AI, human or a blend? How the educational content creator influences consumer engagement and brand-related outcomes

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Abstract

Purpose – This study aims to investigate the impact of educational digital content (EDC) creators on perceived content quality, consumer engagement, brand attitude and advocacy intention.

Design/methodology/approach – The research consists of two experimental studies. In Study 1 ($N = 172$), participants were exposed to either AI-generated or human-generated educational content, with measured perceived content quality and consumer engagement. In Study 2 ($N = 158$), the authors extended the investigation and compared the effects of AI-generated, human-generated and hybrid-generated EDC on consumer engagement, brand attitude and advocacy intention.

Findings – Study 1 demonstrates that while the type of content creator does not significantly affect perceived content quality, it significantly influences consumer engagement, with the AI-generated EDC resulting in lower engagement. Study 2 highlights the effectiveness of human-AI collaboration, showing that consumer engagement is higher for hybrid posts than fully AI-generated ones, with hybrid content performing on par with human-generated content. Mediation analyses indicate that consumer engagement is a crucial mediator between content creator type and brand outcomes.

Originality/value – This research contributes to the literature on EDC in digital marketing and AI-generated content. Unlike previous studies that often isolate AI and human creators, this work highlights the benefits of integrating a hybrid approach. The findings provide practical implications for managers seeking to optimize digital strategies with valuable educational content.

Keywords Content marketing, Educational digital content, Artificial Intelligence, Content creator, Consumer engagement, Brand attitude, Advocacy

Paper type Research paper

1. Introduction

Digital content marketing (DCM) focuses on creating and distributing relevant, valuable content to target audiences via digital platforms. Its primary goal is to enhance customer relationships rather than just drive direct sales. As a result, DCM has become a cornerstone of modern marketing strategies, offering businesses significant opportunities to engage prospects and customers, build loyalty and generate value (Hollebeek and Macky, 2019).

Educational Digital Content Marketing (EDCM) is a promising subcategory of digital content marketing, particularly for its ability to positively influence customer engagement (Tafesse, 2016; Knihová, 2019). Its relevance has grown significantly in recent years, especially in response to the COVID-19 crisis (Knihová, 2020b). During this period, major brands, such as Nike and Apple, adopted educational digital content (EDC) to reach consumers in the digital environment, by launching awareness campaigns about social distancing in different ways (Knihová, 2020a). Initiatives like these, often outside the core mission and identity of the brands, aimed to support their audiences during difficult times.

Moreover, as consumer tolerance for interruptive advertising declines, with online banner ads and paid editorials facing increasing skepticism (Ho *et al.*, 2020), EDC provides a way to move beyond traditional ads by offering valuable information to consumers. According to Statista (2023), millions of internet users worldwide now use ad blockers. As a result, businesses must adapt their strategies to promote their brands and products effectively. One promising approach is to deliver high-quality EDC that adds value to consumers' lives (Sun *et al.*, 2021). This shift toward content-driven marketing can help create more meaningful interactions while also generating and spreading a positive brand image (Terho *et al.*, 2022).

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Until recently, digital content was created by humans, starting from the creative concept to its development using advanced graphic design software. Today, however, this content can be entirely generated by artificial intelligence (AI) (Chen *et al.*, 2024a). AI-generated content (AIGC) has been increasingly prevalent with the introduction of powerful and user-friendly generative AI tools like ChatGPT by OpenAI. Specialized tools for text-to-image creation, such as DALL-E and MidJourney, have also contributed to this rise (Grassini and Koivisto, 2024) since generative AI can match, and even surpass, human-made images in terms of marketing effectiveness (Hartmann *et al.*, 2024).

According to Gartner (2023), over 80% of companies are expected to adopt generative AI and deploy GenAI-enabled applications in content production environments by 2026, a significant increase from less than 5% in 2023. Because AIGC frees human creators from time-consuming tasks, enhances efficiency and personalization and reduces costs (Blaurock *et al.*, 2024; Chen *et al.*, 2019), it is set to revolutionize the market, marking a significant shift from traditional human-created digital content. It is no surprise that the adoption of generative AI has progressed rapidly in various fields, including art (Grassini and Koivisto, 2024; Wu *et al.*, 2020), essay writing (Noy and Zhang, 2023), and advertisements (Song *et al.*, 2024). However, despite the increasing use of EDC in brands' communication strategies, no study has yet examined the role of AI in generating EDC or its impact on consumer engagement and brand-related outcomes. This aspect should not be overlooked, since on the one hand, innovative approaches to marketing content development require evaluation and analysis across different contexts, and, on the other hand, the existing literature on AIGC presents mixed findings, indicating a pronounced influence of the type of communication or content involved (Peres *et al.*, 2023). Some studies highlight a greater user appreciation for works created by generative AI (Chaisatitkul *et al.*, 2024). Conversely, other research has documented a more critical stance toward AI-generated content compared to human-created content (Wu *et al.*, 2020).

Beyond examining a type of AI-generated digital content that has yet to be studied, this research introduces a novel perspective by investigating the relationship between brand-related variables that remain unexplored in the literature, as well as by focusing on the impact of a hybrid approach to content generation, an area that remains largely understudied. Specifically, study 1 explores how perceived content quality and consumer engagement differ when the content is created by AI versus humans. Study 2 extends Study 1 by introducing a hybrid approach, where a team of humans collaborates with AI in EDC creation, and explores the content creators' effects not only on consumer engagement but also on brand attitude and advocacy intentions.

The research enriches the literature on digital content (e.g. Ho *et al.*, 2020) and educational marketing (e.g. Bell *et al.*, 2017), as well as the literature on the use of generative AI to create digital content (e.g. Kim *et al.*, 2020). Additionally, the study makes a substantial contribution to the literature on AI-human collaboration (Blaurock *et al.*, 2024). Our findings also align with collaborative content creation models (Le *et al.*, 2024) by showing that hybrid-generated EDC – where AI-generated drafts are refined through human input – outperforms fully AI-generated content. Moreover, they support the idea that AI should complement rather than replace human creativity.

Beyond its theoretical contributions, this study provides valuable practical insights for marketers. While AI can generate content that is perceived as qualitatively comparable to human-created material, fully AI-generated educational content poses a risk of reduced engagement, ultimately weakening consumer-brand relationships. A hybrid content creation approach emerges as a viable solution to the engagement challenges associated with AI-generated EDC.

2. Literature review and hypotheses development

2.1 The role of education in marketing

Educational marketing represents a strategic brand initiative to impart relevant knowledge and skills to customers (Honebein, 1997). This approach has garnered significant interest from businesses over the years, with many prioritizing it due to its potential to increase customer loyalty and create more profitable relationships. Customer education can do more than just supplement a firm's service offerings, it also strengthens customer ties to the firm by encouraging loyalty through enhanced knowledge and competencies (Bell *et al.*, 2017).

Over time, the focus of educational marketing has broadened from merely transferring specific product knowledge to addressing wider and more complex themes such as ethical practices and sustainability. This shift mirrors changing consumer expectations toward brands that demonstrate social responsibility (Sari *et al.*, 2021). The evolution of educational marketing has been driven by brands' goals and efforts not only to enhance customers' understanding of product-related information but also to encourage an ongoing relationship that goes beyond routine transactions.

Originally rooted in offline contexts – such as in-store educational events, workshops and seminars – consumer education effectively catered to diverse needs by providing direct engagement opportunities that enriched the shopping experience (Sands *et al.*, 2015). Over time, however, this practice has increasingly shifted to digital platforms. This transition marks a transformation in how educational marketing is executed (Knihová, 2020b), as digital platforms facilitate scalability and customization, enabling brands to offer personalized educational content to a global audience. Yet, this digital shift comes with its own set of challenges. Producing high-quality digital content demands significant investments in technology and expertise. Maintaining consumer engagement online requires frequent updates and interactive elements (Hollebeek and Macky, 2019), which Ai's new capabilities can autonomously manage. Despite the opportunities presented by AI tools to advance customer education and engagement, research in this area remains limited (Knihová, 2021), highlighting the need to explore the combination of educational strategies and AI technologies to better understand how EDCM is perceived based on its source.

2.2 Educational content marketing

Educational content informs and educates followers on specific topics, guiding digital customers throughout their journey. This process involves inspiring, motivating, and empathetically

supporting them in their decision-making (Knihová, 2021). Examples of such content include professional tips, do-it-yourself (DIY) instructions, expert opinions, and in-depth educational materials such as articles, reports, and blog posts (Tafesse, 2016). A well-known example of educational branded content is Procter & Gamble's educational content platforms such as "Home Made Simple" (for busy moms), "Being Girl" (for adolescent girls), and "Man of the House" (for dads). These sites target specific niche audiences with relevant, useful, and engaging educational content, making it a strong example of effective EDCM (Pulizzi, 2012). Owing to the increasing use of EDCM by companies online, four main themes have been conceptualized:

1 health;
2 social issues;
3 content about hobbies/work; and
4 knowledge about the world (Olenski, 2015).

Table 1 reports the main educational theme categories together with some relevant case studies.

Although educational content may resemble informational content, the key difference is that while the latter enhances consumer knowledge about a brand's products, the former covers a broader context beyond the company's offerings (Knihová, 2021).

Research suggests that emphasizing the educational nature of content is crucial for the success of a brand (Grubor and Milovanov, 2016). It is no surprise then, that firms have recognized the potential of incorporating quality educational content into their strategies (Ho *et al.*, 2020). By leveraging EDCM to build long-term relationships with customers, companies can move closer to achieving their business objectives (Knihová, 2019). While relevant content can drive purchase behaviors (Dabbous and Barakat, 2020; Terho *et al.*, 2022), educating consumers can offer additional benefits, such as improving perceptions of service quality, cultivating customer trust, and encouraging stronger brand loyalty (Hepola *et al.*, 2020).

2.3 Content creation: AI vs human

The idea of machines producing original creative and informative content, such as text and artwork has generated concern about the dynamic between humans and machines (Grassini and Koivisto, 2024). This has sparked considerable research on the topic, with results often being contradictory, particularly when analyzing the different types of AI-generated content (Wu *et al.*, 2020).

Table 2 indicates the key insights from the main research on AI-generated content.

For instance, in journalism, Waddell (2018) reported that machine authorship negatively affects content credibility compared to human authorship. Graefe and Bohlken (2020) found that although AI-generated news can be perceived as credible, it is rated lower in quality and readability. In the domain of art, according to Grassini and Koivisto (2024), people tended to judge artworks created by AI unfavorably, showing a negative bias toward AI. In contrast, Chaisatitkul *et al.* (2024) found that consumers had a positive perception of AI-generated content, viewing it as "unbiased". Conflicting results also emerge when comparing users' opinions across different countries. Wu *et al.* (2020) identified varying attitudes toward AI's performance in artistic work. U.S. participants were more critical of AI-generated content, whereas Chinese participants expressed overtly positive views toward AI-generated content. In their study on AI-generated ads, Arango *et al.* (2023) demonstrated that when consumers realize AI is responsible

Table 1 Main educational content marketing themes with examples

	Health themes	Social issues	Contents about hobbies/ work	Knowledge about the world
Olenski (2015)			Pension guide – *Retirement Prosperity Group*	
Mansuri (2018)	#YouNeverRideAlone - *Exide Life Insurance*	#ReleaseThePressure – *Mirinda*		
Knihová (2019)			"Today at Apple" –*Apple*; Conferences and webinars about data mining, statistics and text mining – *ACREA*	Conferences about holiday destinations and creative labs – *Černý most* mall; "Giants of the Oceans"– *Nový Smíchov* mall in collaboration with *National Geographic* "My Body" – *Metropole Zličín* mall
Knihová (2020a)	Preventive measures of Covid-19 – *Ikea, McDonald's, Audi, Volkswagen, Coca-Cola, Mercedes*	"For once, don't do it" – *Nike* "Diversity, equality and inclusion" – Russ Klein, CEO of *American Marketing Association* "Strategy of diversity and inclusion" – *Harley Davidson* #BlackLivesMatter – *Apple, Amazon, Microsoft*		

Source(s): Authors' own work

Table 2 Overview of key insights from main research on AI-generated content, presented chronologically from the oldest to the most recent

Author(s)	Context	Method	Key insights/findings
Waddell (2018)	AI-generated news	Quantitative approach	The study revealed that news attributed to a machine is perceived as less credible than news attributed to a human journalist. The authors also observed a negative effects of machine authorship through the indirect pathway of source anthropomorphism and negative expectancy violations, with evidence of moderation by prior recall of robotics
Graefe and Bohlken (2020)	AI-generated news	Meta-analysis	This meta-analysis' results from 12 studies involving a total of 4,473 participants revealed no significant difference in perceived credibility between human and AI-generated news. However, a slight edge for human-written news regarding quality and a substantial advantage for human-written news in terms of readability were found. Experimental comparisons indicated that participants rated credibility, quality, and readability higher when informed that they were reading a human-written article
Kim *et al.* (2020)	AI-generated content (text, audio, and video)	Quantitative approach	The study examined how different content generators (human vs. AI) and information delivery methods (text, audio and video) influence users' perceptions of content. The findings suggest that both the type of generator and the delivery method significantly impact the perceived quality, satisfaction and readability of the content
Moravec *et al.* (2024)	AI-crafted journalism	Quantitative approach	The study identified gender, age, and socioeconomic status as significant factors influencing respondents' ability to recognize the source of text. Females were more successful at identifying human-generated texts, while males excelled at recognizing AI-generated texts. Younger respondents were generally better at identifying AI-generated content, and higher education and income levels correlated with improved accuracy. Attitudes toward AI in journalism varied by age: those aged 18–29 showed ambivalence, 30–49 were uncertain, 50–69 had diverse views and those 70 and older were skeptical. Males, particularly in older age groups, were more optimistic about AI's potential in journalism compared to females
Wu *et al.* (2020)	AI-generated artistic content	Quantitative approach	An experiment was conducted to explore subjects' explicit and implicit perceptions of AI-generated content in the U.S. and China. The two countries showed differing attitudes towards AI's performance in artistic work. U.S. subjects were more critical of AI-generated content compared to human-generated content, both explicitly and implicitly. In contrast, while Chinese subjects expressed overt positivity towards AI-generated content, they valued it less than human-authored content
Wu and Wen (2021)	AI-generated ads	Quantitative approach	This study explored the factors that affect consumers' overall appreciation of AI-created advertisements. The findings revealed consumers' perception of the objectivity of the advertisement creation process positively influences the machine heuristic - a belief that machines are more secure and trustworthy than humans. This perception enhanced consumer appreciation for AI-generated advertisements. However, the perceived objectivity of the ad creation process negatively affected the perceived eeriness of AI advertising, which in turn diminished appreciation for these ads. Additionally, consumers' discomfort with robots positively influenced both the machine heuristic and the perceived eeriness of AI advertising
Arango *et al.* (2023)	AI-generated charitable giving ads	Quantitative approach	The research found that potential donors reacted differently to children's faces when they were aware that these images were AI-generated. Knowing an image is artificial negatively affected donation intentions, with this effect being mediated by empathy and anticipatory guilt, as well as by empathy and emotion perception. AI-generated images can enhance their effectiveness by emphasizing their ethical intentions and in extraordinary situations, the use of AI-generated images by charities is deemed acceptable by consumers
Chaisatitkul *et al.* (2024)	AI-generated storyboards	Interview	The research findings revealed that consumers had a positive outlook and greater liking for works created by generative AI, as they perceived it as "unbiased"
Hitsuwari *et al.* (2023)	AI-generated poetry*	Quantitative approach	The study's results indicated that the beauty rating of the AI-generated haiku created with human intervention was the highest, while the ratings for both human-made and AI-generated haiku without human involvement were identical. Participants were unable to differentiate between human-made and AI-generated haiku. These findings imply that human-AI collaboration enhances creativity in haiku production. Furthermore, a negative correlation was observed between discrimination performance and beauty ratings in AI-generated haiku, indicating that high-quality AI-generated works are often perceived as being human-created
Chen *et al.* (2024a)	AI-generated ads	Quantitative approach	Consumers have more positive attitudes toward AI-generated ads with agentic appeals, and the effect is mediated by task self-efficacy, while they have more positive attitudes toward human-created ads with communal appeals, and the effect is mediated by social self-efficacy. Assigning a social role to the AI advertising generator, a partner, or a servant role, helps mitigate or even reverse the negative effects of AI-generated ads with communal appeals

(*continued*)

Table 2

Author(s)	Context	Method	Key insights/findings
Grassini and Koivisto (2024)	AI-generated artwork	Quantitative approach	The study's findings indicated that individual characteristics, such as creative personal identity and openness to experience, influence how people perceive artworks based on their believed source. Participants struggled to consistently differentiate between human and AI-generated images. While they generally preferred AI-generated artworks over human-made ones, a negative bias emerged when considering subjective source attribution. As a result, artworks perceived as AI-generated were rated as less preferable, regardless of their actual source
Park *et al.* (2024)	AI-generated content	Mixed-method approach	Participants struggled to differentiate between AI accounts and human accounts. Additionally, there were notable differences in how users perceived the three types of accounts. Participants found both AI and influencer accounts to be more appealing than public accounts, and they rated the quality of AI-generated content similarly to that of content produced by influencers
Song *et al.* (2024)	AI-generated advertisement	Quantitative approach	The study's results demonstrated that the advertisements with rational appeals improved visit intention for AI-generated ads more effectively. In contrast, those with emotional appeals were more attractive when the declared creator was human
Zhang *et al.* (2024)	AI-generated content	Mixed-method approach	This study employed a mixed-method approach including grounded theory and content analysis. Grounded research, conducted on an innovative digital tourism platform in China, identified three key dimensions of content quality in digital tourism interpretation: informativeness, emotional appeal and empathy. Additionally, content analysis and ANOVA results revealed that AI-generated content displayed lower quality across all three dimensions compared to professionally generated content. The findings support the conclusion that AI cannot replace human professional interpreters in terms of content quality for interpretation
Kirk and Givi (2025)	AI-generated follow-up email	Quantitative approach	Seven preregistered studies show that consumer belief that marketing communications are AI-generated (vs. human) reduces positive word-of-mouth and loyalty. The "AI-authorship effect" is mediated by perceived authenticity and moral disgust, and is weaker for factual (vs. emotional) messages, AI-edited content, AI-signed communications, and when consumers perceive most marketing as AI-generated

Note(s): *For a more comprehensive literature review comparing human-made and AI-generated poetry, refer to the study by Hitsuwari *et al.* (2023)
Source(s): Authors' own work

for generating images of children in charitable giving ads, their empathetic responses diminish, leading to reduced feelings of guilt and sadness and ultimately lowering donation intentions. On a different note, Wu and Wen (2021) revealed that consumers' perception of objectivity in the creation process positively influences the machine heuristic, enhancing consumer appreciation for AI-generated advertisements.

The wide range of findings suggests that perceptions of AI-generated content are neither universally negative nor entirely positive. Instead, they are shaped by contextual factors and the type of content. This highlights the need to move beyond viewing AI-generated content as a single, uniform category and instead conduct more granular analyses of specific types and aims of marketing communications.

While AI-generated content presents new opportunities, it also raises important questions about how consumers perceive AI-created outputs in domains traditionally dominated by humans (Huo *et al.*, 2024), such as knowledge dissemination.

2.4 Human-AI collaboration

Although most of the literature has focused on comparing content generated solely by AI vs content generated solely by humans, today it may be short-sighted to consider services and content as being purely either human- or AI-generated. New forms of collaboration between humans and AI have emerged. One of the most effective forms of human-AI collaboration has been seen in collaborative innovation for the common good, such as in the creation of new healthcare protocols or the development of the COVID-19 vaccine, where AI played a crucial role (Razmerita *et al.*, 2022).

Much of the current research focuses on Human-AI collaboration in managerial professions, specifically investigating the synergies between human workers and AI in managerial tasks from the workers' perspective (e.g. Sowa *et al.*, 2021). A few studies have taken the perspective of service and product users to assess the value of human-AI collaboration. For instance, Longoni *et al.* (2019) found that, in the healthcare sector, users were resistant to fully AI-generated services but were more accepting when AI supported and collaborated with humans. Peng *et al.* (2022) revealed that AI-human collaboration, where AI supports a human employee, increases consumer acceptance of services requiring high warmth. However, this does not hold for collaborations where a human merely supervises AI. Yue and Li (2023) investigated user acceptance and intentions toward smart cars either entirely developed by AI or through AI-human collaboration, with users exhibiting a preference for the latter.

Beyond these initial studies on professional settings and product and service development, there is a need for further research exploring AI-human collaboration in content generation, especially in EDC. This research aims to provide new insights that contribute to the literature on the topic and offer valuable starting points for future studies.

2.5 AI vs human-generated educational digital content: effects on perceived content quality and consumer engagement

According to the social identity theory (Tajfel and Turner, 1979), people categorize concepts as "us" and "them" in social interactions, assigning ingroup and outgroup identities based on characteristics such as race, religion, gender, sexual orientation and nationality. The ingroup is the group with which an individual identifies, creating a sense of belonging and positive bias. In contrast, the outgroup consists of those perceived as outsiders, often leading to stereotyping, prejudice and discrimination. This distinction forms the basis of group dynamics, where favoritism toward the ingroup and less positive attitudes toward the outgroup emerge, shaping social perceptions and behaviors.

Recently, the preference for in-group members has been extended to the context of human versus AI interactions, as reflected in the recent concept of "human favoritism" (Zhang and Gosline, 2023) and Schmitt's (2020) notion of speciesism, which both reflect the way humans prioritize their own species over other entities including AI. This approach has been widely adopted in studies examining user reactions to AI vs humans, as it inherently involves an in-group versus out-group dynamic (e.g. Grassini and Koivisto, 2024; Huo *et al.*, 2024).

Consumers are likely to perceive AI as lacking a human mind, making it difficult for them to trust and empathize with AI-generated content as with human-created one (Gray and Wegner, 2012). This challenge is particularly evident in educational content, which is designed to convey information that resonates with learners, establish social connections and relate to their everyday experiences. Educational content is often perceived as requiring a high degree of credibility and reliability (Alraimi *et al.*, 2015). Learners typically trust educators and authors to deliver rigorously verified information. When users learn that EDC content is AI-generated instead of crafted by a human expert, they may question its accuracy. While AI can generate impressive outputs, numerous instances of inaccuracies and misinformation have been documented (Floridi and Chiriatti, 2020). This skepticism can diminish confidence in AI-authored materials and negatively affect the brand reputation. According to Chen *et al.* (2024b), this could lead to a more critical assessment of AI-generated EDC, as opposed to users' more intuitive and positive reception of human-generated content. Conversely, AI-generated EDC may fall short in emotional depth and personalization, both of which are crucial for promoting meaningful connections with the audiences it seeks to educate.

Zhang and Gosline (2023) were among the first to find that biases toward AIGC can affect users' perceptions of its overall quality and even decrease their willingness to engage with it. These factors are particularly critical in marketing, where perceived quality and engagement are key drivers of business success (Mohammad *et al.*, 2020). High-quality content is expected to capture consumers' attention and improve their ability to recall brands (Keller, 2016). Perceived content quality encompasses attributes such as accuracy, credibility, attractiveness, and other related characteristics (Chen *et al.*, 2024a), all of which are relevant in the context of sharing educational content. Quality content also plays a crucial role in enhancing engagement (Ashley and Tuten, 2015; Cvijikj and Michahelles, 2013), a critical factor influencing individuals' consumer-brand relationships (So *et al.*, 2016). Customer engagement is the affective, cognitive, and behavioral manifestations toward a brand, reflecting psychological states that emerge from interactive consumer-brand relationships (Hollebeek *et al.*, 2014). Previous studies demonstrated the importance of firms' social media content in increasing consumer engagement (Shukla *et al.*, 2023). By providing valuable educational content on social channels in the form of tangible and intangible benefits (Weiger *et al.*, 2019), brands can generate meaningful interactions with their target audience. The relationship between AIGC and engagement has recently garnered attention, with studies warning that brands should be mindful of the potential decline in consumer engagement associated with AI-generated content (Aljarah *et al.*, 2024).

In EDC creation, perceived content quality and consumer engagement are key areas where AI and human creators may lead to different expectations and outcomes. Thus, according to the rationale above, we propose that both factors are influenced by the content creator type and that perceived quality mediates this relationship:

H1. Compared to human-generated posts, AI-generated posts lead to lower (a) EDC perceived quality and (b) consumer engagement.

H2. EDC perceived quality mediates the effect of the content creator on consumer engagement.

2.6 Human, AI or hybrid? The impact of educational digital content creator type on consumer engagement, brand attitude and advocacy intentions

As AI continues to evolve and integrate into digital content creation, understanding how consumers perceive AI- versus human-generated content demands closer attention (Campbell *et al.*, 2022). Nowadays, however, a straightforward distinction between content created solely by humans or by AI could prove short-sighted. The growing relevance of hybrid collaboration, where humans leverage AI as a supportive tool in content creation, warrants particular attention in the current debate (Fui-Hoon Nah *et al.*, 2023). This evolving scenario mirrors the growing number of companies integrating AI into their creative processes and raises the question of how consumers respond to content produced by hybrid teams, where human and AI intelligence coexist (Zhang and Gosline, 2023). The hybrid content creation introduces a gray area where human intervention may mitigate human favoritism and speciesism (De Freitas *et al.*, 2023), and the less positive perceptions often associated with content generated solely by AI (e.g. Arango *et al.*, 2023; Waddell, 2018). Content produced by hybrid teams may enjoy a higher engagement and positive intentions than content generated entirely by AI, as it retains a human element that facilitates emotional and social connection with the audience (Oh *et al.*, 2018). AI can bring efficiency, while humans can add creative and empathetic elements that enhance the content's relevance and engagement for consumers (Koivisto and Grassini, 2023). As a result, they may react more favorably to hybrid-generated content than to content created solely by AI, although in line with human favoritism and speciesism, a general preference for fully human-generated content might persist.

While collaborations between humans and AI are common in services, with research examining the phenomenon from the employee's perspective (Blaurock *et al.*, 2024), it remains unclear how these collaborations impact consumer outcomes and what mechanisms drive these effects (Le *et al.*, 2024).

Considering this, the study aims to analyze the impact of the human-AI collaboration in EDC creation on two brand-related variables, brand attitude and advocacy intentions, and the possible mediating role of consumer engagement. Brand attitude refers to the overall evaluation consumers have of a brand, positively influenced by factors such as trust and affective connection (Aurier and Séré de Lanauze, 2012). Advocacy intention refers to the likelihood that a consumer will recommend a brand or its content to others (Kim *et al.*, 2023). In the current digital landscape, brands frequently rely on educational posts to inform their audiences, thereby aiming to position themselves as credible sources of knowledge (Knihová, 2021). The dual focus on brand attitude and advocacy provides a comprehensive framework for understanding how individuals cognitively and affectively respond to different EDC sources. Studying brand attitude is important because a less favorable brand attitude, potentially driven by users' resistance toward AI-generated educational content, may lead users to diminish the brand's capacity in delivering valuable educational insights (Liu *et al.*, 2024). For brands disseminating educational content, advocacy plays a vital role with implications extending beyond corporate boundaries and impacting society since users who endorse the brand often share posts, spark discussions, and invite others to explore the material, thus strengthening the brand's online presence and even nurturing a positive brand community (Kwon *et al.*, 2017). This makes it particularly interesting to investigate how users perceive AI-, human-, or hybrid-generated EDC shared by brands, and to identify the right formula for optimizing engagement without undermining the brand's identity and performance. Studies have shown how customer engagement can be considered the basis of customer loyalty, which is crucial for building strong customer relationships and achieving positive brand-related outcomes (Jagani *et al.*, 2024). Consumer engagement was found to directly predict variables such as brand loyalty (Hollebeek and Macky, 2019) and brand equity (Xi and Hamari, 2020). Therefore, we expect that this variable mediates the relationship between the EDCM content creator and both brand attitude and advocacy intentions. When consumers perceive that EDC is generated by humans, they are more likely to associate the brand with values like authenticity, creativity, and emotional intelligence, thus increasing engagement (Aljarah *et al.*, 2024). AI, on the other hand, may be viewed as more efficient but impersonal and less emotional, lacking empathetic skills, which are unique to human creators (Huang and Rust, 2018), thus potentially leading to a colder, less favorable evaluation (Arango *et al.*, 2023). Moreover, the perception of reduced effort in creating the content can diminish the perceived value of the content, especially considering recent research suggesting that consumers are more interested in and more likely to choose products or services that the brand genuinely "enjoys" creating (Paley *et al.*, 2024). Since AI cannot experience enjoyment, AI-generated content may struggle to convey this emotion. The hybrid approach may be a compromise. EDC created by a mixed team could evoke higher engagement but also a more positive brand attitude and advocacy intentions than content generated solely by AI, thanks to the human element that balances the cold and rational aspect of AI:

H3. Consumer engagement is (a) higher when EDC posts are generated by a hybrid team (vs only AI), but (b) still lower compared to fully human-generated EDC posts.

H4. Brand attitude is (a) higher when EDC posts are generated by a hybrid team (vs only AI), but (b) still lower compared to fully human-generated EDC posts.

H5. Advocacy intention is (a) higher when EDC posts are generated by a hybrid team (vs only AI), but (b) still lower compared to fully human-generated EDC posts.

H6. Consumer engagement mediates the effect of the content creator on (a) brand attitude and (b) advocacy intention.

3. Overview of the studies

This research consists of two experimental studies that examine how the type of content creator influences consumer perceptions, engagement and intentions related to EDC.

In the first study, we manipulated the identity of the EDC creator by comparing an EDC generated by AI vs humans. The primary goal was to assess whether the source of the content impacts its perceived quality and the level of consumer engagement. The findings from this study provided an initial understanding of the relationship between content creator type and consumer responses, highlighting the potential differences in how AI-generated content is perceived compared to human-generated content. Building on the insights from Study 1, the second study introduced an additional layer (identity) by including a hybrid condition, where the EDC was produced collaboratively by both AI and humans. This extension was designed to explore whether the hybrid approach could alter consumer engagement and further influence brand-related dimensions such as attitudes and advocacy intentions. This study aimed to explore the mechanisms through which the source of educational content affects consumers' perceptions, engagement, and intentions. The first study establishes a baseline by comparing two distinct sources, while the second study builds on this foundation by examining a more complex, "hybrid" model. This progression facilitated the exploration of not only the direct effects of different EDC creators on consumer engagement but also the subsequent impact on broader consumer attitudes and advocacy. In doing so, the research contributes to a more fine-tuned understanding of content creation strategies and their implications for marketing and communication practices.

The complete research model is displayed in Figure 1.

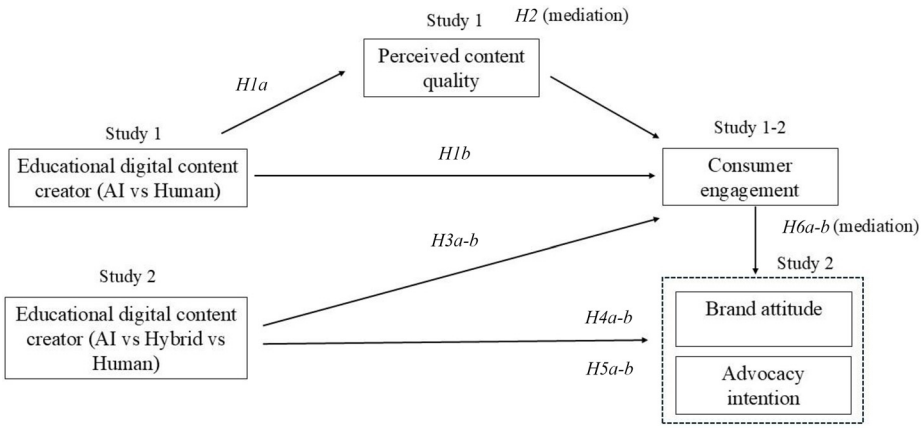
4. Study 1

4.1 Method

4.1.1 Experiment design

Study 1 tested the impact of the EDC creator (AI vs Human) on perceived content quality (H1a) and consumer engagement

Figure 1 Research model



Source(s): Authors' own work

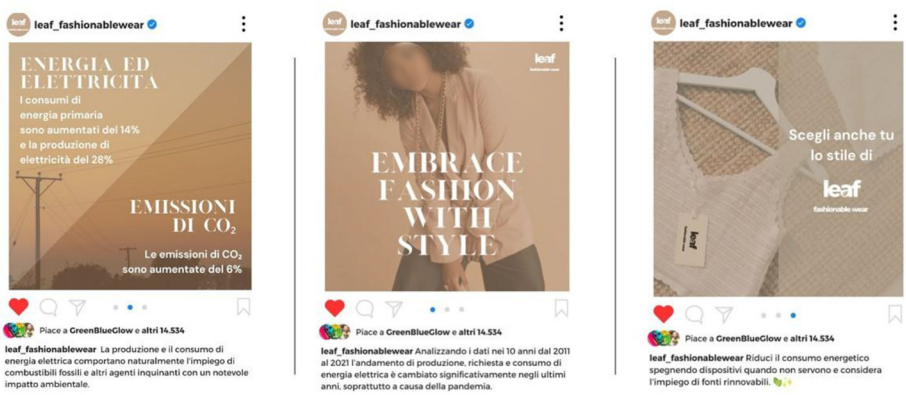
(H1b), and the possible mediating role of the former (*H2*). To achieve this, a fictitious Instagram post depicting educational content was purposely created for the study. The fictitious post is displayed in Figure 2. We integrated the EDC into an Instagram post because its visual and interactive nature has been shown to enhance user involvement and information processing (Phua *et al.*, 2017). With over one billion monthly active users (projected to reach 1.44 billion by 2025) and its visual nature (Statista, 2022), Instagram offers an ideal setting for sharing concise and appealing educational content.

The EDC in this study fell into the category of "knowledge about the world" and featured a post from a fictional fashion company presenting data on the increase in energy consumption and CO2 emissions over the years. It encouraged users to reduce energy consumption by turning off devices when not needed and urged them to shop from companies that adopt renewable sources.

The visuals and texts presented in the post were identical in both conditions, while the introductory element before showing the post to the participants was changed according to the specific condition. In the AI-generated post scenario, participants were told that the post they were about to visualize was entirely created by the AI, while in the human post scenario, participants were told the post was created by a human team with no use of AI.

The stimuli were subjected to a preliminary assessment through interviews with ten participants. These interviews aimed to evaluate 1) whether the Instagram post was perceived as educational, 2) the relevance and clarity of the questionnaire items related to the constructs of interest and 3) the credibility

Figure 2 The educational digital content post



Note(s): Translation: 1) Visual: Primary energy consumption increased by 14% and electricity production by 28%. CO_2 emissions rose by 6%; Copy: The production and consumption of electricity naturally involve the use of fossil fuels and other pollutants, resulting in a significant environmental impact. 2) Copy: Analyzing the data from the 10 years between 2011 and 2021, the trends in production, demand, and consumption of electricity have changed significantly in recent years, especially due to the pandemic. 3) Visual: Choose Leaf's style; Copy: Reduce energy consumption by turning off devices when not in use and consider using renewable energy sources
Source(s): Authors' own work

of the experimental manipulation. Based on the positive feedback from these participants, the scenarios were validated, and the clarity of the questionnaire was confirmed. The fictional educational post, created specifically for this study, was placed at the very beginning of the survey. Participants were asked to imagine themselves scrolling through their personal Instagram feed and coming across the company-shared post featuring educational content.

4.1.2 Measures and sample

Responses were captured using a 7-point Likert scale, ranging from 1 ("*strongly disagree*") to 7 ("*strongly agree*"). Perceived content quality: three items, $M = 5.21$; SD = 1.17; $\alpha = 0.86$, $CR = 0.87$, was measured following Dabbous and Barakat (2020); Consumer engagement: four items, $M = 3.93$; SD = 1.47; $\alpha = 0.93$, $CR = 0.93$, was adapted from Gligor and Bozkurt (2021).

Including control variables helps mitigate alternative explanations for observed relationships, thereby strengthening causal inference and enhancing the reliability of findings (Klarmann and Feurer, 2018).

AI technology anxiety, defined as the degree of discomfort and concern related to trust, ethical implications and the reliability of AI systems users experience when interacting with the technology (Li and Huang, 2022; Pillai and Sivathanu, 2020), was included as a covariate in the study. This is because such an emotional state can influence users' commitment to AI-based applications and shape their perceptions of the social and functional roles of AI technologies (Meuter *et al.*, 2003).

The construct was measured with four items:

1 I feel unable to keep up with the advances associated with AI systems makes me anxious;
2 I am afraid that AI systems may make us dependent;
3 I am afraid that AI systems may be misused; and
4 I find humanoid AI products scary ($M = 3.68$; $SD = 1.75$; $\alpha = 0.92$, $CR = 0.93$).

Sensitivity analyses were conducted using G*Power (version 3.1.9.7) for sample size estimation. Using an alpha of 0.05 and a power of 0.80, the estimated minimum sample size required to identify a medium effect size in a between-groups comparison (difference between two independent means) is 128 subjects.

Participation in the study was voluntary and followed the ethical principles of the 1964 Declaration of Helsinki. Participants were informed of their right to decline or withdraw from the study at any time. Before participation, they received detailed information about the study's procedures, data protection measures and compliance with general data protection regulation privacy regulations.

Given the digital nature of the content analyzed, participants were recruited by sharing the survey link across various social media platforms, including Facebook, LinkedIn, and Instagram. This approach aimed to engage a diverse range of digital users. Participants were also encouraged to share the link with their contacts. It was explicitly stated that only adults were eligible to participate. To ensure diversity, participants were asked to specify their city of residence to confirm geographic variability.

We excluded four participants who failed the attention check. This check, placed among the items measuring consumer engagement, asked participants to select the box corresponding to number 1 to ensure they were fully engaged and paying attention to the survey. Additionally, we removed four participants who did not pass the manipulation check. At the end of the survey, participants in each condition were asked to recall who created the post to confirm they experienced the manipulation as intended. This step helped ensure that the observed effects were due to the manipulation itself rather than other factors. After these exclusions, the final sample consisted of 172 valid participants.

Respondents were randomly assigned to view either the AI-created post ($N = 88$) or the human-created post ($N = 84$). Participants ranged from 18 to 63 years ($M = 27.49$, SD = 7.47); 119 identified as women and 49 as men, and 4 preferred not to specify their gender. The majority of participants (116) possessed a bachelor's degree, while 40 had a high school diploma. Most participants used social networks daily (165), with 144 specifically reporting daily use of Instagram. Regarding interaction with EDC by companies, 96 participants declared that they encountered such content multiple times a week.

4.2 Results

4.2.1 Preliminary analyses

A post hoc Harman's single-factor analysis was conducted to confirm that the data variance was not driven by a single underlying factor. The unrotated solution showed a variance of 44.28%, well below the 50% threshold (KMO measure of sampling adequacy = 0.83, Bartlett's test of sphericity: $p < 0.001$) (Podsakoff *et al.*, 2003). These results indicated that common method bias (CMB) was not a concern.

Although the random assignment of participants to the conditions likely minimized the risk of systematic errors from confounding factors (Kim and Woo, 2019), we verified that background variables were consistent across participants in the two experimental groups.

Gender distribution was balanced in the two conditions, $\chi^2(2, n = 172) = 4.039$, $p = 0.133$. No significant differences were found between the groups in age, $F(1,167) = 1.813$, $p = 0.180$, education, $F(1,167) = 1.974$, $p = 0.162$, frequency of social network use, $F(1,167) = 0.137$, $p = 0.712$, Instagram use, $F(1,167) = 1.907$, $p = 0.169$, frequency of interaction with EDC by companies, $F(1,167) = 1.285$, $p = 0.257$, and AI technology anxiety, $F(1,170) = 1.606$, $p = 0.207$.

4.2.2 Main results

The correlation matrix for the variables in Study 1 is reported in Appendix 2.

Two ANCOVAs were conducted with SPSS (version 22) to compare the effects of the post generator (AI vs Human) on:

1 content quality; and
2 consumer engagement, including AI technology anxiety as a covariate.

No significant difference was found in perceived content quality *(H1a)* between participants who visualized AI-created EDC ($M = 5.18$, SD = 1.20) and those who viewed human-created EDC ($M = 5.24$, SD = 1.13), $F(1,169) = 0.072$, $p = 0.789$. However, a significant difference was observed in consumer engagement, with participants who viewed the AI-created EDC reporting lower engagement scores ($M = 3.68$, SD = 1.47) compared to those who visualized human-created

EDC ($M = 4.20$, SD = 1.45), $F(1,169) = 4.230$, $p < 0.05$, $\eta^2 = 0.024$, thus supporting *H1b*. The mean comparisons with relative error bars for both variables are displayed in Figure 3.

To investigate the role of perceived content quality as a mediator between content creator type and consumer engagement (H2), we applied Hayes' (2017) Process Macro n. 4 in SPSS, using 5,000 bootstrap samples. The content creator type was included as the predictor variable (human condition coded as 0 and AI condition coded as 1), perceived content quality as the mediator and consumer engagement as the dependent variable.

As expected, due to the lack of impact of the content creator on perceived content quality, the results (presented in Table 3) showed a nonsignificant mediation effect (b = −0.03, 95% CI [−0.23, 0.20]), thus not supporting *H2*.

4.3 Short discussion of Study 1

The findings of Study 1 shed light on the role of AI vs humans in creating EDC on social media and the effects on perceived content quality on consumer engagement. While no significant difference was found in perceived content quality based on the identity of the EDC creator, there was a significant difference in consumer engagement. Participants' willingness to engage and "connect" with the EDC decreased with the AI-generated post compared to the human one. Additionally, results revealed no significant mediation effect of perceived content quality, demonstrating that this variable did not influence the relationship between the content creator type and consumer engagement, regardless of whether the content was AI- or human-generated.

5. Study 2

5.1 Method

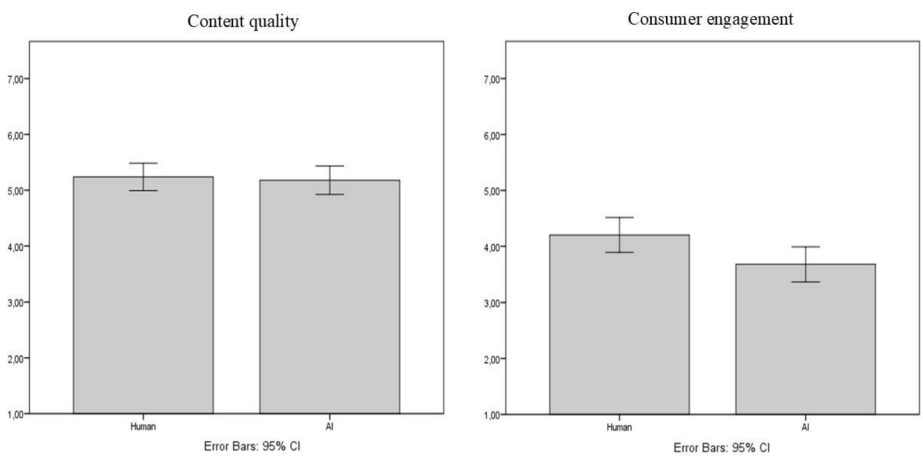
5.1.1 Experiment design

Study 2 tested the impact of the EDC post creator (Human vs Hybrid vs AI) on consumer engagement (*H3*), brand attitude (*H4*), advocacy intention (*H5*) and the possible mediating role of consumer engagement (*H6*). The same fictitious Instagram post from Study 1 was used for Study 2 (Figure 2). The introductory statement shown to participants was modified according to the specific condition, as in Study 1. For participants in the hybrid condition, it was explained that the post had been created by a team of in-house employees who use AI to generate a draft of texts and achieve a better visual result.

5.1.2 Measures and sample

Responses were collected using a 7-point Likert scale, ranging from 1 ("strongly disagree") to 7 ("strongly agree"), except

Figure 3 Mean comparisons with relative error bars for Study 1



Source(s): Authors' own work

Table 3 Results of mediation analysis for Study 1

Path	*B (SE)*	*LLCI*	*ULCI*
Direct effects			
EDC creator → Perceived information quality	−0.05 (0.18)	−0.4026	0.3062
EDC creator → Consumer engagement	−0.41 (0.18)	−0.7661	−0.0483
Perceived information quality → Consumer engagement	0.62 (0.08)	0.4642	0.7717
Indirect effects			
EDC creator → Perceived information quality → Consumer engagement	−0.03 (0.11)	−0.2338	0.1987

Note(s): $N = 172$. $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. Number of bootstrap samples 5,000; *B* = Unstandardized coefficients (bootstrap *standard errors* in parentheses); LLCI = 95% lower level confidence interval; ULCI = 95% upper-level confidence interval
Source(s): Authors' own work

brand attitude, which was measured with a 7-point differential semantic scale. As in Study 1, consumer engagement was measured with four items, $M = 4.01$; SD = 1.54; $\alpha = 0.93$, $CR = 0.92$. For brand attitude, five items have been used, $M = 4.91$; SD = 1.41; $\alpha = 0.94$, $CR = 0.94$, following Spears and Singh (2004). Concerning advocacy intention, three items have been adapted, $M = 4.57$; SD = 1.62; $\alpha = 0.96$, $CR = 96$, from Zhang *et al.* (2022). All the items of the study are reported in the Appendix 1.

As in Study 1, technology anxiety was included as a covariate (four items, $M = 4.37$; SD = 1.64; $\alpha = 0.92$; $CR = 0.93$).

Sensitivity analyses were performed using G*Power (version 3.1.9.7) to estimate the required sample size. With an alpha of 0.05 and a power of 0.80, the minimum estimated sample size needed to identify a medium effect size for a three-group comparison is 158 subjects.

The data collection followed the same procedure of Study 1 and the same type of attention and manipulation checks presented in Study 1 were used. The final sample was adequate: after removing 21 participants who failed attention (12) and manipulation checks (9), a total of 158 valid participants remained.

Respondents were randomly assigned to view either the post created by the Human ($N = 54$) or the Hybrid team ($N = 53$) or the AI ($N = 51$).

They ranged from 18 to 73 years ($M = 33.57$, SD = 13.70); 99 identified as women and 57 as men, while 2 participants preferred not to specify their gender. Most participants (61) possessed a bachelor's degree, followed by 58 participants with a high school diploma. The majority of participants used social networks daily (142), with 125 declaring a daily use of Instagram. Regarding the frequency of interaction with EDC by companies, 72 participants affirmed they viewed EDC often during the week.

5.2 Results

5.2.1 Preliminary analyses

The post hoc Harman's single-factor test showed that the unrotated solution accounted for 47.87% of the variance, remaining well below the 50% threshold. The KMO measure of sampling adequacy was 0.90, and Bartlett's test of sphericity was significant ($p < 0.001$) (Podsakoff *et al.*, 2003). These findings suggest that CMB was not an issue. As in Study 1, we confirmed that background variables were consistent between participants in the two experimental groups. Gender distribution was balanced in the conditions, χ^2 (4, $n = 158$) = 4.481, $p = 0.345$. Furthermore, no significant differences were found between the groups in age, $F(2,155) = 1.271$, $p = 0.284$, education, $F(2,155) = 0.355$, $p = 0.702$, frequency of social network use, $F(2,155) = 0.648$, $p = 0.525$, Instagram use, $F(2,155) = 0.233$, $p = 0.793$, frequency of interaction with EDC posted by companies, $F(2,155) = 1.297$, $p = 0.276$, and AI technology anxiety, $F(2,155) = 1.296$, $p = 0.276$.

5.2.2 Main results

The correlation matrix for the variables in Study 2 is reported in Appendix 2.

A series of ANCOVAs were conducted to compare the effects of the post generator (Human vs Hybrid vs AI) on consumer engagement, brand attitude, and advocacy intention, including AI technology anxiety as a covariate.

The findings revealed a significant main effect of the EDC creator on consumer engagement: $F(2,154) = 3.737$, $p < 0.05$, $\eta^2 = 0.46$. Pairwise comparisons indicated that consumer engagement in the hybrid condition ($M = 4.17$, SD = 1.46) was significantly higher than in the AI condition ($M = 3.56$, SD = 1.61), $p < 0.05$, supporting *H3a*. However, the hybrid condition was not significantly different from the human condition ($M = 4.28$, SD = 1.47), $p = 0.701$, thus *H3b* was not supported.

The results also showed a significant main effect of the EDC creator on brand attitude: $F(2,154) = 11.143$, $p < 0.001$, $\eta^2 = 0.13$. Pairwise comparisons indicated that the brand attitude in the hybrid condition ($M = 5.18$, SD = 1.03) was significantly higher than in the AI condition ($M = 4.17$, SD = 1.71), $p < 0.001$, supporting H4a. However, the hybrid condition was not significantly different from the human condition ($M = 5.33$, SD = 1.61), $p = 0.570$, therefore H4b was not supported.

Finally, the findings indicated a significant main effect of the EDC creator on advocacy intention: $F(2,154) = 8.968$, $p < 0.001$, $\eta 2 = 0.10$. Pairwise comparisons showed that the advocacy intention in the hybrid condition ($M = 4.77$, SD = 1.61) was significantly higher than in the AI condition ($M = 3.84$, SD = 1.67), $p < 0.01$, supporting *H4a*. However, the hybrid condition did not differ significantly from the human condition ($M = 5.05$, SD = 1.35), $p = 0.353$, thus *H4b* was not supported.

The mean comparisons with relative error bars for consumer engagement, brand attitude, and advocacy intention are displayed in Figure 4.

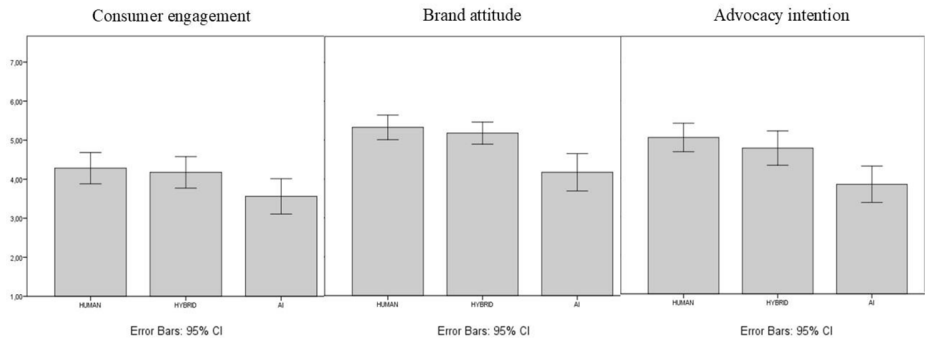
Then, to investigate the role of consumer engagement as a mediator between the type of content creator and brand attitude (H6a) and advocacy intention *(H6b)*, we applied Hayes' (2017) Process Macro n. 4 in SPSS, using 5,000 bootstrap samples for bias-corrected bootstrap confidence intervals. The content creator was included as the predictor (human condition coded as 0, hybrid condition coded as 1, and AI condition coded as 2), consumer engagement as the mediator, and brand attitude and advocacy intention as the dependent variables.

Findings indicated a significant mediation effect for both brand attitude (b = −0.23, 95% CI [−0.42, −0.04]) and advocacy intention (b = −0.28, 95% CI [−0.53, 0.05]), thus supporting respectively H6a and H6b. Table 4 reports all the results for direct and indirect effects. Results suggested partial mediation, as consumer engagement significantly influences both brand attitude and advocacy intention; however, there remains a direct relationship between the type of content creator and these outcomes.

5.3 Short discussion of Study 2

The findings from Study 2 provide insights into the role of the type of EDC creator, whether it is AI, hybrid, or human, and its impact on consumer engagement, brand attitude, and advocacy intention. The study highlighted the effectiveness of hybrid-generated content, showing that consumer engagement, brand attitude, and advocacy intention were significantly higher for the post created by the hybrid team compared to the fully AI-generated, while no significant differences were found between hybrid and human-generated posts.

Figure 4 Mean comparisons with relative error bars for Study 2



Source(s): Authors' own work

Table 4 Results of mediation analysis for Study 2

Path	*B (SE)*	*LLCI*	*ULCI*
Direct effects			
EDC creator → Consumer engagement	−0.38 (0.15)	−0.6699	−0.0819
AI vs Human → Consumer engagement	−0.36 (0.15)	−0.6699	−0.0640
Hybrid vs human → Consumer engagement	−0.11 (0.28)	−0.6703	0.4545
Hybrid vs AI → Consumer engagement	−0.61 (0.30)	−1.2130	−0.0184
EDC creator → Brand attitude	−0.34 (0.10)	−0.5347	−0.1436
AI vs human → Brand attitude	−0.34 (0.10)	−0.5469	−0.1320
Hybrid vs human → Brand attitude	−0.10 (0.17)	−0.4297	0.2334
Hybrid vs AI → Brand attitude	−0.62 (0.06)	−1.0299	−0.2147
EDC creator → Advocacy intention	−0.33 (0.11)	−0.5398	−0.1214
AI vs human → Advocacy intention	−0.34 (0.10)	−0.5492	−0.1384
Hybrid vs human → Advocacy intention	−0.20 (0.20)	−0.6118	−0.2125
Hybrid vs AI → Advocacy intention	−0.43 (0.21)	−0.8452	−0.0119
Consumer engagement → Brand attitude	0.60 (0.05)	0.4980	0.7048
Consumer engagement → Advocacy intention	0.76 (0.06)	0.6463	0.0999
Indirect effects			
EDC creator → Consumer engagement → Brand attitude	−0.23 (0.10)	−0.4213	−0.0420
AI vs human → Consumer engagement → Brand attitude	−0.24 (0.10)	−0.4496	−0.0384
Hybrid vs human → Consumer engagement → Brand attitude	−0.05 (0.13)	−0.3235	0.2052
Hybrid vs AI → Consumer engagement → Brand attitude	−0.39 (0.19)	−0.7910	−0.0187
EDC creator → Consumer engagement → Advocacy intention	−0.28 (0.12)	−0.5328	−0.0523
AI vs human → Consumer engagement → Advocacy intention	−0.26 (0.11)	−0.4949	−0.0519
Hybrid vs human → Consumer engagement → Advocacy intention	−0.08 (0.20)	−0.4805	0.3058
Hybrid vs AI → Consumer engagement → Advocacy intention	−0.50 (0.25)	−1.0244	−0.0186

Note(s): $N = 158$. $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. Number of bootstrap samples 5,000; B = Unstandardized coefficients (bootstrap *standard errors* in parentheses); LLCI = 95% lower level confidence interval; ULCI = 95% upper-level confidence interval
Source(s): Authors' own work

The results suggested that while AI-generated EDC may negatively impact consumer engagement, integrating AI with human input (hybrid approach) can achieve results similar to those of human-generated content alone. Mediation analyses further underscored the importance of consumer engagement, revealing that it mediated the relationship between the content creator type and both brand attitude and advocacy intention.

6. General discussion

Despite the growing use of AI-generated content by companies and the introduction of the first EU AI Act in March 2024, which aims to regulate transparency in AI usage by mandating clear labeling of AI-generated content (European Parliament, 2023), uncertainties persist regarding how users perceive AI- versus human-generated content, particularly in domains beyond pure entertainment, such as educational content.

As AI continues to advance, it not only changes the way content is produced but also posits new questions about user expectations and engagement with such content. Users may be more critical of AI-generated content, especially in education settings, where accuracy and empathy are extremely important. While authors emphasized the importance of educational

content in the success of a brand's content marketing strategy (Grubor and Milovanov, 2016), the impact of EDC and its "artificial creator" in the marketing domain remains relatively unexplored.

This study provides insights into the effects of AI-generated EDC on perceived content quality and consumer engagement. A key finding is the significant difference in consumer engagement between AI-generated and human-generated EDC, with engagement being notably lower for AI-generated posts. Our results align with a growing body of research indicating that, despite acknowledging an equal level of quality (Kim *et al.*, 2020), consumers still perceive AIGC as lacking the emotional and cognitive appeal typically associated with human-created content (e.g. Zhang *et al.*, 2024). Although users assess AI- and human-generated content similarly in terms of quality, the absence of a human touch in AI-generated EDC may weaken emotional and cognitive connections, leading to lower engagement. This finding supports the concept of speciesism (Cheng and Wang, 2024; Schmitt, 2020), which may favor content created within a "human-only" paradigm. From the social identity perspective, human-generated EDC may establish a more effective connection with the audience because both the author and the reader belong to the same "group", as humans with a shared concern for the planet's well-being. This common perspective builds a sense of shared purpose and responsibility, making the educational message feel more personal and engaging. Conversely, when the AI creates EDC, this sense of shared identity weakens. AI does not possess an emotional investment in truly educating people, as a result, while AI-generated EDC may provide interesting and useful information, it lacks the emotional depth that makes it personally relevant. This gap can reduce the content's ability to engage the audience and generate positive feelings toward the brand, as the reader may perceive the issue as being handled by an uninvolved party.

Then, by analyzing how AI-human collaboration in EDC creation impacts consumer engagement, brand perception and advocacy intentions, the study provides new and valuable insights into a field where most research still focuses on mere comparisons between AI and humans (Kirkby *et al.*, 2023), with just a few studies exploring hybrid collaboration from the consumers' perspective, mainly in the service domain (Yue and Li, 2023; Sowa *et al.*, 2021; Jacobsen *et al.*, 2020). Our findings reinforce the notion that hybrid collaboration models are perceived more favorably and gain broader acceptance compared to the exclusive reliance on AI for creating EDC. This result aligns with the concept of "human favoritism" (Zhang and Gosline, 2023) and suggests that the preference for human elements in EDC creation does not stem from a strong aversion to AI. Rather, it reflects an inherent positive bias toward humans, whom consumers view as members of their in-group. While no prior research directly matches this scenario, results support Hitsuwari *et al.* (2023), who found that human-AI collaboration was perceived as more creative in haiku production than creations made solely by humans or AI. Similarly, the findings are consistent with Longoni *et al.* (2019), who showed that users were resistant to fully AI-generated services but more accepting when AI was used in support of, and in collaboration with, humans.

Taking a closer look at the investigated variables, the findings related to advocacy intentions provide a unique contribution to the literature, as no previous studies have explored the impact of AI content creators on brand advocacy. Regarding brand attitude, our study extends the work of Kirkby *et al.* (2023), who analyzed and identified the effects of AI disclosure in content creation on brand attitude. However, their research focused solely on the comparison between human and AI creators, leaving out the collaborative aspect.

The positive outcomes of AI-human collaboration in terms of engagement, brand attitude, and advocacy intentions in EDC creation may be explained by the nature of the content itself. An educational post promoting the protection of humans and their ecosystem through sustainable actions aims to establish both a cognitive and emotional connection between the creator and the audience. This connection is likely strengthened by the combination of human creativity and AI precision.

Interestingly, while the differences in consumer engagement, brand attitude, and advocacy intention between AI-generated and human-generated EDC are larger than those between AI-generated and hybrid-developed EDC, the study does not reveal differences between human-generated and hybrid-generated EDC. Although these findings contradict the initial hypothesis that human-generated content would outperform hybrid-generated EDC, they provide a valuable contribution by expanding the discussion initiated by Zhang and Gosline (2023), showing that AI-generated EDC should be interpreted within the framework of human favoritism rather than pure aversion to AI.

7. Implications

7.1 Theoretical implications

This research contributes to the literature seeking to understand consumers' perception of AI-generated marketing content (e.g. Song *et al.*, 2024; Wu *et al.*, 2020). The study enhances the nascent literature on AI-human cooperation and collaborative content creation models (e.g. Le *et al.*, 2024; Peng *et al.*, 2022), demonstrating that AI can effectively complement human efforts. The absence of significant differences in terms of engagement and intentions toward the brand when EDC is generated by humans or human-AI collaboration offers valuable input to the recent discourse on speciesism (Schmitt, 2020) and human favoritism (Zhang and Gosline, 2023), extending the knowledge of intergroup dynamics in AI context. The findings reframe the conversation around technology acceptance by highlighting that consumer responses to AI tools are not driven solely by utilitarian or performance-based factors but also by social categorization processes.

From a brand perspective, this study contributes to the literature on consumer-brand relationships, particularly regarding brand attitude (e.g. Jagani *et al.*, 2024) and advocacy intentions (Kim *et al.*, 2023) within a context where these variables had not yet been explored – that is AI-generated EDC. The study also extends knowledge on the role of consumer engagement toward the brand by integrating the literature that has focused on assessing primary engagement metrics, such as likes and comments on posts (Dabbous and Barakat, 2020). It identifies a key mediating mechanism to

explain the relationship between AI and brand-related variables (McLean *et al.*, 2021).

The study enriches the existing knowledge of digital content marketing, which currently represents one of the core digital assets for brands (Homburg and Wielgos, 2022; Ho *et al.*, 2020; Hollebeek and Macky, 2019). It addresses a gap in the literature by investigating a specific type of digital marketing content, EDC (Knihová, 2021), which has received less attention than other forms of content, such as entertaining posts (Choi *et al.*, 2018). In doing so, this study also deepens the understanding of marketing education (Honebein, 1997), an approach increasingly valued by businesses for enhancing customer loyalty and building profitable, long-term relationships.

7.2 Managerial implications

This study provides practical insights for brands on how to enhance consumer engagement and maximize brand performance when using or intending to use AI tools to generate EDC.

Our findings suggest that companies should be careful when only using AI to generate content aimed at educating and engaging users. Although the perceived content quality may not differ between AI and human creators, the reduced users' engagement with fully AI-generated EDC can impact overall content effectiveness. This study reveals that brands should integrate AI as an augmenting tool rather than fully replacing human creators, ensuring that human insight and authenticity remain visible. Thus, while it is true that companies must be cautious about relying solely on AI to generate EDC content, the findings indicate that these should not shy away from signaling AI involvement when human oversight is maintained. This approach not only addresses concerns about transparency – considering the European AI Act, which requires companies to disclose AI-generated content on social platforms – but also positions the brand as innovative and adaptive, capitalizing on the growing consumer interest in AI-driven solutions. For instance, in domains where human authenticity is highly valued such as education, marketers could emphasize the collaborative process through behind-the-scenes narratives, showcasing how AI assists human creators without replacing their expertise. In the early stages of content development, AI could generate ideas, identify key insights and draft educational materials (both textual and visual). Then, human intervention remains fundamental in refining these outputs to ensure a human touch regarding creativity, relevance, and emotional resonance. This hybrid approach can reduce production time and cost, a key benefit for organizations with high educational content demands.

Overall, the preference for human-AI collaboration uncovered in the study invites a reevaluation of the long-standing debate pitting "human creativity" against "machine efficiency": brands can promote stronger brand attitudes, engagement and advocacy intentions when sharing EDC by wisely harnessing the best of both worlds.

8. Limitations and further research

Although this study provides valuable implications regarding AI-generated EDC, some limitations remain.

Firstly, the EDC used in our experiments was presented as an Instagram post. While our study offers exploratory insights into how the type of content creator (AI, human, or hybrid) influences perceived quality, consumer engagement, brand attitude and brand advocacy, the effects of different media platforms and content characteristics remain fully elucidated. Future research should address these gaps by systematically comparing specific EDC formats. For instance, experiments could assess the effectiveness of videos, infographics, and text-based posts in delivering EDC. Other research could assess the impact of EDC interactivity on user engagement by comparing interactive elements, such as embedded quizzes or polls, with static formats. Researchers should also explore how different EDC tones (e.g. emotional vs rational) interact with the creator's identity and influence consumer perceptions and behaviors. Moreover, future studies could explore the potential for a habituation effect (Jankowski, 2021), where initial negative reactions to EDC content may diminish with increased exposure. Longitudinal research would be particularly appropriate for examining whether consumer engagement and intentions toward the brand improve over time with more exposure to such AI-generated content, offering insights into how brands can introduce AI-driven strategies in their marketing communications effectively.

From a sampling perspective, the survey was digitally distributed across various social networks to reach a diverse group of participants. Although this is a widely used method (e.g. Walter *et al.*, 2024), it has inherent limitations in terms of representativeness. Future studies could enhance generalizability by employing probabilistic sampling techniques.

Ultimately, the study examined two potential mediators and found that consumer engagement explained the relationship between the EDC creator and brand-related variables. Psychological factors more strictly related to social identity may also play a mediating role between the type of EDC creator and brand-related outcomes. Future research should also offer a deeper investigation into the emotional and cognitive processes underlying the preferences linked to group membership and social belonging. Additionally, research could explore boundary conditions by examining the possible moderating influence of consumer characteristics, such as digital literacy, prior exposure to AI and demographic variables (e.g. age and education).

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Further reading

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Appendix 1

Table A1 Constructs' sources, items and factor loadings

Construct	Adapted source	Item	Factor loading
Content quality	Dabbous and Barakat (2020)	1. The educational content shown on the social network page of this brands is accurate	0.853
		2. The educational content shown on the social network page of this brands is interesting	0.898
		3. The educational content shown on the social network page of this brands is valuable	0.902
Consumer engagement	Gligor and Bozkurt (2021)	1. My interaction with the educational content of this brand would make me feel valuable	0.836 | 0.838
		2. I feel a special bond with the educational content of this brand	0.921 | 0.932
		3. I feel I have a personal connection with the educational content of this brand	0.941 | 0.926
		4. I feel I have a special relation with the educational content of this brand that drives me to interact with it	0.918 | 0.924
Brand attitude	Spears and Singh (2004)	I feel this brand is:	
		1. Unappealing/appealing	0.830
		2. Bad/good	0.917
		3. Unpleasant/pleasant	0.936
		4. Unfavorable/favorable	0.906
		5. Unlikable/likable	0.901
Advocacy intentions	Zhang *et al.* (2022)	1. I would say positive things about this brand to other people	0.963
		2. I would recommend this brand to others who seek my advice	0.975
		3. I would encourage friends and relatives to consider this brand	0.943

Source(s): Authors' own work

Appendix 2

Table A2 Correlation matrix for all the variables in Study 1 and Study 2

Constructs	Content quality (S1)	Consumer engagement (S1-S2)	Brand attitude (S2)	Advocacy intentions (S2)
Content quality (S1)	1.00			
Consumer engagement (S1-S2)	0.51**	1.00		
Brand attitude (S2)	nd	0.69**	1.00	
Advocacy intentions (S2)	nd	0.75**	0.80**	1.00

Note(s): **Correlation is significant at the 0.01 level (2-tailed). S1 is Study 1; S2 is Study 2
Source(s): Authors' own work

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