A Study on the Politeness Analysis of AIGC in E-commerce Multimedia Advertising

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ABSTRACT

With the rapid development of the e-commerce industry, multimedia advertising plays a key role in attracting consumers and promoting sales. The emergence of AIGC (Artificial Intelligence Generated Content) has facilitated the creation of e-commerce advertisements. However, how to effectively utilize AIGC to generate high-quality multimedia advertisements remains a critical issue in the current e-commerce field. This study aims to investigate user experiences (i.e., "politeness") when using AI tools to generate multimedia advertisements. Good user experience is crucial for enhancing consumer satisfaction and loyalty, and optimizing AIGC-generated multimedia advertisements can provide significant competitive advantages for e-commerce enterprises. Therefore, in-depth research on the integration of AIGC with e-commerce advertising and exploring methods to improve user experience have important practical significance. This study employs the critical incident technique, using online questionnaires to collect and analyze users' polite and impolite incidents when using AIGC. The research shows that users' experience of "politeness" when using AIGC is influenced by various factors, including the relevance, creativity, and visual appeal of the generated content. E-commerce enterprises should emphasize the regulation and guidance of AIGC-generated multimedia advertisements to enhance user experience and promote the deep integration of AIGC with the e-commerce industry.

Keywords: AIGC; E-commerce Advertising; Multimedia Advertising; Politeness; User Experience.

1. Introduction

With the development of Artificial Intelligence Generated Content (AIGC) technology, the production and dissemination methods of e-commerce multimedia advertising are constantly evolving. Multimedia advertising, which combines various forms such as images and videos, has gradually become an essential tool in e-commerce marketing due to its rich expressive power and interactivity. AIGC technology can automatically generate personalized advertising content based on users' interests and behavioral data, thereby improving the relevance and click-through rate of advertisements. The application of this technology not only optimizes the effectiveness of ad placement but also enhances consumers' shopping experience. This study focuses on two main forms of multimedia advertising: ad images and ad videos. By employing the critical incident technique, it deeply analyzes users' experiences when using AIGC tools to generate multimedia ads, explores the politeness performance of AIGC, and helps e-commerce enterprises optimize ad content, improve user satisfaction, and promote the effective application of AIGC technology in e-commerce ad creation.

2. Literature Review

2.1 Overview of AIGC

Artificial Intelligence Generated Content (AIGC) is an automated technology that relies on artificial intelligence algorithms to creatively generate, process, and edit various valuable and diverse data. This approach enables the efficient production of novel content[1]. AIGC uses AI technology to generate content based on keywords or requirements provided by users, aiming to assist or replace traditional manual content creation. With the development of large model algorithms, the capabilities of AIGC have been significantly enhanced, making it a highly potential generation tool that greatly facilitates our daily lives[2].Hanjie Yu, Yan Dong, and Qiong Wu's research indicates that AIGC tools face some challenges in user experience, necessitating user-centered design strategies. They propose a conceptual model to improve the user experience of AIGC[3]. Tao Wang et al. systematically review the security and privacy of AIGC-generated data from the perspective of information security characteristics. Specifically, they start from basic characteristics such as privacy, controllability, authenticity, and compliance, revealing the success of current advanced strategies[4].

2.2 The Application of AIGC in E-commerce Multimedia Advertising

With continuous technological advancements, the role of AIGC in e-commerce advertising is becoming increasingly significant. E-commerce enterprises can achieve higher efficiency and personalization in multimedia ad production, thereby enhancing user experience and conversion rates. Artificial Intelligence (AI) is profoundly changing the way brand content is disseminated and how consumers interact with it in the advertising industry. Generative AI, represented by ChatGPT, is expected to have a significant impact on various fields of global digital advertising[5]. Vakratsas and Wang believe that AI has a high degree of flexibility, capable of automatically generating creative advertisements while also allowing for creative collaboration with human assistance[6]. Research by Gu C et al. found that the realism and creativity level of AI-generated ads might make consumers uncomfortable, negatively affecting their perceptions, while a combination of these factors could yield positive effects. On the other hand, the realism, vibrancy, and creativity of ads positively influence consumers' intellectual perception, but combining these factors might negatively impact their intellectual perception. Additionally, the uncanny feeling consumers have towards AI-generated ads can reduce their acceptance, while their perception of the ad's intelligence can increase their willingness to accept these ads[7]. Göring et al. suggest that the alignment of AIGC-generated images with reality affects users' perceptions and evaluations of them[8]. If the generated content significantly deviates from reality, consumers may feel alienated, making it difficult for them to identify with and resonate with the content; conversely, the more realistic the AI-generated ad, the easier it is for consumers to immerse themselves and enhance their trust[9]. By using advanced AIGC tools, the efficiency of e-commerce ad production is significantly improved, while also endowing it with unprecedented intelligent features[7].

2.3 Overview of Politeness

Politeness generally refers to the legitimate and considerate attitude people show in interactions, and it is an essential cornerstone of modern social civilization[10]. Here, politeness refers to the user experience in "human-computer interaction." For instance, when you use an e-commerce platform, your overall experience and interaction feelings in browsing, searching, purchasing, payment, and after-sales service. Simply put, any experience that makes you dissatisfied can be considered the platform's "impolite" behavior. Nass's research found that people expect computers to respond to them politely, just as they show politeness when interacting with computers[11]. Brian Whitworth et al., based on sociological and socio-technical interaction theories, proposed five definitions of software

politeness: respecting users' rights, maintaining transparency in behavior, providing practical information, remembering users' needs, and faithfully responding to users' requests. These five principles apply to any type of computer software, and users can interact with these software to complete specific tasks[12]. Human-computer interaction involves not only text communication like verbal dialogue between people but also covers aspects such as information structure, design and experience of graphical user interfaces, system response speed, usability, and transparency of operations[13]. As the internet and various computer technologies become increasingly integrated into our daily lives, customers will eventually recognize the importance of politeness and behavioral norms in online stores, just as they do in physical stores[14]. Politeness is an important factor in enhancing customer satisfaction[15], as well as a key element in continuously generating revenue and achieving commercial success[16].



Figure 1: Intelligent Marketing Interaction Diagram

3. <u>Research Methods and Design</u>

3.1 Critical Incident Technique

The Critical Incident Technique (CIT) is a qualitative research method proposed by American psychologist Flanagan in 1954. This method involves collecting significant events or cases related to a specific theme or field, systematically categorizing and analyzing the content to gain a deep understanding of the information conveyed by these events. CIT is regarded as a bridge between theoretical research and practical application, aiming to promote progress in practice and enhance work effectiveness[17].

The study of the Critical Incident Technique can be divided into the following five steps. First, determine the overall objective of the research; second, develop plans and standards for effectively collecting relevant incidents; next, proceed with the actual data collection; then analyze the collected data; finally, interpret the analysis results and write a report to present the relevant information[18].

3.2 Research Design

The main objective of this study is to clarify the direction and scope of the research, which includes defining the research subjects and identifying critical incidents. The primary subjects of this study are users who have used AI tools to generate multimedia advertisements. Critical incidents are considered as "polite and impolite events in the process of users' interaction experience with AIGC," aiming to explore users' experiences when using AIGC.

After defining the overall goal, a specific plan and standards need to be established to guide data collection and analysis. This study adopts an online questionnaire survey method, with the main part containing a series of exploratory questions. The researchers are three classifiers who have an in-depth understanding of the characteristics, application methods, and operational processes of AIGC, and are also very familiar with the operational mechanisms of e-commerce ad content.

After establishing standards, a questionnaire survey is conducted to collect relevant data, followed by an analysis of these data. The reliability analysis of the critical incident technique classification usually includes two parts: intra-rater consistency and inter-rater consistency[17]. Intra-rater consistency refers to the extent to which the classification results of the same event by two or more researchers exceed 0.8 in consistency, indicating that the classification results are reliable. Inter-rater consistency refers to the degree of agreement between different classifiers when classifying the same event. The verification formula is as follows:

$$R = \frac{(N \times A)}{1 + [(N - 1) \times A]} \to (1)$$
$$A = \frac{\frac{2M_{12}}{n_1 + n_2} + \frac{2M_{23}}{n_2 + n_3} + \frac{2M_{13}}{n_1 + n_3}}{N} \to (2)$$

R represents reliability, *N* is the number of raters, *A* is the average inter-rater agreement, *M* is the number of identical classification results by raters (e.g., M_{12} represents the number of agreements between Rater 1 and Rater 2), and n is the number of samples classified by the raters (e.g., n_1 is the number of samples classified by Rater 1). Finally, the results are analyzed and summarized.

4. Data Analysis

4.1 Sample Description

The online questionnaire survey was conducted from July 5 to July 20, 2024, and a total of 170 questionnaire responses were received. Among them, 127 were valid questionnaires, and 43 were invalid. Of the survey participants, 59% were female, and 41% were male. The majority of participants were between the ages of 21 and 30. All participants had at least a high school education, with the highest proportion being undergraduates. To ensure the validity of the sample and the reliability of the data, invalid questionnaires were excluded after the survey collection was completed. The criteria for excluding invalid questionnaires included: eliminating questionnaires with a completion time shorter than the minimum required; eliminating duplicate submissions from the same respondent; eliminating incomplete questionnaires; and eliminating questionnaires with overly similar answers.

4.2 Data Processing

The questionnaire data filled out by respondents were organized and categorized based on the polite and impolite critical incidents they reported. The specific classification and naming details are shown in Tables 1 and 2.

Category Items	Explanation
Aesthetic Appeal	Refers to the visual attractiveness and beauty experienced by users when viewing ad content generated by AI tools, including color matching, composition, and design style.
Convenience	Refers to the ease of operation and efficiency perceived by users when using AI tools, including the user-friendliness and intuitive functionality of the tools.
Efficiency	Refers to the time utilization and output effectiveness experienced by users when using AI tools, including generation speed, processing capability, and resource optimization.
Creativity	Refers to the uniqueness, innovation, and emotional expression of the content generated by AI tools, as experienced by users.
Relevance	Refers to the degree to which the content generated by AI tools matches users' needs, brand image, and target audience.

 Table 1: Explanation of Polite Critical Incident Categories and Naming

Category Items	Explanation	
	Refers to users' perception and experience	
Perceptual Experience	of the visual effects and overall aesthetics	
	when AI tools generate ad content.	
	Refers to the perceived restrictions on the	
	content and the number of generations	
Limitations	when using AI tools, including technical	
	capabilities, customization levels, and	
	generation costs.	
	Refers to the speed of content generation	
	and the ability to provide real-time	
Timeliness	feedback when using AI tools, and how	
	these factors affect user experience and ad	
	effectiveness.	
	Refers to the uniqueness, innovation, and	
Creativity	emotional expression of the content	
	generated by AI tools, as experienced by	
	users.	
	Refers to the degree to which the content	
Relevance	generated by AI tools matches users' needs,	
	brand image, and target audience.	

Table 2: Explanation	of Impolite	e Critical Incident	Categories	and Naming
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4.3 Data Analysis Results

4.3.1 Classification Results of Critical Incidents

After independent analysis, three classification experts conducted a classification study on the polite and impolite critical incidents filled out by respondents, based on the established classification naming standards, to deeply understand users' needs and experiences. The specific classification details are shown in Tables 3 and 4. For polite incidents, users generally reported that using AIGC is efficient and convenient, with a high degree of alignment with personalized needs. For impolite incidents, users highlighted issues with relevance, limitations, and perceptual experience as the most prominent, indicating that these issues significantly affected their user experience.

Category Name	Percentage	Examples of Polite Critical Incidents
		There was an occasion where I was
		designing an ad image for a tourism
		project, aimed at showcasing the beautiful
		scenery and unique charm of the
		destination. I first organized various
		materials of the destination, then used
A anthestic A number	14 440/	Baidu AI's image generation function to
Aesthetic Appeal	14.44%	create the ad. During the process, I
		continuously adjusted the parameters and
		style until I got a picture I was particularly
		satisfied with. The color scheme of the
		image was especially harmonious,
		highlighting the features of the destination
		while making it very pleasing to the eye.
		When making an advertisement video,
		using AI tools can automatically convert
		the text content of the ad video you want
		to make into a dynamic video, and add
		appropriate transition effects and
Convenience	16.27%	background music to complete the
		creation. The whole process is simple and
		quick, allowing you to produce an ad video
		in no time. Even someone like me without
		video editing experience can easily handle
		it.
		I used Doubao AI to generate ad images
		for a shop I was tutoring in a Customer
Efficiency	28 250/	Relationship Management course. I
Efficiency	28.5570	provided a few keywords, and within a few
		seconds, it generated an image that
		matched my description.
		A satisfying incident was creating a high-
	13.91%	quality ad video using AI tools. Such ad
		videos usually need to integrate creative
Creativity		scripts, music, visual effects, and
		narration. AI can automatically generate
		videos that match the brand style based on
		user-input scripts and requirements and

Table 3: Classification of Polite Critical Incidents

		adjust the format and length for different platforms (e.g., social media, TV, YouTube). Users may be amazed by the creativity and smoothness of the AI- generated videos, especially the precision and consistency in details
Relevance	27.03%	A satisfying experience was designing promotional images for a beverage shop using AI tools. The style of the images generated by the tool perfectly matched the atmosphere of the beverage shop.

Table 4:	Classification	of Impolite	Critical	Incidents
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Category Name	Percentage	Examples of Impolite Critical Incidents
Perceptual Experience	19.69%	I tried generating an ad photo of a child brushing their teeth using text, but the generated child looked too fake, with distorted mouth, and even after regenerating, the distortion was severe.
Limitations	23.36%	There is a usage limit, so it cannot be used continuously. Therefore, it is necessary to organize the language well and express oneself as completely as possible.
Timeliness	11.29%	When using the text-to-image function of stable diffusion to create ad images, selecting high steps for generation, it took half an hour to complete, and the resulting image had flaws.
Creativity	13.12%	When I was looking for related ad images, the AI tool provided images that were too conventional and not innovative enough.
Relevance	32.55%	When using the Jidream APP and inputting "girl," the automatically generated image had a tech style, which was not the sweet style I wanted.

4.3.2 Reliability Analysis

In the Critical Incident Technique, the focus of reliability analysis is to assess the consistency of different raters in classifying critical incidents. After the first classification, the three raters conducted a second classification a month later. By comparing the results of these two classifications, personal classification consistency and inter-rater reliability were calculated to verify the credibility of the classification results. The specific numbers for inter-rater reliability are shown in Tables 5 and 6.

Inter-Rater Consistency Counts	Classifier 1	Classifier 2	Classifier 3
Classifier 1	103		
Classifier 2	79	91	
Classifier 3	77	71	119

 Table 5: Number of Inter-Rater Agreements for Polite Incidents

Inter-Rater Consistency Counts	Classifier 1	Classifier 2	Classifier 3
Classifier 1	107		
Classifier 2	78	76	
Classifier 3	74	80	121

Table 6: Number of Inter-Rater Agreements for Impolite Incidents

Based on the number of inter-rater agreements listed in Tables 5 and 6, the average interrater agreement and reliability were calculated using Formulas 1 and 2. The specific calculation results are shown in Table 7.

Classification Incident	Average Inter-Rater Agreement (A)	Reliability (R)
Polite	0.728	0.889
Impolite	0.771	0.910

Table 7: Classification Reliability Table

Based on the reliability analysis results in Table 7, the reliability (R) for both polite and impolite incidents exceeds 0.8. This indicates that the three raters showed a high level of consistency in classifying the critical incidents, providing strong support for the reliability and validity of this study.

4.3.3 Validity Analysis

Validity analysis is a key step in ensuring the reliability of research results. From the perspective of expert validity, by inviting experts in the field to participate in research design and result evaluation, it ensures that the selected dimensions for politeness analysis are professional and scientific. Expert feedback helps confirm whether key events can effectively capture the politeness features displayed by AIGC in multimedia advertisements[19]. Content validity emphasizes whether the politeness features being studied comprehensively cover relevant aspects of e-commerce multimedia advertisements. By deeply analyzing key events, it ensures that classification items can truly reflect the politeness performance in advertisements[20]. Face validity focuses on the rationality and intuitiveness of the research tools' appearance, ensuring that the politeness evaluation of advertisements can be easily understood and accepted by the audience[21]. Integrating these three types of validity analyses, this study not only provides profound insights into the application effects of AIGC in e-commerce advertisements but also offers effective suggestions for the design and optimization of actual advertisements, thereby enhancing the overall politeness and user experience of the advertisements.

5. <u>Research Conclusions and Recommendations</u>

5.1 Research Conclusions

The research results show that users generally experience polite incidents such as visual appeal, convenience, efficiency, creativity, and relevance when using AI tools to generate multimedia advertisements. Among these, efficiency, relevance, and convenience received high recognition, indicating that users positively evaluated the AI tools' performance in improving generation efficiency, meeting personalized content requirements, and ease of use. These factors significantly enhanced user satisfaction, indicating that AIGC tools meet the needs of e-commerce advertisement generation to a certain extent.

However, users also experienced some impolite incidents, mainly including visual appeal, limitations, timeliness, creativity, and relevance. Among these factors, issues with relevance, limitations, and visual appeal were particularly prominent, reflecting that users might face challenges such as poor visual effects, limited functionality, and generated content not

precisely matching their needs during the usage process. These impolite incidents significantly affected users' overall experience, reminding developers to pay more attention to users' actual needs and expectations when designing tools.

Creativity and relevance simultaneously manifested as both polite and impolite factors in user experience, indicating that these two aspects have a dual impact on user satisfaction and experience. Therefore, when developing AI tools, efforts should be made to improve the quality and precision of creative output to reduce users' negative experiences while enhancing their trust in the tools.

AIGC shows good potential and user experience in e-commerce advertisement generation, but there are still some urgent problems to be solved. Future research and practice should focus more on user feedback, optimize tool performance, and improve users' overall experience.

5.2 Recommendations

Based on the polite and impolite incidents experienced by users during the process of using AI tools to generate multimedia advertisements, the following recommendations are proposed from the perspectives of AIGC, e-commerce advertising enterprises, and users to improve user experience and advertising effectiveness.

5.2.1 Recommendations for AIGC

The AIGC development team should create smarter algorithms to improve the match between generated content and user needs. By integrating users' historical data and preference analysis, AI tools can more accurately understand users' requirements, generating more expected advertising content. Additionally, designing simple and intuitive user interfaces can reduce the complexity of user operations. Introducing smart prompts and operation guides can help users get started quickly, enhancing ease of use. For example, a one-click generation function could simplify the steps for users. Moreover, incorporating more creative elements into the generated ads and allowing users to choose different styles and themes can enhance the visual appeal of the ads. Offering a variety of templates and design tools can encourage users to customize their ads. Allowing users to generate a certain amount of free content before payment can help them evaluate the tool's effectiveness and value, thereby reducing users' trial and error costs.

5.2.2 Recommendations for E-Commerce Advertising Companies

E-commerce enterprises should ensure that AI-generated advertising content aligns with their brand image and market positioning. They may consider setting up review mechanisms to guarantee the quality and consistency of the generated content, thus reducing negative experiences caused by low-quality content. Regularly collecting user feedback on ad generation tools can help analyze user experiences and changing needs, allowing timely adjustments to advertising strategies and tool functionalities to ensure ad content stays in line with market trends. Continuous investment in AIGC technology, exploring the combination of cutting-edge technology and market applications, can enhance the innovation capability of generated ads, helping enterprises stand out in the competition.

5.2.3 Recommendations for Users

When using AIGC, users can read and study in advance, including operation tutorials, case sharing, and best practice guides, to better understand and use the tool, reducing dissatisfaction caused by information asymmetry. Additionally, users can actively provide suggestions for improvements and share their experiences to ensure their voices are incorporated into product iterations. Users can also engage in communication and sharing, create and participate in user communities, showcasing their creative ads and usage experiences, thereby inspiring more ideas and creativity. This not only helps users learn from each other but also enhances the cohesion and activity of the community.

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