb Roy, A., Kumar, N., et al. (2023, February 20). Applicability of ChatGPT in assisting to solve higher order problems in pathology. *Cureus*, 15(2), e35237. <https://doi.org/10.7759/cureus.35237>
- Su, J., Ng, D. T., & Chu, S. K. W. (2023). Artificial intelligence (AI) literacy in early childhood education: The challenges and opportunities. *Computers and Education: Artificial Intelligence*, 4, 100124. <https://doi.org/10.1016/j.caeai.2023.100124>
- Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*. <https://doi.org/10.1186/s40561-023-00237-x>
- Topal, A. D., Eren, C. D., & Geçer, A. K. (2021). Chatbot application in a 5th grade science course. *Education and Information Technologies*, 26, 6241–6265. <https://doi.org/10.1007/s10639-021-10627-8>
- Toraco, R. J. (2016). Writing integrative literature reviews: Using the past and present to explore the future. *Human Resource Development Review*, 15(4), 404–428. <https://doi.org/10.1177/1534484316671606>
- Wollny, S., Schneider, J., Di Mitri, D., Weidlich, J., Rittberger, M., & Drachsler, H. (2021). Are we there yet? A systematic literature review on chatbots in education. *Frontiers in Artificial Intelligence*, 4, 654924. <https://doi.org/10.3389/frai.2021.654924>
- Zou, L., Wang, Q., & Zhao, P. (2019). A preliminary study on the application of artificial intelligence technology in meteorological education and training. In *Proceedings of WI '19: IEEE/WIC/ACM International Conference on Web Intelligence (WI '19 Companion)*.



About the author

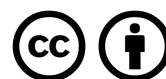
Oga is a dedicated lecturer currently teaching in the United Kingdom. He has extensive experience in education and training, having taught high school, college, and undergraduate courses in Zimbabwe in business, marketing, economics, accounting, and commerce. Passionate about education, he is committed to improving the learning experience through innovative teaching methods. His research interests are integrating generative artificial intelligence to improve the quality of learning and training. With a deep understanding of traditional and emerging educational strategies, Oga strives to equip students with the knowledge and skills needed for success in a rapidly changing world.

✉ o.chapwanya@lancaster.ac.uk

ORCID [0009-0009-5029-9892](https://orcid.org/0009-0009-5029-9892)

Open Access (CC BY 4.0)

© 2020 The Authors. This article is distributed under Creative Commons Attribution 4.0 International licence.



You are free to

- Share — copy and redistribute the material in any medium or format
- Adapt — remix, transform, and build upon the material for any purpose, even commercially.

Under the following terms:

- Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.

The full licence conditions are available at: <https://creativecommons.org/licenses/by/4.0/>

Appendix A: Summary of publications, country, and key findings

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Barrett, M. [1]	United States	Education	To explore the potential benefits of using Artificial Intelligence (AI) in higher education, specifically in student affairs, and to discuss future implications for AI in education.	Not specified	Not specified	Not specified	Artificial Intelligence (AI) has the potential to improve the student experience by aiding in enrolment, sending reminders, providing course information, assisting institutions in planning and communication, and aiding in instruction through notetaking.	TEME
Bollen, J. [2]	United States	Research	To examine how ChatGPT affects the practices of researchers.	Not specified	Not specified	Not specified	ChatGPT can be used by scholars for many tasks and is expected to handle more complex tasks like designing experiments and supporting editorial decisions.	TEL
Gregorcic [3]	Sweden	Education (Physics)	To converse with ChatGPT and evaluate its reliability in answering a basic physics question.	Case Study involving Socratic dialogue with ChatGPT to resolve errors and contradictions in its responses	Not specified. One Chatbot and three researchers.	Two researchers and one Chatbot, ChatGPT	ChatGPT is currently unreliable as a physics tutor nor as a tool for cheating physics students, but its incorrect responses can be used by physics teachers to train themselves in assessing student responses.	TEL
Broughman, D. [4]	New Zealand	Management	To create a new measure called "STARA awareness" that assesses the extent to which workers perceive their job to be at risk of replacement by AI technology.	Mixed methods	One hundred and twenty employees	One hundred and twenty employees, two researchers, and unspecified research assistants	Greater STARA awareness among workers was connected to negative results such as lower organisational commitment and career satisfaction, and higher turnover intentions, cynicism, and depression.	TEME

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Casella, M. [5]	Italy	Healthcare	To explore the potential applications and limitations of ChatGPT in healthcare.	Qualitative open-ended dialogue with ChatGPT	Not specified. One Chatbot and	Four researchers and one Chatbot, ChatGPT	Promoting education on the correct application and drawbacks of AI-based LLMs in healthcare is crucial.	TEL
Chang et al. [6]	Taiwan	Education (Nursing)	To explore the application mode and effectiveness of chatbot technologies in nursing education.	Quasi-experimental study of two classes of nursing students	Thirty-two student nurses from two classes.	Thirty university students and three researchers	The knowledge-based chatbot system improved the academic achievement, critical thinking skills, and satisfaction with learning among the students.	TEL
Chaoning et al. [7]	South Korea	Education	To examine the current range of Artificial Intelligence Generated Content (AIGC) tasks, techniques, and applications, and to investigate how future ChatGPT models may integrate various AIGC tasks to create diverse types of content.	Quantitative survey of AIGC	Not specified	Seventeen researchers and two versions of ChatGPT	Current AI relies on neural network design, self-supervised pretraining, and generative modeling methods, and future ChatGPT models could unify all AI-generated content tasks.	TEL
Chen et al. [8]	Unites States	Commercial Marketing Communi- cations	To investigate customers perceptions of artificial intelligence (AI) and marketing communication related to AI.	Qualitative interviews	Twenty-two commercial customers	Twenty-two commercial customers and four researchers	Customers perceive AI differently, compare it with humans, find voice-assisted AI as functional although they have privacy concerns, and see AI marketing communications as inevitable though it has minimal impact on their product evaluation and buying behaviour.	TEME

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Cotton et al. [9]	United Kingdom	Higher education	To explore the advantages and disadvantages of using ChatGPT in higher education.	Not specified	Not applicable	Three researchers and ChatGPT	ChatGPT increases student engagement, collaboration, and accessibility, but may compromise academic honesty and plagiarism.	TEME TEL
Doshi, R.H. et al. [10]	United States	Medical Research	To examine the potential impact of ChatGPT on medical research and medicine.	Qualitative open-ended dialogue with ChatGPT	Not applicable	Three researchers and ChatGPT	ChatGPT has the potential to revolutionise medicine, but experts warn against careless overreliance on technology without careful regard for its ethical and societal implications.	TEL
Durak, H.Y. [11]	Turkey	Higher Education	To explore the impact of chatbot technology as a guidance tool in educational settings on visual design self-efficacy, engagement, satisfaction, and learner autonomy.	Quantitative	Eighty-six university students	Eighty-six university students and one researcher	A positive relationship exists between higher levels of satisfaction and the use of chatbots giving an increased sense of visual design self-efficacy. Satisfaction with chatbot usage positively impacts certain aspects of course satisfaction and engagement.	TEL
Gallacher et al. [12]	Japan	Higher Education (English)	To explore how Japanese university students perceive the use of chatbots as a tool for learning the English language.	Mixed methods	Two hundred and fifty-three university students	Two hundred and fifty-three university students, a chatbot, and three researchers	Students perceive a chatbot as a new and interesting tool for learning instead of as a valuable language-learning resource. Students regard the chatbot as less interactive compared to collaborations with their peers.	TEL

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Gonzalez et al. [13]	Spain	Healthcare Training (Nursing Manage- ment)	To investigate the ac- ceptability and feasibility of using a chatbot for clinical decision-making and patient safety, as perceived by final-year nursing students.	Qualitative	One hun- dred and fourteen student nurses	One hundred and fourteen students and six researchers	Students perceive that SafeBot, a chatbot for clinical decision-mak- ing and patient safety, is accept- able and feasible but it needs improvement to enhance nursing management.	TEME TEL
Harrer, S. [14]	Australia	Medicine and healthcare	To explore how AI can revolutionise data man- agement workflows in the fields of healthcare and medicine.	Qualitative	Not specified	Not applicable	Scientists can responsibly develop efficient and trustworthy AI tools that can transform data manage- ment workflows in healthcare and medicine, but they need to put measures to prevent misinforma- tion or harmful content due to irresponsible design.	TEME
Haug, C. J. [15]	Norway	Healthcare Training	To examine the role of AI in Clinical Medicine Training.	Not specified	Not specified	Two researchers	Use of AI in healthcare enhances the quality of care. allowing care workers to be effective with the technology, while sparing time for human-to-human interactions that make medicine a fulfilling profession.	TEME
Hew Khe Foon [16]	China	Higher Education	To explore the use of chatbots in supporting student goal setting and social presence in online learning.	Mixed (IM- PLIED)	Twen- ty-nine online postgrad- uate students	Twenty-nine students and four researchers	Students perceived the chatbots as useful and easy to use, resulting in overall positive impact on learning experiences.	TEL

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Homolak, J. [17]	Croatia	Medical training	To examine the advantages and disadvantages of using ChatGPT in medical science and publishing.	Not specified	Not specified	One medical student as the researcher.	ChatGPT has secured a significant number of users and has the potential to revolutionise many fields.	TEME TEL
Khan, R.A. et al. [18]	Pakistan	Medical Education and Clinical Management	To examine the role of ChatGPT in medical education and clinical management.	Not specified	Not specified	Three researchers	Caution must be exercised in using ChatGPT although it can be useful in medical education in automated scoring, teaching assistance, personalised learning, research assistance, generating case scenarios, creating content for learning, language translation, as well as in clinical management by helping to manage patient data, provide decision support, and facilitate communication with patients.	TEL
Kuhail, M.A. et al. [19]	Not specified	Education	To analyse recent evidence-based chatbot-learner interaction design techniques applied in education.	Systematic review	Thirty-six empirical papers		Chatbots used in multiple fields, primarily in computer science, language, general education, and some other fields like engineering and mathematics, with most accessible via a web platform due to its flexibility in supporting multiple devices.	TEL

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Lee Y.F, et al. [20]	Taiwan	Higher Education	To explore the effectiveness of an AI-based chatbot in improving students' academic performance, self-efficacy, learning attitude, and motivation in after-class review.	Quasi experiment	Thirty-eight university students	Thirty university students and three researchers	Students' academic performance, self-efficacy, learning attitude, and motivation improved upon using chatbots in the review process of public health courses.	TEL
Leoste, J., et al. [21]	Estonia	Education (Mathematics) (Computers)	To assess the efficacy of a training program that guides learners through the various stages of the Innovation Process (IP) for an Emerging Technology (ET), using Artificial Intelligence Enhanced Robotics (AIER) as a case example.	Mixed methods-survey and quantitative content analysis	Twenty-six students	Twenty-six students and four researchers	The workshop enhanced AIER-related self-confidence and general knowledge in 78% of participants, while the training course facilitated over 50% to build practical knowledge and recognise its potential in their work contexts.	TEL
Lund, B.D., et al. [22]	USA	Education	To discuss the history, principles, and potential of ChatGPT and similar models and their impact on academia, scholarly research, and publishing.	Not specified	Not specified	Six researchers	The use of ChatGPT has the capability to automate the creation of scholarly manuscripts, like essays; but the adoption of this technology in research and scholarly publishing faces numerous ethical concerns.	TEL

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Moham- madreza, F. [23]	Nether- lands	Education	To analyse the strengths and weaknesses of ChatGPT and its implications for education.	Conceptual analysis using SWOT analysis framework	Not specified	Four researchers	Strengths: personalised, instant responses, more access to information, reduced teacher workload. Weaknesses: limited understanding; response quality assessment hurdles; bias and discrimination. Threats: context misunderstanding; discrimination perpetuation, high-order cognitive abilities fall.	TEL
Molnár Gy [24]	Hungary	Education Marketing Customer service	To explore the use of chatbots in different contexts, including educational settings, and to discuss the challenges and opportunities of programming and implementing chatbots.	Narrative literature review	Not specified	Two researchers	Chatbots have potential as educational assistants, but there are challenges in designing and implementing effective chatbots, such as the need for natural language processing, user testing, and ongoing maintenance.	TEL
Nour- aldeen, R.M. [25]	Lebanon	Accounting Education	To assess the influence of technology readiness (TR), perceived usefulness (PU), and perceived ease of use (PEOU) on adopting AI by accounting students and investigate whether gender moderates these associations.	Quantitative (Survey)	Three hundred and thirty university students	Three hundred and thirty university students and one researcher	Accounting students are likely to adopt AI if they are technology-ready and they perceive it as useful. Male students tend to adopt AI more than females. Accounting educators need to adjust curricula and provide training on AI software to prepare students for the digital workplace.	TEL

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Okonkwo, C.W. [26]	Not specified	Education	To systematically review previous research on the use of Chatbots in education, identify the benefits, and challenges related to the use of Chatbots in education.	Systematic literature review	Fifty-three articles and two researchers	Two researchers	Chatbots have many potential benefits despite their challenges if adopted in the education sector.	TEL
Perez, J. Q. [27]	Spain	Education	To systematically review the literature on educational chatbots and related issues.	Systematic literature review	Eighty papers	Three researchers	Two chatbot types: service-based and teaching-based chatbots evaluated for their effectiveness in different age groups and for language learning and received positive feedback through student questionnaires and usability analysis. They can aid students with disabilities and marginalised groups.	TEL
Qasem et al. [28]	Saudi Arabia	Higher Education	To investigate the impact of using a Dialog flow chatbot in online classrooms during COVID-19 on learning vocabulary as an effective and engaging platform for English for Specific Purposes (ESP) learners.	Quantitative (Experimental)	Twenty students per each of the two groups involved	Forty students and five researchers	The Dialogflow chatbot significantly improved ESP vocabulary learning, with the experimental group outperforming the control group.	TEL

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Rudolph, J., et al. [29]	Singapore	Higher Education	To examine the relevance of ChatGPT in higher education assessment, learning, and teaching.	Quantitative (Experiment with AI software) and Literature review	Not applicable	Three researchers	ChatGPT has impressive functionality, as well as constraints. It has implications for higher education, including opportunities and threats.	TEL
Sadeghi, S.C. [30]	Germany	Higher education	To investigate the potential uses of machine learning for intelligent assessment, and to examine how deep learning models can be employed in knowledge tracing and student modeling.	Scoping literature review (Implied)	Not applicable	One researcher	Machine learning methods have immense potential to enable personalised learning through intelligent assessment tools and deep learning models in education, but various obstacles impede the implementation of state-of-the-art machine learning methods in education.	TEL
Sallam, M. [31]		Healthcare Education	To investigate the possible efficacy and limitations of ChatGPT in health care education, research, and practice.	Systematic literature review	Sixty records and papers	One researcher	ChatGPT can be beneficial to health care education, research, and practice, but ethical, copyright, and legal issues, as well as risks of bias, plagiarism, inaccurate content, limited knowledge, and cybersecurity issues still need to be addressed.	TEL

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Sinha, R.K., et al. [32]	India	Medicine (Pathology)	To assess ChatGPT's ability to solve higher-order reasoning questions in pathology.	Cross sectional study involving dialogue with ChatGPT	One hundred higher order queries from India Institute of Medical Science	Three expert pathologists	ChatGPT has a relational level of accuracy with an overall median score of 4.08 and an average response time of 45.31 ± 7.14 seconds. It is not entirely accurate.	TEL
Su, J., et al. [33]	China	Early Childhood Education	To investigate the topics and content discussed in research papers on AI literacy in early childhood education (ECE), and to recognise the challenges and possibilities for implementing AI literacy in ECE.	Scoping literature review	Sixteen empirical papers	Not specified	Using AI in learning could bring opportunities and foster young children's AI literacy in terms of concepts, practices, and perspectives despite potential challenges such as lack of teacher knowledge, skills, and confidence, lack of curriculum design, and lack of teaching guidelines.	TEL
Tlili, A., et al. [34]	USA	Education	To investigate ChatGPT specific concerns of using chatbots, in education.	Qualitative case study	Nineteen interviewees and three educators	Nineteen interviewees, three educators and seven researchers	ChatGPT is a powerful tool in education, but it needs to be used cautiously with guidelines, and there is a need for further research to establish a better and safe adoption of chatbots in education, as well as the need for new teaching philosophy and upskilling competencies for teachers and students.	TEL

Author	Country	Field	Purpose of study	Methodology/ reviews	Sample size	Participants	Findings	TEL Area
Topal, A.D., et al. [35]	Turkey	Education	To investigate the effect of AI chatbots on student success and opinions in a 5th-grade science course.	Quasi experiment	Forty-one students	Forty-one students and three researchers	The chatbot positively influenced online learning experience and was viewed as useful and fun although it did not show any significant difference in academic achievement.	TEL
Wollny, S., et al. [36]	Germany	Education	To investigate the usage of chatbots in education, explore their learning-oriented functions, and to assess their potential for individualising the learning experience.	Systematic literature review	Seventy-four papers	Six researchers	Chatbots have been employed in various educational contexts, providing feedback, facilitating discussions, answering questions, mentoring, and personalising education.	TEL
Zou, L., et al. [37]	China	Meteorological Education	To review the stages of using AI in meteorology, explore its impact on meteorological education and training, and develop a three-level meteorological AI training framework.	Literature review	Twenty-eight papers	Three researchers	AI technology is usable in meteorological business and services. The technology has potential to aid the intelligent upgrades of existing distance education platforms and big data analysis for AI training.	TEL

Appendix B: Research gaps pointed by scholars

Author (s)	Research gaps they point out
Bollen, J.	Point out further research on which research tasks are appropriate for large language models like ChatGPT, how to adapt research ethics and regulations to fit chatbots, how the technology can promote equity and encourage open science, quality standards, and legal implications related to copyright, patents, and ownership.
Gregorcic	Examine if ChatGPT's dependability enhances through additional training, development, and assessing its accuracy and effectiveness for educational objectives in comparison to other similar chatbots.
Broughman, D.	Prospective research to expand sample size and diversity, adopt a longitudinal approach to track individuals' understanding of technological advancements, investigate the influence of media on STARA awareness, and explore employees' career planning and potential for professional changes.
Casella, M.	Further investigation to examine the extent of support AI-based LLMs can provide for clinical decision-making and enhance patient outcomes.
Chang et al.	Future research to determine how chatbot technologies can be effectively applied in other nursing courses.
Chaoning et al.	Recommend technical investigations to improve the flexibility and control of model architecture, fine tune pre-training, and promote the participation of start-up companies in AI technology development.
Chen et al.	Future research to incorporate long-term and longitudinal studies, diverse samples, investigation of subcultures and subgroups dynamics, and to explore the perspectives of marketing communication practitioners.
Cotton R. E., et al.	Subsequent studies to investigate to focus on how universities can craft policies and procedures, provide training, and support, and employ different techniques to detect and deter cheating.
Doshi, R.H., et al.	Ongoing research to understand the responses of ChatGPT, when prompted to answer to medical questions, and carefully assess and manage its use in medicine to minimise harm to people.
Durak, H. Y.	Future research to focus on clustering perceptions of chatbots as conversational agents based on real user data and learning analytics to examine the differentiation of results according to determined profiles, as well as conducting usability tests and developing a design framework before integrating chatbots into education.
Gallacher, A., et al.	Future studies to create a quantifiable survey based on the categories presented in this study to ensure a more consistent analysis across different AI chatbot platforms.
Gonzalez et al.	Follow up research to develop and assess more advanced conversational AI, the results of which will help in advancing novel techniques in the nursing practice and improving a culture of organisational safety.
Harrer, S.	Future research to tackle ethical, technical, and cultural aspects of chatbot development to ensure reliable and intelligent use of chatbots.
Haug, C. J.	Explore ways for health professionals to adapt to and learn how to work alongside AI and machine learning, to integrate them into their workflows and use them effectively in providing better care to patients. [IMPLIED]
Hew Khe Foon	Future inquiries to increase sample sizes from various courses and include chatbot-supported recommender systems to understand chatbot usage, enhance user satisfaction by evaluating chatbot performance using fallback rate, and support other phases of student self-regulated learning.
Homolak, J.	Future research to carefully consider AI implementation, foster open dialogue regarding their risks and benefits, and explore methods to optimize their efficacy through additional training and improvement.

Author (s)	Research gaps they point out
Khan R.A., et al.	No suggestions for future research.
Kuhail, M.A., et al.	Subsequent research to explore the localisation of chatbots, development of framework for building usable and effective educational chatbots, and end-user development (EUD) tools to accelerate the adoption of chatbot technology in diverse fields.
Lee, Y.F., et al.	Future investigations to scrutinise the effectiveness of AI chatbots in the before-class preview stage, as well as explore AI impact on learning engagement, critical thinking, reflective thinking, and critical thinking skills in educational settings, while also examining the factors that influence learners' performance and perceptions.
Leoste,, J., et al.	Future studies to investigate the effectiveness of such a program in real-life settings through collaborations between universities and industries, assess the sustainability of innovation adoption, and develop the TELIP model with relevant science teams to offer a guiding framework for organisations preparing for the future.
Lund, B.D., et al.	Future studies to assess the potential of merging GPT/ChatGPT with other similar technologies to enhance their capabilities, explore their applicability in various areas and domains, and consider the complete range of existing chatbots to gain a comprehensive understanding of their benefits and limitations.
Molnár Gy	Further investigations to explore the use of chatbots in education, focusing on their integration into current methods of teaching and learning.
Nouraldeem. R.M.	Subsequent research to explore how universities should prepare students to adopt AI.
Okonkwo, C.W.	Future works to empirically assess the benefits and challenges of using Chatbots in education to help determine their impact on Chatbot development and implementation in the educational sector.
Perez, J. Q.	Future research to incorporate thorough details of the programming languages used and a clear focus on the environment in which these learning tools can be applicable
Qasem et al.	Additional research with larger samples to determine how chatbots can effectively enhance English vocabulary learning and language skills.
Rudolph, J., et al.	Future research to explore ways of preventing cheating using ChatGPT such as watermarking ChatGPT text.
Sadeghi, S.C.	Subsequent research to evaluate the effectiveness of machine learning-based assessment tools in education, develop ethical guidelines for the use of student data in machine learning models, and explore the use of machine learning in non-traditional educational settings.
Sallam	Future studies to examine the ethical and responsible use of ChatGPT in scientific research and health care education, evaluate its potential impact and address issues like accountability, integrity, transparency, and emotional support preferences in health care settings.
Sinha, R.K., et al.	Prospective studies to evaluate the accuracy level of ChatGPT's future versions.
Tlili, A., et al.	Further research to find better and safe ways to adopt chatbots in education, as well as the need for new teaching philosophy and upskilling competencies for teachers and students.
Topal, A. D., et al.	Prospective investigations to explore the use of chatbots in lessons with augmented functions such as web searching, voice-over, and topic coverage, in addition to employing alternative approaches to measure cognitive learning and evaluating the long-term impact on science concept association, with the prospect for use across diverse courses, including performing similar studies in a classroom environment after the pandemic.
Wollny, S., et al.	Further studies to address the need to align the assessment of chatbots with implementation objectives, investigate the potential of chatbots to mentor students, and explore and use their adaptation capabilities to enhance their effectiveness in educational settings.

Author (s)	Research gaps they point out
Zou, L., et al.	Future research to develop an interdisciplinary curriculum system for meteorology and AI, upgrading existing meteorological education and training platforms with intelligent features, and creating an AI training platform that supports future meteorological AI training.

Appendix C

The following table shows how a search of the key terms reflected on One-Search in the given order: ChatGPT; Generative Artificial Intelligence (GenAI); Chatbots; ChatGPT; Student Perception; Business Studies Students; Artificial Intelligence (AI); Technology-Enhanced Learning (TEL); Education Technology (EdTech); AI in Education; AI-Driven Student Engagement; User Acceptance of AI. (2013 to 2023). The combination of key terms during the search descends from top to bottom respectively.

Search terms	Database	Full text online	Articles	Peer reviewed journals	Book chapters	Conference proceedings	Books	Total peer reviewed articles for consideration
Artificial intelligence AND chatbots AND student perception.	Google Scholar	1,551	1,410	921				2,598
One Search	2,450	1,776	1,642	266	51	14		
ERIC			35		4			
Artificial intelligence AND chatbots AND Business Studies students' perception.	Google Scholar	1,520	1,130	910				1,944
One Search	1,513	1,126	1,031	136	29	3		
ERIC			3					
Artificial intelligence AND chatbots AND Business Studies students' perception AND technology enhanced learning.	Google Scholar	1,400	1,140	912				1,261
One Search	413	375	349	47	1	0		
ERIC			0					
ChatGPT AND artificial intelligence AND chatbots AND Business Studies students' perception AND technology enhanced learning.	Google Scholar	262	262	153	73	184	134	159
One Search	10	8	6	4	0	0		
ERIC			0					