Journal of Marketing Theory and Practice

ISSN: 1069-6679 (Print) 1944-7175 (Online) Journal homepage: www.tandfonline.com/journals/mmtp20

Artificial intelligence in academic Research: Contributor, constructivist or cheat?

Joanna Scott-Kennel, Rong Mei Zhang & Jonathan M. Scott

To cite this article: Joanna Scott-Kennel, Rong Mei Zhang & Jonathan M. Scott (2026) Artificial intelligence in academic Research: Contributor, constructivist or cheat?, Journal of Marketing Theory and Practice, 34:3, 501-522, DOI: 10.1080/10696679.2025.2457672

To link to this article: https://doi.org/10.1080/10696679.2025.2457672

Published online: 29 Jan 2025.

JOURNAL OF MARKETING THEORY AND PRACTICE
2026, VOL. 34, NO. 3, 501–522
https://doi.org/10.1080/10696679.2025.2457672

Routledge
Taylor & Francis Group

Artificial intelligence in academic Research: Contributor, constructivist or cheat?

Joanna Scott-Kennel[a], Rong Mei Zhang[b], and Jonathan M. Scott[a]

[a]School of Management and Marketing, University of Waikato, Hamilton, New Zealand; [b]Marketing and International Business Department, Auckland University of Technology, Auckland, New Zealand

ABSTRACT

The role of generative AI (Gen-AI) in the academic research process remains underexplored. This paper examines how Chatbots might be integrated into academic research, distinguishing this application from traditional uses of machine learning in marketing research and data analysis. Using Constructivist Learning Theory (CLT) as a framework, we experiment with queries at different stages of the research process, including the literature review, research gap identification, theory alignment, and method selection. The study contributes to understanding how AI can support academic research in marketing. Responses from ChatGPT, Gemini, Perplexity and Claude are compared and potential benefits and limitations for marketing scholars discussed.

Introduction

Since the release of ChatGPT by OpenAI in November 2022, generative artificial intelligence (Gen-AI, or just AI) has seen significant advancements, particularly in areas relevant to marketing, such as marketing research, data collection, and analysis (Chui et al., 2023). The adoption of AI as a research tool in academia has grown rapidly (Lea, 2020). These developments have sparked interest among scholars, highlighting AI's potential to reshape academic research in marketing. However, the use of AI Chatbots as tools to guide research projects and the development of the discipline has not been sufficiently explored.

Prior research has focused on AI's potential and risks for marketing practice, theory relating to practice (Kumar et al., 2021); and AI's role in machine learning and data management (Hair & Sarstedt, 2021), but little attention has been afforded to how AI might assist marketing academics in the research process (e.g. Hair & Sarstedt, 2021 on data; and see Christou, 2023; Dent, 2020; Lévesque et al., 2022 for discussion in other fields). Specifically, the potential for AI in identifying research gaps or contributing to theory development in marketing has been largely overlooked. While the ethical dilemmas associated with AI-facilitated research and data analysis have been debated elsewhere (Bakiner, 2023; Dent, 2020; Dwivedi et al., 2023; Hair & Sarstedt, 2021), we propose testing the proposition that AI (Chatbots) might not only support but potentially replace certain aspects of manual, academic-driven research processes. While such a bold and confronting claim will clearly be anathema to many marketing academics, who still view AI as distant from their work, the rapid growth of AI raises ethical, social, and practical issues (Bakiner, 2023; Dent, 2020) including concerns about the reliability of Chatbot-generated content (Chui et al., 2023).

This study uses a hands-on exploratory approach to investigate how AI Chatbots and their outputs might be integrated into the traditional academic research process. We employ participatory action research (PAR) (Ozanne & Saatcioglu, 2008; Whyte et al., 1989) to combine AI Chatbots and manual, expert intervention in the research process, from identifying the research gap to writing an academic paper. Drawing on the tenets of Constructivist Learning Theory (CLT), this paper adopts an iterative research approach to using Chatbots guided by manual selection and decision-making. The paper contributes to discussion on how Gen-AI could be integrated into the academic research process in marketing, while critically reflecting on AI's potential and limitations.

The remainder of the paper discusses the results of our experimental PAR process, where AI-driven Chatbots guided by human intervention contribute to a research paper acceptable for peer review. This includes identifying a research gap, generating an

CONTACT Joanna Scott-Kennel joanna.scott-kennel@waikato.ac.nz School of Management & Marketing, University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand

outline, reviewing relevant literature, summarizing key themes, and suggesting theory and research methodology and undertaking independent checks and additional manual research to validate Chatbot-generated outputs. Finally, the paper reflects on the integration of AI-assisted and human-led research, discusses the implications for researchers, and outlines the study's limitations.

The origins of Gen-AI, chatbots and applicability to marketing

Introduced in the 1960s in the form of Chatbots, Gen-AI can produce various types of content, including text, imagery, audio, and synthetic data through simple user-friendly interfaces. Gen-AI mimics human-like intelligence, such as logical reasoning, learning, and problem-solving by developing systems based on user prompts and information online (Morandín-Ahuerma, 2022). AI can be categorized based on cognitive capacity and autonomy and uses machine learning algorithms and technologies to perform autonomously or semi-autonomously (Morandín-Ahuerma, 2022).

AI platforms, including Chatbots, enable computers to perform human-like tasks, including perception, knowledge representation, reasoning, problem-solving, and planning, since they can be trained to find, catalog, order, and synthesize information, then to answer questions and make decisions using programmed algorithms (Dobrev, 2022; Dwivedi et al., 2023; Wu et al., 1986). Chatbots are software applications that substitute for live human agents and conduct conversations, using AI to produce dynamic responses to online client enquiries (Jadhav et al., 2022). They are designed to interact with users using natural language or text, using AI algorithms based on user input and stored information to generate the required responses (Yeung et al., 2023). They can perform repetitive tasks such as search, pattern recognition, data measurement, collection, analysis, and transformation (Chintalapati & Pandey, 2021; Hair & Sarstedt, 2021).

Gen-AI can also proxy some dimensions of "quasi" intelligence or "thinking" through mechanical problem-solving, decision-making, natural language understanding, review, summary, and learning from data (Hyder et al., 2023) and content generation (Agnihotri et al., 2023; McKinsey & Company, 2022). This functionality creates an illusion of intelligence that is particularly intriguing for researchers in marketing. M. H. Huang and Rust (2021) propose three types of AI applied to marketing *practice*, namely: (1) mechanical (e.g. data collection (J. Huang & Tan, 2023; Hyder et al., 2023; Robledo et al., 2023); (2) thinking (e.g. data analysis and linking theory to practice); (3) feeling (e.g. raising concerns around identified themes).

With regard to *academic* research, however, Gen-AI might productively support collection, analysis, and linking of theory to practice, but will only ever produce *replicative* research and is unlikely to make a novel contribution to the field. Thus, in the research process, it is useful to consider two categories of human intelligence instead: (i) those aspects which AI Chatbots can simulate convincingly; and (ii) those it cannot. Research aspects that Chatbots *cannot* simulate convincingly are associated with higher level cognitive thinking in academic research, including true innovation, creation, critical thinking, and review. Chatbots lack the ability to reason, think, and make decisions rationally, creatively and humanely using both available information, expertise, and emotion (i.e. "feeling") (Zhou, 2021). Further, the application of human intelligence and cognition – i.e. judgment and comprehension – is still critical to establish the veracity of Gen-AI output.

Goldstein and Papert (1977) contrast the (computational) "power-based" strategy of intelligence with that of the "knowledge-based" approach, where "the problem solver [whether man or machine] must know explicitly how to use its knowledge" (p. 86). This contrast distinguishes information, intelligence, knowledge, and wisdom – the first being more in the domain of technology-driven AI, and the latter in the human brain. Indeed, Gen-AI research requires programming techniques to simulate intelligence and human thought. This becomes a question of speed, information processing, and how knowledge is organized through purposeful and informed selection and decision-making rather than intelligence *per se* (Hof, 2021). Thus, at best, Gen-AI becomes a sophisticated tool in the individual researcher's arsenal, rather than replacing the researcher altogether (Goldstein & Papert, 1977, p. 87).

Despite the rapid adoption of Gen-AI and Chatbots, critical commentary on AI's integration into the research process – beyond the mechanical tasks of data collection, categorization and analysis, social media analytics and behavioral marketing research – remains limited (Agnihotri et al., 2023; Hagen et al., 2020; Hair & Sarstedt, 2021; and for discussion in the medical and science fields, see: Haq et al., 2023; J. Huang & Tan, 2023). This paper aims to integrate AI-powered Chatbots into the higher order thinking aspects of academic research, such as writing an academic paper; generating a literature review; identifying a research gap; linking theory to the research topic; and suggesting research methodology and design. We also examine whether AI output reflects "feeling" aspects, such as

the implications of AI for academics. Thus, the paper explores the effectiveness of Chatbots to perform tasks requiring knowledge, decision-making and actual intelligence, rather than the more mechanical tasks of data collection, analysis, and modeling (Hair & Sarstedt, 2021).

AI in the academic research process

In academia, concerns that AI may threaten jobs are balanced by discussion of its potential to improve performance in search, data analysis, and academic writing (Chui et al., 2023; Dwivedi et al., 2023; Elhajjar, 2024; Hair & Sarstedt, 2021; Lea, 2020), thus accelerating the research process and increasing productivity (Robledo et al., 2023). The efficiency of these tools in processing datasets at speed has improved methodologies (Hyder et al., 2023; Robledo et al., 2023), literature review and hypothesis generation, enhancing the writing process and creation of academic content (Eke, 2023; J. Huang & Tan, 2023; Nature, 2023).

Concerns over the use of AI tools in research focus on the generation of text that blurs the boundaries between AI-generated and human-generated content (Dwivedi et al., 2023; Eke, 2023). As AI tools grow more sophisticated, detecting AI-generated content in academic writing in the marketing field becomes more challenging. While some alternatives, such as the AI text classifier feature of OpenAI, have been available to distinguish between human and AI-generated text, the need for more effective detection tools is evident (Nature, 2023). As Gen-AI continues to evolve, there are also growing calls for tools that can provide accurate references, validate their outputs, and ensure the research integrity (Bhatia, 2023; Deniz, 2023; Eke, 2023).

This debate has fomented questions about academic honesty and ethical use of AI, centering on its (mis)use relating to data (Hair & Sarstedt, 2021). The use of AI tools has generated concerns not only around transparency and reliability of AI algorithms, but also data privacy, academic integrity, and authenticity in marketing science (Bakiner, 2023; Hair & Sarstedt, 2021). The lack of a standardized ethical framework or policy for the use of AI further underscores the need for guidelines and interdisciplinary collaboration (Bakiner, 2023).

Although AI is redefining human-machine collaboration (Deniz, 2023; Robledo et al., 2023), few studies have explored integration of AI into the research process for marketing academics (Dwivedi et al., 2023). Specifically, how AI might contribute to academic content at a publishable standard, rather than simply with greater efficiency (Hair & Sarstedt, 2021). This paper addresses this issue by exploring AI-integration into the research process, using iterative Chatbot prompts and output. We apply CLT theory to examine collaborative learning involving both researcher and AI platforms, then to assess the accuracy of AI-generated output.

Constructivist learning theory

This paper adopts a CLT lens to understand the steps to integrate AI into the research process in marketing. This theory posits that human learning is constructed as new knowledge and builds upon the foundations of previous learning (Bada, 2015). The theory was adopted by AI researchers at the Massachusetts Institute of Technology (MIT) in the late 1960s as a concept of learning without being taught (see Hof, 2021). Learning from a constructivist perspective, therefore, is conceived as a self-regulated process stimulated by practice and the development of conceptual structures through reflection and abstraction (or thinking) (von Glasersfeld, 1995). Thus, application of current understanding, observance of new experiences against prior and emerging knowledge and judgment all feed into new knowledge construction by the learner. CLT is often associated with education, teaching, and learning (Bada, 2015; Dewey, 1916; Goldstein & Papert, 1977; Hein, 1991) rather than research. However, as CLT emphasizes learning through actively building upon and acquiring knowledge, it provides a point of departure for understanding the co-dependence of AI and humans in the research process. Further, since learning is a multistage process, AI could also progress from simple to more complex structures in the process of building knowledge. Indeed, Hof (2021) demonstrates a clear link between AI and cognitive constructivism, where the learner actively influences the outcome or output of the technology. She further argues that technologically generated artifacts are both "objects of knowledge" and "agents" that can change our idea of what learning is. Thus, AI-generated output provides not only an answer but an alternative view of the question that feeds into subsequent answers through active human engagement.

Generative AI can also be described as procedural by "identifying and formalizing pragmatic knowledge, namely, knowledge of 'how' traditional facts are to be used" typically within a given domain (Goldstein & Papert, 1977, p. 87). From a constructivist viewpoint, according to Hein (1991), there is no such thing as knowledge "out there" independent of the knower, but only knowledge constructed as we learn. In terms of the role of AI in constructing knowledge through research

in marketing, therefore, we might observe AI as the repository and organizer of such knowledge in our attempts as academics to learn as we research.

Studies of CLT reinforce the idea that learning comes from experience, a process of discovery, transformation, acquiring and ordering information, checking new information against old, and revising rules when they no longer apply. The same process is used in academic research in the marketing field (and other disciplines), where AI (as medium) and AI-generated output (as artifact) can complement the intuition and critical thinking of the researcher (as learner). Thus, AI supports research as learning or – as Lea (2020) points out – "also makes mistakes that are ultimately human-derived in accordance with the designs and instructions it is given" (p. 335). Thus, the absence of literature on using AI in the academic research process – particularly in marketing – speaks to the need for a better understanding of how AI and human interaction might actively construct learning through the research process (Lévesque et al., 2022; Stokel-Walker, 2023). This paper addresses this gap by exploring the process of human-guided and AI-assisted research through a CLT lens.

Materials and methods

This paper employed the Participatory Action Research (PAR) method (Ozanne & Saatcioglu, 2008; Whyte et al., 2008). PAR is a collaborative, reflective approach to research that actively involves all stakeholders, in this case the authors as academic researchers, in every stage of the research process (Argyris & Schön, 1989). In the tradition of Lewin, PAR "involves practitioners as both subjects and co[-]researchers" (Argyris & Schön, 1989, p. 613). Indeed, viewing AI as a disruptive innovation (Christensen, 2013), PAR is a valid and promising method to investigate a radical innovation [such as AI] since it enables us to study what is a "Quantum" phenomenon, rather than a "Classical [Newtonian]" phenomenon (Ottosson, 2003). Further, this paper is the first to our knowledge that includes a non-human subject (i.e. the Chatbot) as a PAR stakeholder, i.e. as a co-researcher – though not an author, as argued by Thorp (2023) and codified by the Committee on Publication Ethics (COPE, 2023).[1]

The research topic, defined as "integrating AI into the traditional academic research process in marketing," emerged through search using Chatbots and collaborative discussion and refinement of the chat queries or prompts. An important determinant of output generated by ChatGPT and other GenAI platforms is how they are prompted. The researchers adopted an iterative and reflective approach to queries. This involved multiple "chats", "prompts" or "queries" being posed to elicit better responses. The queries in the results section (and Appendix I) that follows are those that were deemed the most useful in terms of relevant output, and in due course were used across all Chatbots. In addition, we also assigned the role of an "experienced marketing professor wanting to publish in top-tier marketing journals" (henceforth, "*with role*"). This role was applied at the beginning of conversations with different Chatbots to assess the impact on output provided by specific context.

Chatbot-generated output was used to guide the research topic, key themes in the literature and method. The authors were responsible for checking outputs for accuracy, authenticity, and focus on the topic. Table 1 provides an example of the type of manual cross-checking undertaken between a human-generated abstract in a research article and a summary generated by ChatGPT-4, and shows the extent of similarity, plagiarization and paraphrasing by the latter. The reiterative, reflective feedback loop of AI-generated responses, expert search, discussion, opinion based on experience and manual review of the literature aligns well with CLT, which emphasizes knowledge construction through experience and reflection.

Data collection was based on participant (researcher/author) observation of the process as it unfolded, and documentation of any tangible artifacts at every stage, including Chatbot-generated output ("responses"), manual checks, reviews, decisions and selections made to advance the search and optimize the relevancy of responses. As responses were generated, the authors discussed the relevancy of each section, then individually and independently checked accuracy through manual literature search where appropriate, then joint interpretation and reflection on implications for the AI-generated and human-guided research process.

This mix of independent and collaborative analysis ensured that multiple perspectives shaped the understanding of the data and research interventions, implications, and action plans. Documentation of the process, findings, and reflections at every stage served as a record and a learning tool for other academics seeking to assess the efficacy of AI-assisted research (see Appendix I). PAR ensured a grounded, holistic understanding of AI's challenges, opportunities, and

[1]COPE (2023) states: "AI tools cannot meet the requirements for authorship as they cannot take responsibility for the submitted work . . . [and] cannot assert the presence or absence of conflicts of interest nor manage copyright and license agreements."

Table 1. Human-generated abstract and AI-generated summary.

Human-generated abstract [Vlačić et al. (2021)]	AI-generated summary [ChatGPT-4) - with original (human) text in bold
An increasing amount of research on Intelligent Systems/Artificial Intelligence (AI) in marketing has shown that AI is capable of mimicking humans and performing activities in an "intelligent" manner. Considering the growing interest in AI among marketing researchers and practitioners, this review seeks to provide an overview of the trajectory of marketing and AI research fields. Building upon the review of 164 articles published in Web of Science and Scopus indexed journals, this article develops a context-specific research agenda. Our study of selected articles by means of Multiple Correspondence Analysis (MCA) procedure outlines several research avenues related to the adoption, use, and acceptance of AI technology in marketing, the role of data protection and ethics, the role of institutional support for marketing AI, as well as the revolution of the labor market and marketers' competencies.	A growing body **of research on Intelligent Systems/Artificial Intelligence (AI) in marketing** demonstrates AI's **capability to mimic** human behaviors and execute tasks intelligently. The article addresses the escalating **interest in AI among marketing researchers and practitioners.** The authors have **reviewed 164 articles** from **Web of Science and Scopus indexed journals to provide an overview of the trajectory of marketing and AI research fields**. Through the use of **Multiple Correspondence Analysis (MCA)**, the article **outlines several research avenues related to the** topic. Total words: 81 Paraphrased words: 27 Plagiarized words: 54 Also included as plagiarized: (1) "capable of mimicking" (HU) and "capability to mimic" (AI); and ("reviewed 164 articles . . . Web of Science and Scopus indexed journals." Some words were changed, e.g "increasing" (HU) to "growing" (AI); "shown" (HU) to "demonstrates" (AI); "performing" (HU) to "execute" (AI); and "growing" (HU) to "escalating" (AI); and "by means of" (HU) to "through the use of" (AI).

Notes: ChatGPT4 summary total words: 81, paraphrased words: 27, plagiarized words: 54. The summary is highly plagiarized (67% "similarity score" cf. Turnitin or other plagiarism detection software).

implications in academic research, giving authors agency in the research process, which is associated with more sustainable, flexible, and contextually relevant interventions or solutions.

The Gen-AI Chatbots chosen for this study were ChatGPT-4, Gemini Advanced, Perplexity Pro, and Claude 3 Opus (see Table 2). These Chatbots are frequently employed by marketing scholars, with trials

Table 2. Comparison of Gen-AI chatbots.

Gen-AI chatbots	Developer	Key functionality	Academic use
ChatGPT-4	OpenAI	–Natural language processing. –Generates, edits, and refines creative and technical writing. –Adapts to user writing styles. –Processes 25,000+ words for long-form content and analysis.	–Supports creative writing, essays, prompts, code writing, and question answering. –Widely used in research, aiding creative and analytical tasks.
Gemini Advanced	Google	–AI-powered information retrieval. –Explores and analyzes large data sets (up to 1,500 pages). –Supports uploads from Google Drive and devices (Docs, PDFs, etc.). –Processes and visualizes data. –Edits and runs Python code snippets.	–Provides personalized and contextually relevant information. –Streamlines information retrieval. –Enhances research with customized content.
Perplexity Pro	OpenAI + Anthropic	–Conversational interface. –Contextual awareness and "learning" over multiple prompts. –Integrates GPT-4, Claude 3, and Sonar (32k based on Llama 3). –Supports file uploads (PDFs, CSVs, images). –Explores file contents with advanced AI models like GPT-4 Omni and Claude 3.	–Employed for questioning using reliable sources, assisting research analysis.
Claude 3 Opus	Anthropic	–Conversational interface. –Automates tasks. –Plans and executes complex actions across APIs and databases, interactive coding. –Supports R&D, research reviews, hypothesis generation, drug discovery. –Enhances strategy, advanced chart/graph analysis, financials, market trends, forecasting.	–Brainstorming and analysis, supports complex document processing.

Sources: https://academiascribes.com/blog/claude-vs-chatgpt-academic-writing; https://www.anthropic.com/news/claude-3-family; https://writingmate.ai/blog/chat-gpt-gemini-claude; https://gemini.google/advanced/?utm_source=help_center; https://www.perplexity.ai/hub/faq/what-is-perplexity-pro; Imran & Almusharraf, 2024; McKay (2024); Semrl et al., 2023; Taecharungroj, 2023.

demonstrating functionalities such as text generation, question-answering, and analysis (Chatlabs, 2024; McKay, 2024; Semrl et al., 2023). Despite some similarities, each Chatbot has unique features, enabling exploration of how their different characteristics impact the research process and results.[2]

Results – integration of AI into the academic research process

Appendix I summarizes the most effective chat queries posed to the Chatbots, their responses, and the manual checks, selections, decisions and interventions made by the researchers. The presentation of results follows the research process and shows prompts with and without the role of "professor" as context (see Appendix I for more detail).

Research objective

The authors tasked the Chatbots to "*write an academic article for the Journal of Marketing Theory and Practice on making a contribution to research in the era of AI*." However, both ChatGPT-4 and Gemini stated they could not complete the task due to its length and complexity. Nor were they able to find or review the research on this topic when prompted. ChatGPT-4 provided a general 12-step guide to getting started, including topic-specific selection, references and an abstract focused on ethics, interdisciplinary collaboration and limitations of AI in the research process. Although not marketing-oriented, each step was explained through 1–2 subheadings and bullet points, and a full outline of a typical academic paper was provided. Responses from Gemini Advanced were similar. Perplexity Pro and Claude 3 Opus both produced short articles, including references.

Each Chatbot's output diverged from the research objective. ChatGPT-4 and Gemini Advanced focused on learning, curriculum and education. Perplexity Pro and Claude 3 Opus focused on marketing research, consumer behavior, and marketing practice. The inclusion of a "professor" role in the query improved the academic style, references, and citations, particularly in Claude 3 Opus and Gemini Advanced's responses, which then focused solely on academic research. While ChatGPT-4 suggested it could provide valuable insights and streamline the process, also acknowledged AI's limitations, including contextual understanding, emerging topics, quality assessment, interdisciplinary considerations, and subjectivity. It emphasized the need for human expertise, critical thinking, and domain knowledge in identifying research gaps and reviewing relevant literature. Given these limitations, we chose to deconstruct our original research objective into smaller subtasks, namely: identifying key themes, drafting a literature review, articulating a research gap and proposing a research design.

Key themes

Multiple iterations of queries generated outlines structured by theme. ChatGPT-4 generated 11 themes (each with bulleted subpoints), of which seven – enhanced data analysis and insights, text and data mining for literature reviews, cross-disciplinary collaboration through AI, ethical considerations and bias in research, skill enhancement and training, ethical use of AI-generated content, and reproducibility and transparency – aligned with our research objective. However, themes relating to teaching, education, and ethics did not.

Perplexity Pro also reported these less relevant aspects, but not as key themes. Perplexity Pro drew on multiple disciplines, providing links to 27 online academic and non-academic sources that could be verified. Gemini Advanced produced nine themes all relevant to academic research with a focus on how to write the paper. Claude 3 Opus generated the most relevant themes focused on application and implications of AI for academic research but did not cite references.

Our manual checking processes and interventions are also presented in Appendix I. In summary, themed outlines were accurate and comprehensive, but only partially relevant and nonspecific to the marketing discipline. Limitations were brevity of output, lack of focus on the topic, discipline and provision of references. To address these issues, we refined our topic from "marketing" (practice) to "academic research in marketing" and shifted our focus to retrieving and reviewing relevant literature.

Literature search and retrieval

When asked to "*Review research on the role of AI in academic research in the marketing discipline*", all four Chatbots focused on marketing research and practice, although Perplexity Pro and Claude 3 Opus included

[2]While Chatbots such as ChatGPT are known to produce "extrinsic hallucinations" from its parametric memory (Bang et al., 2023, p. 2), the authors have carefully checked references and output to ensure their authenticity, addressing concerns about potentially fabricated references (Bhattacharyya et al., 2023; Haq et al., 2023).

academic research as well. All except ChatGPT-4 used references, although Gemini Advanced's two references were omitted when the "professor" role was included in the query. Claude's review most closely aligned to academic standards and expectations and included in-text citations and a reference list. Manual checking revealed that six citations pre-dating 2020 referenced real sources, whereas the seventh reference dated 2021 was fabricated, including a link to an unrelated article on big data. Clearly, there are some output reliability issues, particularly with more recent references.

When tasking the Chatbots to find articles on this topic, they demonstrated limited functionality to retrieve or find suitable academic references, even with the professor role. Perplexity Pro and Claude 3 Opus were able to provide only two academic references each that were relevant to our research topic. Given the poor focus of outputs on research objective and topic, manual intervention was required to retrieve and review relevant literature.

AI platforms

To source relevant articles, we asked "*What AI platforms would I use to undertake a literature review?*" The Chatbots suggested numerous AI-assisted search engines, databases and platforms for academic literature retrieval, analysis, and search (see Appendix I), including 25 platforms driven by AI.[3] After trialing the functionally and results of these platforms, we selected those used by marketing and management colleagues that were freely available and accessible in full-text format. Manual search using Elicit, Google Scholar, ScienceDirect and reference lists within the most relevant articles provided 18 potentially relevant research outputs, and after manual review we removed four that were less relevant to our topic.[4]

Literature review

The authors experienced mixed success when uploading the research outputs for the Chatbots to review. While all platforms produced generic summaries on the topic of AI's transformational role in research and literature reviews, only ChatGPT-4 and Claude 3 Opus could access the uploaded research outputs. Claude 3 Opus's output (with the professor role applied) produced the most useful output consisting of a full (albeit brief) literature review structured by relevant themes and included cited references but no reference list.

ChatGPT-4 identified 10 themes, of which five were relevant to our research objective, namely: integration with traditional research practices, quality of AI-assisted research, bias and objectivity, collaborative research with AI and the AI feedback loop. A second iteration of this process generated a 1,000-word literature review with five relevant themes: AI in academic writing and research; ethics of AI authorship; AI and literature reviews; ethical landscape; and AI beyond academia. Incomplete references (cited by title only) were provided. A third iteration produced a review of only 500 words and no new themes, nor did inclusion of the professor role in the chat query improve the output. ChatGPT-4 did, however, provide a ~ 1 page summary of each research output, consisting of two generic sentences populated with information from each research output for each theme, which were used for the manual cross-checking process. We noted that research methods were frequently reported incorrectly by ChatGPT-4. Although Perplexity Pro and Gemini Advanced were unable to access the uploaded literature, they still generated a review outline. Uploading articles individually by copying them into the chat proved very time-consuming but – after multiple queries – Gemini Advanced produced a review with similar themes to earlier responses (see Appendix I).

Research gap

The authors posed multiple iterative queries to reveal a research gap. Initially, we simply asked the Chatbots: "*can you identify a research gap?*," with regard to AI in research by marketing academics. They could not, but gave suggestions as to how AI might help, including literature review automation, topic modeling, content analysis, citation analysis, and comparative analysis. With the professor role applied, ChatGPT-4 generated a very specific but not very relevant gap. Focus on marketing, rather than academic research featured in other Chatbot responses. Gemini Advanced identified

[3]Semantic Scholar*; Google Scholar; IBM Watson Discovery* (trial only); Science Direct; Microsoft Academic#; CORE; Colwiz (now Wizdom.ai)*; Refinitiv; Kopernio (now EndnoteClick, subscription)*; ReadCube Papers (now just "Papers"); Research Rabbit;* SciSpace;* Roam Research; Zotero; Google Bard (now Gemini);* ChatPDF;* Iris.ai, Scopus;* Knowlit [not found by web search]; Meta;* Rax; Scholarcy;* TLDR papers;* Mendeley; Elicit*. Our checks revealed that only those 13 platforms marked with asterisks were "AI-powered," whilst those marked with a # utilized machine learning.

[4]These outputs related to health (46%, $n = 6$), business and management studies (31%, $n = 4$), and various other diverse fields. Four were literature reviews (Bakiner, 2023; Sallam, 2023; Vlačić et al., 2021; Wagner et al., 2022), four were editorials (Bhatia, 2023; Goto & Katanoda, 2023; Lévesque et al., 2022; Polonsky & Rotman, 2023), and one each of: a review article (J. Huang & Tan, 2023), a letter to the editor (Ide et al., 2023), a technology column (DuBose & Marshall, 2023), and an opinion paper (Rahimi & Abadi, 2023). The remaining two were general research papers (Cotton et al., 2023; Robledo et al., 2023). Furthermore, Cotton et al. (2023) focused on AI and assessment rather than academic research.

gaps on education and learning initially, then with the role applied, marketing practice and ethics. Perplexity Pro provided links to many credible academic and online references and resources but defined the research gap poorly as: "*solutions to ethical and legal challenges of AI in marketing*." Claude 3 Opus's output was similarly poorly defined, with a focus on "*consumer trust and engagement*."

Re-posing the query using the 14 uploaded research outputs (with minor variations if Chatbots could not access or "read" them), ChatGPT-4 identified potentially relevant gaps: integration with traditional research practices, effectiveness in diverse academic disciplines, training and preparedness in academic institutions, quality of AI-assisted research, ethical implications in data handling, bias and objectivity, collaborative research with AI, economic implications, feedback loop with AI, and the future of academic publishing with AI. A role-based query identified a narrow gap: "*evaluation of AI-contributed content's impact on the academic community's acceptance and credibility*," and a short outline. These gaps were useful to refine our research direction, with the gap of "*integration of AI with traditional research practices"* being the closest to our intended purpose.

Without the professor role, Claude 3 Opus's themes were poorly focused. However, with the role, Claude 3 Opus generated several gaps based on the uploaded research outputs. Surprisingly, reiteration of the query without the uploaded research outputs generated an extensive list of highly relevant research gaps, relating to the impact of AI on research quality, AI authorship contributions, research agendas, publication trends and, most significantly, *"the lack of a comprehensive framework or set of best practices for integrating AI into the academic research process*."

The query had to be adapted for Gemini Advanced and Perplexity Pro as they were unable to access external files. Gemini Advanced, despite not being able to review the literature, generated several novel research gaps: "*impact of AI on critical thinking and research independence*" and "*disciplinary variation in AI adoption*." With the role applied but no uploaded research outputs, Perplexity Pro generated less relevant gaps, but accurately noted a: "*lack of empirical studies on the actual experiences of marketing academics as they integrate AI into their research processes*."

Theoretical foundation

When prompted, ChatGPT-4 provided rationale and one-paragraph summaries for each of the following theories: CLT, Technology Acceptance Model (TAM), Unified Acceptance and Use of Technology, Diffusion of innovations, Activity, Cognitive Load, Sociotechnical Systems and ethical theories in AI. A role-based query generated just four theories: CLT, TAM, the Theory of Planned Behavior, and Diffusion of Innovations. With, and then without the professor role applied, Gemini Advanced produced 8 – and then 6 – theories, respectively (although two theories were not relevant), with Activity Theory being the most relevant. Perplexity Pro and Claude 3 Opus both reported multiple theories, of which Innovation Diffusion Theory, Situated Learning Theory and Human-Computer Interaction Theories (including Activity Theory) aligned closely to our research topic.

After independent review and consideration, all authors chose CLT as the theoretical foundation for the ideas germinating in the paper. ChatGPT-4 defined CLT as follows, "*this theory suggests that learners construct knowledge based on their experiences*" (based on Paiget, 1970, cited in: Hof, 2021). When applied to the topic of AI in academic research, CLT can be used to study: "*how AI tools can facilitate or hinder the knowledge construction process*." The rationale behind this choice of theory was that traditional discipline-specific research and expertise require constructivist learning over time. However, the extent to which Chatbots either substituted for or complemented such learning in the research process was unclear from our literature review.

We then asked the Chatbots to apply CLT to the use of AI in academic research. ChatGPT-4 provided a relevant and balanced review, applying principles of CLT to key themes. It systematically extracted two key points (of three lines each) from each research output we had uploaded previously, the first point consisting of a summary and the second connecting the content of each output to CLT (although note that CLT did not feature in any of the 14 research outputs). Gemini Advance, Perplexity Pro and Claude 3 Opus produced similarly focused reviews, placing more emphasis on learning rather than academic research. Claude 3 Opus's concluding comment was particularly insightful: "*researchers can approach AI as a tool for actively constructing knowledge, rather than a replacement for human expertise*."

After repeating our manual checking process and additional search on Google Scholar and Elicit.org, we uploaded five academic research outputs on CLT (although only one mentioned AI) and reiterated the query. ChatGPT-4, both with and without the professor role applied, focused on themes similar to previous queries, used an academic writing style, and provided a skeletal frame on which to develop a paper. However, the limitations of ChatGPT-4's output became more

apparent through its brevity (only 370-words), lack of specific references, and use of vague, nonspecific terminology such as "appears/seems to," "likely focuses," "might/may provide/discuss/address/delve into," etc. Responses from the other Chatbots were similarly limited. Gemini Advanced raised questions around themes rather than responses, Perplexity Pro focused on learning rather than research, and Claude 3 Opus only reviewed a single article.

The authors asked the Chatbots to suggest research gaps based on their prior responses and the literature reviews they had already generated.[5] As shown in Appendix I, responses were repetitive (similar to "data saturation"). However, Perplexity Pro did generate some new and relevant gaps that aligned well with our research objective.

Implications of AI for research by marketing academics

We then challenged the Chatbots to revisit all 19 previously uploaded research outputs (AI and CLT) and to focus on *academic* research in marketing to identify research gaps. ChatGPT-4 identified 11 potential research gaps but, once again, these were focused on marketing research rather than academic research in marketing. We asked ChatGPT-4 to rework the literature review afresh based on the core themes identified in an earlier chat. This result was much more focused on our research intent and included the themes of AI and academic research, academic writing, literature reviews, research ethics, and diverse academic disciplines. However, the review was brief at just 285 words and included only two references. It did, however, provide a useful list of research gaps incorporating the CLT perspective worthy of future research. Asking ChatGPT-4 to "*apply CLT to the literature review*," generated a 404-word summary with the same headings, using a CLT lens.

Gemini Advanced provided a "how to" guide to refine the literature review and key themes, but once again included irrelevant themes related to marketing research and education generated earlier. Perplexity Pro generated themes and responses similar to earlier queries, adding that Artificial General Intelligence (AGI) "*raises questions about future capabilities [i.e functionality] of AI in human-like domains*," and a new theme of understanding AI compatibility with human rationality. Finally, Claude 3 Opus provided novel, highly relevant research gaps including: the impact of AI on marketing research quality, best practices and ethical guidelines, role and skills of marketing academics, bridging theory and practice, infrastructure and support systems to facilitate ethical integration of AI into marketing scholarship, risks and mitigation strategies for unintended bias, privacy breaches, misinformation, evolution of epistemology, methodology and impact on the philosophy of science in marketing.

Research methods

All Chatbots suggested a mixed methods design and provided a variety of research methods suitable for studying AI in marketing academic research through the lens of CLT. Multiple options were provided for data collection, such as in-depth interviews, focus groups, participant observations, reflective journals, and artifact/document analysis. ChatGPT-4's suggestion that, " . . . *action research where the researchers participate in the process of integrating AI tools into academic research and then reflect on the learning and knowledge construction that takes place*," aligned well with this study.

More specifically, Claude 3 Opus suggested, *inter alia*, using PAR for data collection and analysis. As explained by Perplexity Pro: "*[t]hese methods support the constructivist approach by focusing on the active role of the researcher in learning from AI integration and by recognizing the influence of social interactions and context on the construction of knowledge*." Responses to our query of how to conduct PAR echoed the processes used in this paper, namely: defining the research goal (topic), participant selection (ourselves), AI tool selection (Chatbots, search engines), training and onboarding (to familiarize ourselves with AI tools), research (this paper), ongoing support (AI queries and author discussions), data collection (literature, artifacts, observations and collaborative meetings), and data analysis (patterns, themes and shifts in participants' understanding, learning and knowledge construction processes around AI-generated output/artifacts) as documented in our results.

Discussion

Employing PAR (Ozanne & Saatcioglu, 2008; Whyte et al., 1989), specifically from a Quantum phenomenon perspective (Ottosson, 2003), this paper examines the

[5]Research gaps identified were: "Developing a comprehensive framework for AI integration in academic research;" "Investigating the impact of AI on researchers' learning and knowledge construction processes;" "Exploring the role of scaffolding and support in AI adoption;" "Examining the situated nature of AI adoption in different research contexts;" "Investigating the strategies for fostering reflective practice and metacognition in AI adoption;" and "Exploring the collaborative dimensions of AI adoption in academic research."

use of Chatbots in the academic research process. Specifically, we ask if AI-powered Chatbots can be applied to simulate human intelligence in terms of the replicative and iterative processes of writing a research paper (GPT-3 [Generative Pretrained Transformer] et al., 2022). Chatbot queries are effective for mechanical ("contextual") tasks, as noted in our results but not those which involve thinking ("intuition") (M. H. Huang & Rust, 2022). Indeed, our observation that the focus and content of Chatbot responses were *not* on academic research and suggested a research gap that the Chatbots had missed. In other words, it was an example of where human intelligence (or intuition) could see past the summarized content provided by the Chatbots.

On the surface, these Chatbots appear to provide the passive academic researcher with a compliant and comprehensively conversant co-researcher in unlimited topics of discourse (M. H. Huang & Rust, 2022). However, as Lea (2020) suggests, "AI both allows and promotes a misguided perception of [the researcher's] ability to handle (and eliminate) complexity" (p. 334). Hence, marketing scholars should not rely on Chatbots as coauthors (Polonsky & Rotman, 2023; Stokel-Walker, 2023; Thorp, 2023) because their responses contain substantial plagiarism and inaccuracies (Bhattacharyya et al., 2023; Dehouche, 2021): i.e. fragments of text from the original abstract are not quoted but presented as the author's own work (the author being the Chatbot). CLT suggests that human learners construct knowledge based on their experiences (Dewey, 1916; Hein, 1991; Hof, 2021). When applied to using Chatbots in academic research in the marketing field, we see that if human intervention through the integration of critical thinking and reiteration of steps is thorough, Chatbots can facilitate the knowledge construction process (Jadhav et al., 2022). Chatbots actively draw on ideas from different disciplines, methods and theories that the researcher might not otherwise consider. In this sense, and used appropriately, Chatbots, even in their current form, may contribute by providing both building blocks and processes for academic researchers to develop further. However, reliance on Chatbot-generated content without manual checks and balances could easily undermine the in-depth understanding and critical thinking advocated by CLT.

Thus, while Chatbots do not actually think, they can uncover patterns and themes beyond human capabilities, and prompt researchers to question the resources provided and biases in outputs. Such deep reflective engagement with the material, guiding and being guided by AI, has the potential to enhance the researcher's understanding and lead to more in-depth exploration of the topic. AI-powered Chatbots in this context can act as a collaborative catalyst whose responses nudge the researcher toward deeper engagement. Responses improved as researchers made more specific queries, and the Chatbots became more "familiar" with the topic by building on prior responses. ChatGPT-4, for example, was able to "remember" the conversation history and apply what it had "learnt" to new queries. Hence, AI does not simply provide content but also interacts with researchers to become a participant in the construction of knowledge, suggesting constructivist learning by marketing academics and practitioners is occurring in the age of AI (Bhatia, 2023; Rabby et al., 2021).

However, challenges remain. Prior research reveals that the debate about AI as a contributor to academic papers is ongoing (e.g. COPE, 2023; Ide et al., 2023; Polonsky & Rotman, 2023; Stokel-Walker, 2023; Thorp, 2023). We find Chatbots do not have access to real-time external databases, limiting direct literature search functionality and the ability to produce up-to-date responses. Chatbots need specific and iterative prompts to gather and synthesize information to tell the "story" sought by the researcher. Chatbot responses are concise, providing themes, questions and tips but lacking in depth and references. They also demonstrate limitations in handling query complexity. Where human or AI-selected literature does not address the research gap identified very closely, or where AI incorrectly interprets terminology, key themes become misaligned or irrelevant. Further, as queries became more complex, nonspecific language such as "appears/seems to" or "might/may provide" in Chatbot-generated summaries, increased. Application of pre-selected research outputs and the marketing professor role to queries did not consistently improve the focus, context and content of responses. In contrast, Claude 3 Opus and Gemini Advanced, despite not being able to review our outputs, generated several novel and relevant research gaps independently. Summaries – and subsequent reviews – display similarities across queries and Chatbots, without being replicable. Further, despite multiple iterations, the AI-generated themes and research gaps were often recurrent rather than novel and failed to be developed or refined over time.

Echoing the authors' own sentiments, ChatGPT-4 did highlight limitations of AI-human collaboration, stating: "*questions arise about the quality and depth of AI-assisted reviews and whether they can capture the nuances and interconnected themes inherent in human-led reviews*." Fundamentally, Chatbots lack human-level expertise to discern and deconstruct important elements of academic writing, as well as the critical thinking and domain knowledge essential to identify and address

research gaps, define the scope and nature of key themes, and bridge gaps in interdisciplinary research. Although AI has instant recall from a vast and more reliable source of memory, machine-based simulation of human intelligence cannot match the complexity of the human brain's cognitive processes and ability to think laterally and to conceptualize. As identified in prior research (Eke, 2023; Goldstein & Papert, 1977; Hein, 1991; Hof, 2021; J. Huang & Tan, 2023), AI-human collaboration, or achieving a balance between AI contribution and human intervention, critical thinking and decision-making is essential to achieving relevant, authentic and ethical output.

From the constructivist lens, the value of these Chatbots lies in their functionality to augment the human cognitive process. Incorporating CLT reframes the integration of AI into academic research as an evolving landscape of knowledge construction. Researchers, through their interactions with AI tools, "*are not just passive recipients of technology's benefits but active constructors of knowledge, shaped by their experiences, reflections, and the dynamic interplay between human cognition and artificial intelligence*" (ChatGPT-4, June 23). This is important to the research process because not only does AI "learn," but so do researchers. Developing a constructivist feedback loop between the researcher and AI suggests a potential transformation of the researcher's role. The constructivist paradigm views the researcher as an active learner who is constructing new knowledge.

By automating certain aspects of the research process, AI tools can enable researchers to engage more deeply with critical thinking and creative synthesis. Adopting the role of "guide" through use of interpretive and evaluative skills to assess the relevance and reliability of AI-generated outputs is integral to the quality AI-assisted research process. In other words, expert evaluation of AI-outputs today provides the foundation for better outputs in the future. Thus, interactions with AI chatbots enable researchers to: 1) reassess their role; 2) guide constructivist learning; and 3) gain deeper insights into the research process.

Implications for researchers in marketing

There are several implications for researchers in marketing that stem from our work. The first implication relates to using AI for research whilst maintaining the purity and transparency of academic endeavors. The potential for AI to mislead or misconstrue marketing science, whether by algorithmic bias or misguided selection of material, emphasizes the necessity for careful oversight and thorough validation of AI-driven results (Hair & Sarstedt, 2021). The danger of Chatbot-automation of tedious, replicative tasks such as producing summaries, for example, is that it may lure marketing academics into a false sense of trust in the ability of the AI to generate useful *and* accurate material (Bhattacharyya et al., 2023; Lea, 2020). Therefore, the onus is increasingly on academic researchers in the marketing field not just to utilize AI tools, but also to understand their underpinnings and potential pitfalls.

The second implication is that the traditional marketing research paradigm – defined by established methods and protocols – is being transformed from transactional to relational. Marketing researchers need to rethink and reframe existing conventions to accommodate AI-driven processes and practices (Dwivedi et al., 2023). While AI offers efficiency, integrating it more meaningfully as co-constructor of the research process will require more than just superficial adaptation of research techniques. For instance, research designs and methodologies can integrate AI prompts, theoretical suggestions and AI-assisted data collection and analysis, whilst researchers ensure outcomes remain theoretically sound.

Third, editors of academic journals in the marketing field, as the gatekeepers of quality scholarly work, may need to revise their expectations of research that seamlessly and transparently incorporates AI. Clear disclosure of algorithms, methodologies, prompt strategies and the potential biases therein should be a prerequisite. This transparency will be crucial to maintain trust in AI-driven research and to distinguish between genuine scholarly contributions and algorithmic outputs. Further, we concur that authors must remain responsible for the content of their manuscript, including AI contributions (COPE, 2023).

Fourth, with the rapid evolution of AI technologies, is the need for researchers to undergo training in the use of AI tools, techniques, and interpretation in the research process (Christou, 2023). This training is not only for achieving proficiency but for critical assessment of their relevance and validity in the context of specific research objectives. Such skills are vital for marketing scholars to remain effective and to ensure that the results derived from AI interventions are both credible and valuable. Further, while many research outputs discuss the effectiveness of ChatGPT-4 and other AI tools in generating content, analyzing data (Hair & Sarstedt, 2021) or cementing relationships with consumers through digital technologies (Rabby et al., 2021), the exploration of tools or methodologies to verify the authenticity and accuracy of such AI-generated content is urgently needed.

Theoretical and practical contributions

The contributions of this paper to extant literature are twofold. First, it develops our understanding of the use, limitations and potential contribution of AI (specifically Chatbots) to the steps of building a research idea, searching for literature, identifying a gap and theory, and suggesting alternative methodologies. Through observation of Chatbot-generated artifacts and manual checking, the paper demonstrates the limited functionality of Chatbots at each step. Further, this process focuses on the relevance of AI to research in the marketing discipline rather than to other disciplines.

Second, the paper builds on research and commentary on the potential opportunities and misuse of AI in the marketing field (Eke, 2023) by focusing on the integration of Chatbots into the process of initiating, shaping, analyzing and reviewing research (Hair & Sarstedt, 2021; Hyder et al., 2023). We find this very much follows a constructivist learning approach – by both human and AI contributors. Ultimately, we conclude that there is no part of the process where Chatbots can independently proceed, at least in their current form. Evaluation, summary, decision-making, validation, verification and expert development of arguments and theories must be undertaken by the (human) researcher. This confirms Chatbots as complementary, constructive, even collaborative tools in the academic research process in the marketing field rather than an independent contributor (or cheat) (DuBose & Marshall, 2023).

Limitations and future research

Including multiple Chatbots aids understanding of the potential applications and limitations of these AI-powered assistants in the academic setting. The Chatbots used in this research are the most recent versions commonly used to assist academic writing (Chatlabs, 2024; McKay, 2024; Semrl et al., 2023), rather than an exhaustive list. The authors acknowledge that it might be beneficial to use a wider range of AI-embedded Chatbots or other AI tools with functions more specifically aligned to the steps in the research process, particularly as Gen-AI advances.

During the research process, straightforward language and the role of professor were used to prompt conversations with the Chatbots. Although multiple iterations of queries for each step of the process were undertaken, we accept that different prompting techniques could also change the Chatbots' responses. By investigating the nuances of how individuals interact with Chatbots and the impact of various prompting methods, future studies might further optimize the use of these AI-powered tools in academic research.

The investigations in this paper are by their nature exploratory and incomplete, as integration of Chatbots into the research process continues to evolve. The authors acknowledge that focus on a more mainstream topic in marketing where more research has been published might have resulted in higher quality, more reliable responses. Equally, however, we argue that the marketing discipline needs more research on emerging issues such as AI and that, despite the proliferation of online discussion, the Chatbots were still unable to identify this specific research gap.

Future research might explore mechanisms or tools that can swiftly authenticate Chatbot-produced content, ensuring that it aligns with existing and emerging phenomena, factual rather than hallucinated information and academic literature. Such research agendas would serve to reinforce the PAR approach, namely evaluating the effectiveness of each action (step) and learning by academics using Chatbots. As our current paper has demonstrated, a human-led, iterative approach is critical to ensuring an exhaustive search, maintaining academic integrity, clarifying the research gap, scope and objectives, and ensuring that feedback loops based on dubious conclusions do not become self-reinforcing or deterministic (Lea, 2020).

Concluding comments

This research leads us to revise our initial proposition that Chatbots might completely supplant the research process led by marketing academics. While Chatbots offer speed, efficiency and scope, marketing scholars must ensure the accuracy and relevance of AI-generated content, as well as refine their own queries and interventions (Thorp, 2023). Researchers who adopt a cyclical and critical approach to integrating Chatbots into the research process will better position themselves to identify new challenges and topics of exploration, actionable methodologies and ultimately, to extend research and theory. From a CLT lens, such an approach reinforces the learning that occurs in AI-assisted research endeavors.

Marketing academics stand at a crossroads. The intersection of AI with marketing research is more than just a procedural shift but a horizon-broadening opportunity that spans disciplines, knowledge and research skills. Chatbot-generated output may reveal previously uncharted research questions, themes and topics in the marketing field. Academics need to consider how to integrate Chatbots within traditional marketing research processes, invest in advanced AI detection tools, and create an environment fostering ethical awareness to ensure research integrity (Eke, 2023; Hair & Sarstedt, 2021).

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Joanna Scott-Kennel http://orcid.org/0000-0002-0836-6811

References

Agnihotri, R., Bakeshloo, K. A., & Mani, S. (2023). Social media analytics for business-to-business marketing. *Industrial Marketing Management*, *115*, 110–126. https://doi.org/10.1016/j.indmarman.2023.09.012

Argyris, C., & Schön, D. A. (1989). Participatory action research and action science compared: A commentary. *The American Behavioral Scientist*, *32*(5), 612–623. https://doi.org/10.1177/0002764289032005008

Bada, S. O. (2015). Constructivism learning theory: A paradigm for teaching and learning. *Journal of Research & Method in Education*, *5*(6), 66–70. https://www.iosrjournals.org/iosr-jrme/papers/Vol-5%20Issue-6/Version-1/I05616670.pdf

Bakiner, O. (2023). What do academics say about artificial intelligence ethics? An overview of the scholarship. *AI and Ethics*, *3*(2), 513–525. https://doi.org/10.1007/s43681-022-00182-4

Bang, Y., Cahyawijaya, S., Lee, N., Dai, W., Su, D., Wilie, B., Lovenia, H., Ji, Z., Yu, T., Chung, W., Do, Q., Xu, Y., & Fung, P. (2023). A multitask, multilingual, multimodal evaluation of ChatGPT on reasoning, hallucination, and interactivity. *arXiv*. https://doi.org/10.48550/arXiv.2302.04023

Bhatia, P. (2023). ChatGPT for academic writing: A game changer or a disruptive tool? *Journal of Anesthesiology Clinical Pharmacology*, *39*(1), 1. 10.4103/joacp.joacp_84_23

Bhattacharyya, M., M, M. V., Bhattacharyya, D., & Miller, L. E. (2023, May). High rates of fabricated and inaccurate references in ChatGPT-generated medical content. *Cureus*, *15*(5), e39238. 10.7759/cureus.39238

Chatlabs. (2024, August 1). *Comparing top AI models: ChatGPT Vs gemini Vs Claude*. https://writingmate.ai/blog/chat-gpt-gemini-claude

Chintalapati, S., & Pandey, S. K. (2021). Artificial intelligence in marketing: A systematic literature review. *International Journal of Market Research*, *64*(1), 38–68. https://doi.org/10.1177/14707853211018428

Christensen, C. M. (2013). *The innovator's dilemma: When new technologies cause great firms to fail*. Harvard Business Review Press.

Christou, P. A. (2023). How to use artificial intelligence (AI) as a resource, methodological and analysis tool in qualitative research? *The Qualitative Report*, *28*(7), 1968–1980. https://doi.org/10.46743/2160-3715/2023.6406

Chui, M., Yee, L., Hall, B., Singla, A., & Sukharevsky, A. (2023, August 1). *The state of AI in 2023: Generative AI's breakout year*. QuantumBlack AI by McKinsey.

COPE. (2023). *Authorship and AI tools: COPE position statement*. https://publicationethics.org/cope-position-statements/ai-author?ct=t(member-insight-ai-feb-2023)

Cotton, D. R., 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

Dehouche, N. (2021). Plagiarism in the age of massive generative pre-trained transformers (GPT-3). *Ethics in Science and Environmental Politics*, *2*, 17–23. https://doi.org/10.3354/esep00195

Deniz, G. (2023). *The role of artificial intelligence in academic paper writing and its prospective application as a co-author: A letter to the editor. European journal of therapeutics*. https://doi.org/10.58600/eurjther1808

Dent, K. (2020). Ethical considerations for AI researchers. https://arxiv.org/abs/2006.07558

Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. The Free Press.

Dobrev, D. (2022). The AI definition and a program which satisfies this definition. *arXiv*. https://arxiv.org/abs/2212.03184 .

DuBose, J., & Marshall, D. (2023). AI in academic writing: Tool or invader. *Public Services Quarterly*, *19*(2), 125–130. https://doi.org/10.1080/15228959.2023.2185338

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L. . . . Wright, R. (2023, August). Opinion paper: "so what if ChatGPT wrote it?" multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *Journal of Information Management*, *71*, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Eke, D. O. (2023). ChatGPT and the rise of generative AI: Threat to academic integrity? *Journal of Responsible Technology*, *13*, 1–4. https://doi.org/10.1016/j.jrt.2023.100060

Elhajjar, S. (2024). The current and future state of the marketing management profession. *Journal of Marketing Theory & Practice*, *32*(2), 233–250. https://doi.org/10.1080/10696679.2023.2166535

Goldstein, I., & Papert, S. (1977). Artificial intelligence, language, and the study of knowledge. *Cognitive Science*, *1*(1), 84–123. https://doi.org/10.1016/S0364-0213(77)80006-2

Goto, A., & Katanoda, K. (2023). Should we acknowledge ChatGPT as an author? *Journal of Epidemiology*, *33*(7), 333–334. https://doi.org/10.2188/jea.JE20230078

Hagen, L., Uetake, K., Yang, N., Bollinger, B., Chaney, A. J. B., Dzyabura, D., Etkin, J. G., Liu, A., Sudhir, L., Wang, K., Wright, Y., R, J., & Zhu, Y. (2020). How can machine learning aid behavioral marketing research? *Marketing Letters*, *31*(4), 361–370. https://doi.org/10.1007/s11002-020-09535-7

Hair, J. F., Jr., & Sarstedt, M. (2021). Data, measurement, and causal inferences in machine learning: Opportunities and challenges for marketing. *Journal of Marketing Theory & Practice*, *29*(1), 65–77. https://doi.org/10.1080/10696679.2020.1860683

Haq, Z., Naeem, H., Naeem, A., Iqbal, F., & Zaeem, D. (2023). Comparing human and artificial intelligence in writing for health journals: An exploratory study. *medRxiv*. https://doi.org/10.1101/2023.02.22.23286322

Hein, G. E. (1991). *Constructivist learning theory. Institute for inquiry*. http://www.exploratorium.edu/ifi/resources/constructivistlearning.html

Hof, B. (2021). The turtle and the mouse: How constructivist learning theory shaped artificial intelligence and educational technology in the 1960s. *History of Education*, *50* (1), 93–111. https://doi.org/10.1080/0046760X.2020.1826053

Huang, J., & Tan, M. (2023). The role of ChatGPT in scientific communication: Writing better scientific review articles. *American Journal of Cancer Research*, *13*(4), 1148. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10164801

Huang, M. H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, *49*(1), 30–50. https://doi.org/10.1007/s11747-020-00749-9

Huang, M. H., & Rust, R. T. (2022). A framework for collaborative artificial intelligence in marketing. *Journal of Retailing*, *98*(2), 209–223. https://doi.org/10.1016/j.jretai.2021.03.001

Hyder, A., Perez-Vidal, C., & Nag, R. (2023). Artificial intelligence method for the analysis of marketing scientific literature. In L. Moutinho, L. Cavique, & E. Bigné (Eds.), *Philosophy of artificial intelligence and its place in society* (pp. 142–159). IGI Global. https://doi.org/10.4018/978-1-6684-9591-9.ch008

Ide, K., Hawke, P., & Nakayama, T. (2023). Can ChatGPT be considered an author of a medical article? *Journal of Epidemiology*, *33*(7), 381–382. https://doi.org/10.2188/jea.JE20230030

Jadhav, P., Samnani, A., Alachiya, A., Shah, V., & Selvam, A. (2022). Intelligent chatbot. *International Journal of Advanced Research in Science, Communication and Technology*. https://doi.org/10.48175/ijarsct-3996

Kumar, V., Ramachandran, D., & Kumar, B. (2021). Influence of new-age technologies on marketing: A research agenda. *Journal of Business Research*, *125*, 864–877. https://doi.org/10.1016/j.jbusres.2020.01.007

Lea, G. R. (2020). Constructivism and its risks in artificial intelligence. *Prometheus*, *36*(4), 322–346. https://doi.org/10.13169/prometheus.36.4.0322

Lévesque, M., Obschonka, M., & Nambisan, S. (2022). Pursuing impactful entrepreneurship research using artificial intelligence. *Entrepreneurship Theory and Practice*, *46* (4), 803–832. https://doi.org/10.1177/1042258720927369

McKay, P. Z. (2024, August 27). *Research & Knowledge*. https://answers.businesslibrary.uflib.ufl.edu/genai/faq/413488.

McKinsey & Company. (2022, August). *McKinsey technology trends outlook 2022 report*. https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/the%20top%20trends%20in%20tech%202022/mckinsey-tech-trends-outlook-2022-full-report.pdf

Morandín-Ahuerma, F. (2022). What is artificial intelligence? *International Journal of Research Publication and Reviews*, *3*(12), 1947–1951. https://doi.org/10.55248/gengpi.2022.31261

Nature. (2023). Tools such as ChatGPT threaten transparent science; here are our ground rules for their use. *Nature*, *613* (7945), 612–613. https://doi.org/10.1038/d41586-023-00191-1

Ottosson, S. (2003). Participation action research: A key to improved knowledge of management. *Technovation*, *23*(2), 87–94. https://doi.org/10.1016/S0166-4972(01)00097-9

Ozanne, J. L., & Saatcioglu, B. (2008). Participatory action research. *Journal of Consumer Research*, *35*(3), 423–439. https://doi.org/10.1086/586911

Paiget, J. (1970). *The science of education and the psychology of the child*. Grossman.

Polonsky, M. J., & Rotman, J. D. (2023). Should artificial intelligent agents be your co-author? Arguments in favour, informed by ChatGPT. *Australasian Marketing Journal*, *31* (2), 91–96. https://doi.org/10.1177/14413582231167882

Rabby, F., Chimhundu, R., & Hassan, R. (2021). Artificial intelligence in digital marketing influences consumer behaviour: A review and theoretical foundation for future research. *Academy of Marketing Studies Journal*, *25*(5), 1–7. https://www.abacademies.org/articles/artificial-intelligence-in-digital-marketing-influences-consumer-behaviour-a-review-and-theoretical-foundation-for-future-research-11892.html

Rahimi, F., & Abadi, A. T. B. (2023). ChatGPT and publication ethics. *Archives of Medical Research*, *54*(3), 272–274. https://doi.org/10.1016/j.arcmed.2023.03.004

Robledo, S., Grisales Aguirre, A. M., Hughes, M., & Eggers, F. (2023). "Hasta la vista, baby" - will machine learning terminate human literature reviews in entrepreneurship? *Journal of Small Business Management*, *61*(3), 1314–1343. https://doi.org/10.1080/00472778.2021.1955125

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

Semrl, N., Feigl, S., Taumberger, N., Bracic, T., Fluhr, H., Blockeel, C., & Kollmann, M. (2023). *AI language models in human reproduction research: exploring ChatGPT's potential to assist academic writing*. Human Reproduction. https://doi.org/10.1093/humrep/dead207.

Stokel-Walker, C. (2023). ChatGPT listed as author on research papers: Many scientists disapprove. *Nature*, *613* (7945), 620–621. https://doi.org/10.1038/d41586-023-00107-z

Taecharungroj, V. (2023). What can ChatGPT do? Analyzing early reactions to the innovative AI chatbot on Twitter. *Big Data Cognitive Computing*, *7*, 35. https://doi.org/10.3390/bdcc7010035

Thorp, H. H. (2023). ChatGPT is fun, but not an author. *Science*, *379*(6630), 313–313. https://doi.org/10.1126/science.adg7879

GPT-3 (Gpt Generative Pretrained Transformer), Thunström, A. O., & Steingrimsson, S. (2022). *Can GPT-3*

write an academic paper on itself, with minimal human input? (pp. Hal–03701250. https://hal.science/hal-03701250/document

Vlačić, B., Corbo, L., de Silva, S. C., & Dabić, M. (2021). The evolving role of artificial intelligence in marketing: A review and research agenda. *Journal of Business Research*, *128*, 187–203. https://doi.org/10.1016/j.jbusres.2021.01.055

von Glasersfeld, E. (1995). A constructivist approach to teaching. In L. Steffe & J. Gale (Eds.), *Constructivism in education* (pp. 3–16). Lawrence Erlbaum Associates, Inc.

Wagner, G., Lukyanenko, R., & Paré, G. (2022). Artificial intelligence and the conduct of literature reviews. *Journal of Information Technology*, *37*(2), 209–226. https://doi.org/10.1177/02683962211048201

Whyte, W. F., Greenwood, D. J., & Lazes, P. (1989). Participatory action research: Through practice to science in social research. *The American Behavioral Scientist*, *32*(5), 513–551. https://doi.org/10.1177/0002764289032005003

Wu, A., Caddell, J., & MacNeil, C. (1986). Introduction to Artificial Intelligence. *Computer Science, Art*. http://doi.org/10.2514/6.1986-163

Yeung, J., Kraljevic, Z., Luintel, A., Balston, A., Idowu, E., Dobson, R., & Teo, J. (2023). AI chatbots not yet ready for clinical use. *Frontiers in Digital Health*, *5*. https://doi.org/10.3389/fdgth.2023.1161098

Zhou, Z. (2021). Emotional thinking as the foundation of consciousness in artificial intelligence. *Cultures of Science*, *4*(3), 112–123. https://doi.org/10.1177/20966083211052651

Appendix I. Summary of AI Chatbot Queries/Outputs, Manual Checks and Interventions

Artificial Intelligence (Chatbot)	Actual Intelligence (Human)	
Stage of the Research Process "*Chat Query*" Chatbot Output *(with/out marketing professor role/top-tier journal specified)*	Authenticity and Accuracy Check, Limitations	Intervention
Research objective. *"Write an academic article for the 'Journal of Marketing Theory and Practice', on making a contribution to academic research in marketing in the era of AI"*		
ChatGPT-4 – Provided a general structured abstract and detailed outline including ethics, interdisciplinary collaboration, limitations. *With role* specified, provided a basic structure and some marketing research, practice, education and academic research-oriented themes. **Gemini Advanced** – Provided a detailed article structure, tips for authors. *With role* specified, abstract and bullet instructions for each section and theme, and tips for authors. **Perplexity Pro –** Provided URLs for one academic and four non-academic articles focused on AI and marketing (research) or consumer behavior, rather than academic research. These are referenced using numbers in a 597-word "article." *With role* – 27 marketing-related outputs, broad coverage of topics from consumer behavior, marketing strategy to tools and techniques for market research. Produced a 522 word "article," "Role of AI in Enhancing Academic Research in Marketing," with data analysis, consumer behavior, predictive modeling, strategies, ethics as key themes. **Claude 3 Opus** – *with role* – Complete 1339-word article, titled as per prompt above, including keywords. Focus on how marketing researchers can leverage AI to make meaningful contributions to the field. Includes data analysis, predictive modeling, consumer insights, advancing marketing theory and practice, ethical considerations and limitations, and recommendations for marketing researchers. 19 academic articles in top marketing journals cited and in reference list.	**ChatGPT-4** – Unable to write an article. Terms incorrectly defined, focus on marketing practice/research/curriculum rather than academic research in marketing, low relevance output. **Gemini Advanced** – Unable to perform this task, due to academic scope, specificity, originality and journal focus. *Without role* focused on learning, teaching and curriculum, *with role*, focused on academic research. **Perplexity Pro –** Some relevant arguments and themes. *With role* – Too broad, less useful as academic research. Emphasis on marketing research and strategies rather than academic research in marketing. **Claude 3 Opus** – *with role* – Style is academic, topic focussed but not relevant, 94% of content focused on academic research rather than practice. Correctly cited references and a reference list, relevant but out of date (2016–2021).	Break query into sub-tasks. Refocus research query on academic research in marketing rather than marketing research. Use marketing professor **role** and target outlet to refine responses going forward.
Key themes. *"Draft an outline and structure for an academic paper on 'Implications of AI for academic researchers and research'"*		
ChatGPT-4 – Generated structure based 11 research themes (e.g. evolution, potential, challenges, ethics, governance of AI in academic research, and recommendations for researchers). **Gemini Advanced** – Provided an outline for an article entitled "Opportunities and challenges of AI for academic researchers," including 9 relevant themes as sub-headings, for example, "enhanced literature discovery," "accelerated data analysis," "streamlined research workflows," "ethical considerations," "AI literacy," "collaborative" "ways researchers and AI systems can work together." *With role*, focused on AI tools in research and research methodologies. **Perplexity Pro** – *with role* – Provided 27 references to academic and non-academic online sources. References 7 of these in the outline for paper entitled "AI in Academic Research;" focused on research efficiency, innovation and discovery, accessibility and collaboration, data bias, academic integrity and authorship, privacy and security, recommendations for researchers. **Claude 3 Opus** – *with role* – generated 458-words, titled and focused as per query, includes abstract, keywords, sub-topics by theme; application, challenges and ethics, researcher skills and competencies; recommendations for researchers, institutions, policymakers.	**ChatGPT-4** – 7 of 11 themes identified were relevant to academic research. However, initial queries also included teaching and education, ethics themes. No references or actual content provided. **Gemini Advanced** – Focus on how to write the paper. All themes relevant to AI in academic research. No references or actual content provided. **Perplexity Pro** – *with role* – Article (sub)headings and bullet points focussed on academic research across disciplines. Academic sources not typically accessible via URLs listed. Some are useful, others off-topic focused on tertiary education and teaching. **Claude 3 Opus** – *with role* – Focused on both application and implications of AI for academic research. Lists relevant themes and sub-topics as per outline format, no references or reference list.	Remove unintended emphasis on "education" and "teaching" in chat queries. Select relevant themes for further investigation. Focus queries on prior research (literature) in marketing.
Literature search and retrieval. *"Review research on the role of AI in academic research in the marketing discipline"*		

(*Continued*)

(Continued).

Artificial Intelligence (Chatbot)	Actual Intelligence (Human)	
Stage of the Research Process "*Chat Query*" Chatbot Output *(with/out marketing professor role/top-tier journal specified)*	Authenticity and Accuracy Check, Limitations	Intervention
ChatGPT-4 – Articles retrieved focus on AI in marketing practice and marketing research. *With role*, lists and explains six key areas where AI has made a significant contribution e.g. consumer behavior analysis, market segmentation and targeting. **Gemini Advanced** – both *with* and *without role* – Where and how to find relevant research (search engines, marketing journals, AI publications), topics and search terms. Two full references. **Perplexity Pro** – *with role* – Provided URLs and one sentence summaries for 30 online sources, both academic and non-academic, focussed on marketing, marketing strategy, data management, digital marketing, consumer behaviour/ research, future of marketing, AI applications, implementation, academic research (algorithms for data analysis, pattern recognition), market research, pitfalls, opportunities, ethics and legal challenges, academic R&D, academic journals. **Claude 3 Opus** – *with role* – Introduction, conclusion, references. Lists and references research topics on the role of AI in academic research within the marketing discipline focusing on applications (data analysis and insights, natural language processing, computer vision, AI-assistance), automation and efficiency, knowledge discovery and theory development; benefits of AI in marketing research; limitations and challenges; future research directions. 23 academic references from marketing, computer science and management journals and a book.	**ChatGPT-4** – No real-time access to databases to retrieve specific articles. Low relevancy, functionality. Summaries brief but well written, no references provided. Further checking revealed summaries contained evidence of plagiarism and paraphrasing. Despite inclusion of role, answer focused on marketing research and practice. **Gemini Advanced** – Themes, topics, terms all related to marketing research and practice rather than research by marketing scholars. Referenced two reviews on AI in marketing research (2020; 2021), that were omitted in the *with role* query. **Perplexity Pro** – *with role* – Extensive reference list is useful but only two articles address AI in the academic research process. **Claude 3 Opus** – *with role* – similar themes to previous answers, but very dense lists of sub-points, each individually referenced with academic citations.	Redefine query to focus on academic research. Split into smaller sub-tasks, e.g. article retrieval via other AI platforms. Manual review to confirm research gap as "using AI to write an academic article."
AI platforms. *"What AI platforms would I use to undertake a literature review?"*		
ChatGPT-4 – *with role* – Identified Iris.ai, Semantic Scholar, Connected Papers, Scite, Meta, Ryyan, Elicit, Google Scholar, ScienceDirect, ArXiv and bioRxiv. *With role* suggested others; Elicit and Science Direct, two key search engines used by marketing scholars. **Gemini Advanced** – Identified 10 platforms categorized by type: AI-focused semantic search engines (e.g. Semantic Scholar, Scite, Connected Papers); multi-disciplinary search platforms with AI features (e.g. Google Scholar, Research Rabbit, SciSpace); specialized literature analysis tools (e.g. Iris.ai, Litmaps); Note-taking, reference management tools (e.g. Roam Research, Zotero). *With role* query added Scholarcy, TLDR papers, Mendeley. **Perplexity Pro** – *with role* – 8 non-academic sources focussed on AI tools. Listed & described Semantic Scholar, Elicit, Scite, Research Rabbit, Google Bard, ChatPDF, Iris.ai, SciSpace. **Claude 3 Opus** – *with role* – Provides description, key functions, URL for Semantic Scholar, Iris.ai, Scopus, Research Rabbit, Knowlit, Meta, Rax. Brief discussion of advantages, limitations, and importance of human judgment and expertise in review.	**ChatGPT-4** – Online search engines assisted or driven by AI algorithms and machine learning. Useful, but out of date. **Gemini Advanced** – Search engines assisted or enhanced by AI. URLs provided. **Perplexity Pro** – Useful as a list of AI-assisted research tools that use AI and natural language processing to search, "read," summarize, suggest, retrieve, analyze, reference, map, recommend, rewrite or answer queries about literature on a topic. **Claude 3 Opus** – Tools described as AI-powered, AI-driven, AI-based, AI-assisted or using AI technologies.	Focus on free platforms able to retrieve full-text academic marketing articles. Refine definitions of AI technologies to distinguish Chatbots and search engines.
Literature review. *"Read the uploaded articles and generate a literature review on 'integrating AI into the academic research process?'"*		

(*Continued*)

(Continued).

Artificial Intelligence (Chatbot)	Actual Intelligence (Human)	
Stage of the Research Process "*Chat Query*" Chatbot Output *(with/out marketing professor role/top-tier journal specified)*	Authenticity and Accuracy Check, Limitations	Intervention
ChatGPT-4 – Generated summaries of uploaded articles around the theme of AI's transformational role in research, and a literature review including 12 referenced bullet points. Included less relevant topics related to media writing and professional domains. Reiteration of query generated 10 themes, of which 5 were most relevant, no references to specific articles, but a detailed one-page summary of each, followed by a 500-word literature review, no new themes. *With role* – generated a 500-word review. Key themes; efficiency and communication, AI as a collaborator, ethical considerations and authorship, future directions. **Gemini Advanced** – Initially unable to access or literature files/articles due to privacy (permissions), format incompatibility (text) and complexity (expertise). Provided a "how-to" guide for manual summary of each article, and the process Gemini would adopt to generate a review. Once the articles were uploaded to Google Workspace, and all key information for the review was given, Gemini generated an outline of the benefits, opportunities, challenges and considerations of AI and research. *With role* did not produce better results. Copying the first few pages of each research output into a separate review query generated a review. **Perplexity Pro** – *with role* – Unable to access or review uploaded documents or external files. Multiple iterations each provided a general structure for literature review, including AI technologies, and benefits of integrating AI into academic research. **Claude 3 Opus** – *with role* – 871 words. Abstract, introduction, benefits and opportunities, challenges and concerns, strategies and recommendations for integrating AI into academic research, future directions, conclusion, references cited but not listed.	**ChatGPT-4** – Manual review of these articles found summaries were broadly accurate but plagiarized or paraphrased. *With role* query useful to identify relevant themes and focus direction of the research. No references cited or listed. **Gemini Advanced** – Ineffective, inability to access more that 2–3 research outputs at a time, and those restricted in length. Considerable manual intervention and repeat queries needed which generated instructions on how the articles could be manually prepared for review. The (eventual) review did not provide any new themes. **Perplexity Pro** – *with role* – Useful as a process and guide, with some themes broadly identified, not referenced. **Claude 3 Opus** – *with role* – Well-written. Relevant and focused on academic research, fully referenced in text but no reference list.	Observe themes/sub-headings from new queries and Chatbot outputs converging in multiple iterations. Select the most relevant themes as a foundation for literature review.
Research gap. *"Can you identify a research gap from the literature review centred on 'AI in academic research"' (14 outputs/articles uploaded) OR "Can you identify a research gap in the literature on the contribution of AI to academic research? (if unable to upload research outputs)"*		

(*Continued*)

(Continued).

Artificial Intelligence (Chatbot)	Actual Intelligence (Human)	
Stage of the Research Process "*Chat Query*" Chatbot Output *(with/out marketing professor role/top-tier journal specified)*	Authenticity and Accuracy Check, Limitations	Intervention
ChatGPT-4 – Ten themes similar to those generated earlier, with five being relevant (see footnote 5 in paper). **Gemini Advanced** – Reiteration eventually produced potential research gaps: "guidelines and best practices" that balance innovation with integrity, "long-term impacts on critical thinking;" "addressing bias in AI for writing" and perpetuating such bias; "specialized AI for scholarly writing" including tools to read scholarly text, generate citations and adhere to style guidelines; and "human-AI collaboration models" using AI for specific tasks alongside human judgment and interpretation. *With role* generated new gaps: "impact of AI on critical thinking and research independence," disciplinary variation in AI adoption,' a worldview (as opposed to a Western view) of AI in research, and long-term transformational effects of AI on research. **Perplexity Pro** – *with role* – Reiteration without uploaded outputs identified relevant gaps: "understanding the impact of AI on the CLT environments in academia . . . lack of empirical studies on the actual experiences of marketing academics as they integrate AI into their research processes . . . [and] exploration of the ethical, social, and pedagogical implications of AI integration into academic research, with a specific focus on the marketing discipline and its alignment with CLT." **Claude 3 Opus** – *with role* – Identified gaps as: "Longitudinal studies on the impact of AI adoption," "Strategies for ensuring accountability and transparency," "Pedagogical approaches for AI literacy," "Equity and accessibility considerations," "Discipline-specific applications and challenges," "Collaborative human-AI research processes." Reiteration without uploaded outputs added; "Guidelines and best practices for AI use in research," "longitudinal impact of AI adoption on academic research quality and innovation," "authorship models and mechanisms for crediting AI contributions"	**ChatGPT-4** – Research gaps not focused on academic research. **Gemini Advanced** – Difficulty accessing files or previous review, summarized each article separately using separate queries. Increasingly vague as to the reliability of summary output, e.g. "unable to guarantee," "likely emphasizes," "might conclude," "probably argues." Reiteration based on analysis of the articles useful, but produced similar "gaps" to earlier queries (see output for key themes above). **Perplexity Pro** – *with role* – Access problems, poorly focused on academic research, practitioner- oriented when research outputs included. Query reiteration without these outputs did identify real gaps. **Claude 3 Opus** – *with role* – Identified need for discipline-specific research and human-AI collaboration. Other gaps were not focused on academic research. Reiteration without uploaded intputs were more relevant to topic. No references cited or provided.	Select most relevant themes: "Integration of AI with traditional research practices," and "human-AI collaboration models." Manual, expert identification of focused research gap as "AI in the academic research process."
Theoretical foundation. *"We want to write an academic research article on the topic of 'Using AI for Academic Research'.' Can you please suggest relevant theories and explain the reason behind each suggestion?*		
ChatGPT-4 – Eight potentially relevant theories with brief explanations of each and how they might apply to the topic. **Gemini Advanced** – Eight theories focused on *capability*: Machine Learning Theory, Natural Language Processing Theory, Symbolic AI Theory, *impact*; Diffusion of Innovation Theory, Activity Theory, Actor-Network Theory, and ethics; Algorithmic Bias Theory, Ethics of AI Theory. *With role* – fewer and less relevant theories suggested. **Perplexity Pro** – *with role* – Theories and rationale: Technological determinism, Actor-Network, Innovation Diffusion, Socio-Technical Systems, Ethics of AI. **Claude 3 Opus** – *with role* – Theories: Socio-Technical Systems, Diffusion of Innovations, Technology Acceptance, Actor-Network, Situated Learning, Human-Computer Interaction (HCI), Activity Theory.	**ChatGPT-4 & Gemini Advanced** – Explanation of each theory. No references. **Perplexity Pro** – *with role* – Theories align with idea of human-AI collaboration in research and change rather than learning. 10 sources, no reference list. **Claude 3 Opus** – *with role* – Situated Learning Theory, Human-Computer Interaction (HCI) Theories most appropriate for this research and complement CLT.	Review theory explanations. Select CLT as the most relevant to research. Integrate CLT into the literature review.
Integrating CLT. *"How might constructivist learning theory apply to the use of AI in academic research?"*		

(*Continued*)

(Continued).

Artificial Intelligence (Chatbot)	Actual Intelligence (Human)	
Stage of the Research Process "*Chat Query*" Chatbot Output *(with/out marketing professor role/top-tier journal specified)*	Authenticity and Accuracy Check, Limitations	Intervention
ChatGPT-4 – Insightful view on the potential for AI, although efficient, to diminish in-depth understanding and critical thinking born of a constructivist approach. **Gemini Advanced** – Focused. Identifies active learning, social interaction, situated learning and learner autonomy as core principles of CLT, then provides a short paragraph on how constructivism relates to AI in academic research, namely: personalization of learning, collaborative tool, scenarios and problem-solving, learner agency and metacognition. **Perplexity Pro** – *with role* – 10 sources. CLT related to learning through engagement with AI, other theories, as per previous query (above). **Claude 3 Opus** – *with role* – Application of CLT discussed in 518 words, with 6 headings; active knowledge construction, scaffolding and support (for learners/researchers), collaborative knowledge building, authentic and situated learning, reflection and metacognition, iterative and adaptive learning.	**ChatGPT-4** – Useful and critical view of AI in academic research from CLT perspective. **Gemini Advanced** – Useful and concise application of theory but focused on learner rather than academic research. **Perplexity Pro** – *with role* – Addition of paragraph on CLT and AI, repetition of prior theories. Limited usefulness. **Claude 3 Opus** – *with role* – Discussion aptly describes our participant action research approach through the lens of CLT.	Manual search for AI and CLT research. One article found, not focussed on academic research. Manual search for academic articles on CLT.
Theory review and application. *"Can you review these articles to understand Constructivist Learning theory and then apply them to the literature review on 'AI and academic research' to generate a new literature review?"*		
ChatGPT-4 – Limited summary of each article. Links made between content of each article and CLT. Literature review framework highly relevant in terms of themes but very brief at only 370 words. Wording vague and inconclusive. Included one-page summaries of the 19 articles. Themes and outline similar to previous output, no references. *With role* query response focussed on; constructivist foundations, active engagement with AI tools, personal and social construction of knowledge, reflection and abstraction, challenges and ethical considerations. **Gemini Advanced** – Outlined process Gemini would follow to do this, specifically linking AI to CLT with limited mention of academic research. Focus on research process and gaps. *With role* – provided a definition of CLT before applying it to AI using a series of questions and themes for a review (similar to previous output). **Perplexity Pro** – *with role* – 15 articles, cited 3. Themes: AI as tool for active learning, collaborative learning and AI, AI and personalized learning, challenges. **Claude** 3 Opus – *with role* – Reviewed only one article and provided a summary.	**ChatGPT-4** – Integration of CLT with AI. Some themes related to academic research. No references. **Perplexity Pro** – Encountered access problems to external files, attempted to synthesize 3 articles, hence focus on learning, education and data privacy issues, and CLT and learning/learners rather than academic research. No references cited or listed. **Gemini** Advanced – AI and CLT outputs had to be reshared, resulting in permission and format errors. **Claude 3 Opus** – Upload limited 1–4 short, non-complex articles.	Manually address limitations of AI-generated literature reviews. Manually develop themes, implications and outcomes, using human expertise.
Research gap (post-review of outputs). *"Can you, based on your knowledge and the literature review, suggest academic research gaps around the topic of "AI in Academic Research?"*		

(*Continued*)

(Continued).

Artificial Intelligence (Chatbot)	Actual Intelligence (Human)	
Stage of the Research Process "*Chat Query*" Chatbot Output *(with/out marketing professor role/top-tier journal specified)*	Authenticity and Accuracy Check, Limitations	Intervention
ChatGPT-4 – 13 research gaps identified and explained, including five new gaps, of which "AI's role in data collection and analysis," and "long-term impacts of AI on the nature of academic research" and "AI's role in peer review and publication process" were most relevant. *With role* query generated five more focused and relevant gaps, including: "empirical evidence on constructivist AI learning in research contexts," "AI-assisted research collaboration between researchers," "ethical considerations and frameworks," "AI's role in facilitating reflective inquiry and metacognition," and "integrating AI into diverse disciplines." **Gemini Advanced** – 8 gaps identified, similar to previous responses (above). **Perplexity Pro** – *without role* – Similar themes based on CLT principles. *With role* - focused and relevant outline based on key gaps (see text), cited 18 articles. **Claude 3 Opus** – *with role* – List of research gaps, each explained with relevance to AI.	**ChatGPT-4** – Reveals the diversity of potential research gaps across this topic from roles, reflection and impact to collaboration and ethical frameworks. Does not consider AI-human collaboration. **Gemini Advanced, Perplexity Pro** – *without role* – and **Claude 3 Opus** – *with role* – Similar to previous responses. **Perplexity Pro** – *with role* – Clear and insightful, focused on key themes and gaps relating to AI in academic research, including CLT. New gap of rationality identified. No reference list.	Focus on "integrating AI into traditional academic research." Confirm this focus as a research gap through manual review.
Implications for marketing academics. *"Go back to the literature review; based on the 19 articles uploaded in the conversation history, refine the literature review and research gap around the topic 'integration of AI into traditional academic research (with specific implications for marketing academics)?'"*		
ChatGPT-4 – Review focussed on research objectives, and relevant research gaps. Brief, 285 words, 2 references cited. **Gemini Advanced** – Requested themes and existing gaps from the researcher. Articles reloaded instead. Provided "how to" guide to refine the literature review. Themes: challenges, research methods, ethical implications, impact on marketing scholar roles. Gaps: developing frameworks, impact of quality of marketing research and education, building trust, and the role of marketing expertise. **Perplexity Pro** – *with role* – Access problems, 10 articles uploaded, unable to review these directly. Gaps similar to previous response (above), and the impact of AI on research methodologies. **Claude 3 Opus** – *with role* – Review focussed on prior themes, potential and challenges of AI, application and functions of AI in marketing and academic research. Seven gaps (see text) were novel and relevant.	**ChatGPT-4** – Accurate but insufficient review, more suited as an initial guideline for a paper. **Gemini Advanced** – Themes and gaps somewhat repetitive but mostly relevant, however re-inclusion of irrelevant education and ethics themes. **Perplexity Pro** – Clear, focussed, relevant themes and gaps suited to academic research. **Claude 3 Opus** – Review, gaps and recommendations highly relevant to academic research from methodological, ethical, theoretical and philosophical perspectives.	Manual review of literature on AI-identified themes. Manual integration of CLT into literature review.
Research methods 1. *"We aim to write an academic research article on the topic of 'Using AI for Academic Research' using CLT as theory. Could you suggest appropriate research methods and data collection methods, and explanation for why these methods are recommended?"*		

(*Continued*)

(Continued).

Artificial Intelligence (Chatbot)	Actual Intelligence (Human)	
Stage of the Research Process "*Chat Query*" Chatbot Output *(with/out marketing professor role/top-tier journal specified)*	Authenticity and Accuracy Check, Limitations	Intervention
ChatGPT-4 – Methods and explanations: Ethnography – lived experiences of researchers, Action research – researcher participation and reflection, Narrative inquiry – stories from researchers, and Grounded theory – data on researchers. Data collection: in-depth interviews, focus groups, participant observations, reflective journals, artifact analysis. *With role* query suggested mixed methods using surveys, interviews, case studies, and/or document analysis. **Gemini Advanced** – Multi-method approach for triangulation, understanding experiences and contextualizing insights. Links quantitative and qualitative methods, case studies with CLT focus. Data collection: surveys and questionnaires, interviews, focus groups, case study data collection and analysis. **Perplexity Pro** – *with role* – 20 articles, 4 cited. Mixed-method research design, with surveys, bibliometric analysis, semi-structured interviews, case studies, focus groups and participant observation and document analysis as options. **Claude 3 Opus** – *with role* – Functions and explanation linked to CLT for; qualitative case studies, participatory action research, and data collection methods; semi-structured interviews, participant observation, and document analysis.	**ChatGPT-4 and Gemini Advanced** – Explanations of methods accurate and useful, more focused with role included in the query. **Perplexity Pro** – *with role* – Focus is how these methods might be used to explore AI in the academic research process, broad and brief explanation/ justification of mixed method approach using these methods. **Claude 3 Opus** – *with role* – Aligns well to the approach taken in this research, including PAR, observation and document analysis of AI.	Manual review of AI-generated summaries and methods literature. Select participatory action research (PAR) as method.
Research methods 2. *"Please be more specific as to how we could undertake action research where researchers participate in the process of integrating AI tools into academic research, then reflect on the learning and knowledge construction that takes place?"*		
ChatGPT-4 – Action plan for topic identification, and how to integrate AI tools into the research process, engage in research, reflect on the process, analyze, share and interpret findings and evaluate effectiveness. **Gemini Advanced** – Action research framework aligned with CLT principles, including collaboration across disciplines, AI tool selection, cycle of action and reflection. **Perplexity Pro** – *with role* – Definition of PAR, list and definition of methods; case studies, ethnographic studies, interviews and focus groups, surveys, reflective journals, participant observations. **Claude 3 Opus** – *with role* – Participant recruitment, collaborative planning, iterative implementation and reflective cycles, progressive refinement, culminating reflections and dissemination.	**ChatGPT-4** – Focus on process of how AI tools might be used in academic research. Aligns with this paper. **Gemini Advanced** – Suggests researchers adopt different AI tools for different parts of the research process, documentation and group discussion of output. **Perplexity Pro** – *with role* – Identifies PAR without prompt, explanation of advantages of each method linked to AI and CLT principles. **Claude 3 Opus** – Participatory approach aligned closely with CLT principles of learner agency, social context, and iterative knowledge construction.	Demonstrate feedback loop between AI-assisted and human-guided research (ie. researchers and chatbots arrive at similar methods).