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ORIGINAL ARTICLE

Which Is Superior in Creating Scientific Article Titles in Plastic Surgery: Human Intelligence or Artificial Intelligence?

Plastik Cerrahide Bilimsel Makale Başlığı Oluşturmada Hangisi Üstündür: İnsan Zekâsı mı Yapay Zekâ mı?

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ABSTRACT

Aim: This study explores the effectiveness of artificial intelligence (AI) versus human expertise in generating scientific article titles within the context of plastic surgery. Acknowledging the pivotal role titles play in attracting readership and conveying a study's significance, this research investigates whether AI can match or surpass human capability in crafting compelling titles for academic articles.
Methods: Utilizing a sample of original articles from the Plastic and Reconstructive Surgery Journal and published in January and February 2023, the study employs OpenAI's ChatGPT to generate alternative titles based on article abstracts. A survey among plastic, reconstructive, and aesthetic surgery experts, with a blinded setup regarding the origin of the titles (AI-generated or original), facilitates the comparison. Statistical analysis, including t-tests and the Mann-Whitney U test, assesses preferences across general and specific subject areas within plastic surgery.
Results: Findings indicate a predominant preference for original titles, yet in certain subjects like hand/peripheral nerve surgery, AI-generated titles were more favored. On the other hand, in experimental and cosmetic subjects original titles were more favored.
Conclusion: The study highlights the potential and limitations of AI in academic creativity, suggesting a nuanced view where AI's effectiveness varies by subject matter, such as experimental and cosmetic subjects. It concludes that while AI exhibits competence in title generation, human oversight remains crucial, especially in areas requiring deep expertise and nuanced understanding. This investigation contributes to the discourse on AI's role in academic publishing, emphasizing the need for balanced integration of AI tools in the scientific communication process.

Keywords: Artificial intelligence, article, plastic surgery, title

ÖZ

Amaç: Bu çalışma, plastik cerrahi alanında bilimsel makale başlıkları oluşturulması için yapay zekâ kullanımı ile orijinal başlıklar arasındaki farkı araştırmaktadır. Başlıkların temel rolü, okuyucu çekme ve çalışmanın önemini iletme olup, bu araştırma yapay zekanın akademik makaleler için çekici başlıklar oluşturma konusunda insan yeteneğine eşit veya onu aşma potansiyeline sahip olup olmadığını incelemektedir.
Gereç ve Yöntem: Ocak ve Şubat 2023'te yayımlanan Plastic and Reconstructive Surgery Journal isimli dergiden seçilen orijinal makalelerin makale özetlerine dayanarak alternatif başlıklar üretildi. Plastik, rekonstrüktif ve estetik cerrahi uzmanlarından, tek körleştirilmiş bir anketle hem orijinal başlık hem de yapay zekanın ürettiği başlık arasından makaleye daha uygun olanını seçmeleri istendi. İstatistiksel analiz yapıldı.
Bulgular: Bulgular, orijinal başlıklara yönelik yaygın bir tercihi göstermekle birlikte, el/periferik sinir cerrahisi gibi belirli konularda yapay zekâ tarafından üretilmiş başlıkların daha fazla tercih edildiği ortaya konulmuştur. Öte yandan deneysel araştırma makalelerinde ve estetik cerrahi alanında orijinal başlık daha fazla tercih edilmiştir.
Sonuç: Akademik yaratıcılıkta yapay zekanın potansiyeli ve sınırları çok geniştir, ancak etkinliği konu maddesine göre dahi değişebilmektedir. Deneysel araştırmalar ve estetik cerrahi gibi derin uzmanlık ve nüanslı anlayış gerektiren alanlarda, insan gözetimi halen kritik durumdadır. Bu araştırma, yapay zekanın akademik yayıncılıktaki rolü üzerine tartışmaya katkıda bulunarak, bilimsel iletişim sürecinde yapay zekâ araçlarının dengeli entegrasyonunun önemini vurgulamaktadır.

Anahtar Kelimeler: Başlık, makale, plastik cerrahi, yapay zekâ

Introduction

The role of article titles in disseminating scientific research and increasing its impact is undeniably important. Titles are critical in attracting the interest of potential readers and reflect the overall scope and significance of the study at first glance. Therefore, the title of an article has a direct effect on the audience it reaches. In rapidly evolving disciplines with wide interest, such as plastic, reconstructive, and aesthetic surgery, the ability to create effective titles becomes even more significant.

The use of artificial intelligence (AI) in academic writing is increasingly becoming a topic of interest and concern (1, 2). Thanks to the rapid advancement of

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these technologies and their language-processing capabilities, they have come into the discussion of being able to interact and even compete with human intelligence in writing. Considering the development of scientific communication, the increasing use of AI in academic settings, and the contributions of these technologies to education, library services, and research processes, the potential use of AI in article titles is particularly noteworthy. However, despite many research topics, there is still not enough data on the creation of titles in scientific articles by AI.

This study aims to compare and evaluate the effectiveness of scientific article titles created by AI with those created by human experts in the field of plastic surgery.

Material And Methods

The Plastic and Reconstructive Surgery Journal (PRSJ) was selected through random sampling among academic journals related to plastic, reconstructive, and aesthetic surgery with impact factors above two (3). All original articles in the issues of January 2023 and February 2023 were included in the study. Articles that are not research articles, such as editors' perspectives, discussions, continuing medical education (CME) articles, ideas and innovations, special topics, letters, viewpoints, replies, corrections, and podcasts, were excluded from the study. The topics were classified according to the subject index of the same journal: Breast, cosmetic, experimental, hand/peripheral nerve, pediatric/craniofacial, head and neck, and trunk.

The AI tool ChatGPT, known for its natural language processing capabilities, was used in its 4th version to load the abstracts of articles without their titles, and the same question was posed to the AI for each article abstract: "I am providing you with an abstract of a scientific research article, what do you think should be the title of this article?" Both the title generated by AI and the original title of the article were recorded.

A survey was created on Google Forms, targeting plastic, reconstructive, and aesthetic surgery experts with an h-index of at least three, who were blind to the study. No information about AI was provided in the survey. The participants were informed with the following instructions: "In each of the following questions, you will find an abstract of an article published in PRSJ. We ask you to choose which title you think is more appropriate for this abstract."

The data were collected via GoogleForms and analyzed using the Statistical Package for Social Sciences (SPSS), version 21.0, focusing on AI-generated Title (AIT) versus Original-Title (OT). The distribution of the data was examined using the Shapiro-Wilk test, and the difference between the two groups was assessed with the independent samples t-test and the Mann-Whitney U test. A p-value of less than 0.05 was considered statistically significant.

The average preference for titles on a general level and by specific topics was investigated. The difference between the OT and AIT groups was evaluated. The t-test was applied to the preference rates for titles in the sample sizes, which were subgroups representing at least 10% of the universe, specifically for the topics of breast, cosmetic, and experimental. The differences between the OT and AIT groups within these subtopics were assessed.

Results

A total of 54 articles were evaluated, with their distribution across subjects as follows: breast (n=13), cosmetic (n=12), experimental (n=8), hand/peripheral nerve (n=6), pediatric/craniofacial (n=6), head and neck (n=4), trunk (n=4), and lower extremity (n=1).

Out of the survey participants, 15 individuals responded to all questions. When evaluating all titles, it was found that the original titles of 37 articles (68.5%) were deemed more appropriate by the participants, while the AI-generated titles were preferred for 17 articles (31.4%).

Subject-specific evaluations revealed that only in the hand/peripheral nerve subject did the AI-generated titles find greater appropriateness (66.6%). For all other subjects, the original titles were considered more suitable.

Based on the number of preferences, the original titles were found suitable by an average of 8.18 people, while AI titles were preferred by an average of 6.81 people, with a statistically significant difference ($p<0.05$).

The preference rates for titles in the breast, cosmetic, and experimental subgroups were also evaluated. In the breast subject, the averages for original title (OT) and AI-generated title (AIT) were 7.61 and 7.38, respectively (Table 1). For the cosmetic subject, the OT and AIT averages were 8.66 and 6.33, respectively (Table 2). In the experimental subgroup, the OT and AIT averages were 8.5 and 6.5, respectively (Table 3).

Table 1. Test Statistics

	Breast
Mann-Whitney U	76.000
Wilcoxon W	167.000
Z	-.442
Asymp. Sig. (2-tailed)	.658

Table 2. Test Statistics

	Cosmetic
Mann-Whitney U	18.000
Wilcoxon W	96.000
Z	-3.156
Asymp. Sig. (2-tailed)	.002

Table 3. Test Statistics

	Exp.
Mann-Whitney U	13.000
Wilcoxon W	49.000
Z	-2.028
Asymp. Sig. (2-tailed)	.043

While no significant difference was found between OT and AIT groups in the breast subjects ($p>0.05$), a statistically significant difference was found in the cosmetic and experimental subjects between the two groups ($p<0.05$).

Discussion

ChatGPT, an advanced chatbot developed by OpenAI, has the potential to significantly impact academia, libraries, and education (4, 5). The reason for specifically using the January and February 2023 issues in this study was to select issues published before the release of ChatGPT4, thereby eliminating the possibility of titles being previously generated by ChatGPT4. AI can enhance searching and discovery, reference and information services, and content creation, but its use should be approached responsibly and ethically (4). In education, ChatGPT can serve as an assistant for instructors and a virtual teacher for students, but its performance varies across subject areas and raises concerns about the generation of incorrect or misleading information (5). Nevertheless, these AI models can perform various language tasks and produce human-like responses, offering excitement for academic productivity (6).

The excitement generated by this potential for academic productivity has also brought along questions related to article writing in the academic world. While ChatGPT can be entertaining and may enhance the writing of review articles, thereby improving scientific communication, it's important to consider its limitations, such as the need for review and editing to avoid plagiarism, if academic support is to be sought (7, 8). Additionally, its capability to generate incorrect information is a handicap, suggesting that reliance on its outputs in academic writing could be problematic.

Nevertheless, since it could be considered a language robot, using it to generate titles for scientific papers without making scientific interpretations could be intriguing. This study investigated which is more successful: Titles generated by AI or those produced by the human brain? In the field of plastic surgery, finding that original titles were more successful than those generated by AI indicates that the human brain is capable of evaluating and interpreting the entire article and summarizing the scientific content more effectively in a title.

When investigated by subject, only in the hand and peripheral nerve category were the AI-generated titles found to be more preferred, but due to the small sample size, it couldn't be determined if this finding was coincidental. However, in the breast area, statistically, both AI and original titles created similarly liked titles. This could be interpreted as a significant development in this clinical area, which occupies a large space in plastic surgery journals, suggesting that AI can generate titles for articles that are at least as good as the originals. Conversely, in the cosmetic and experimental fields, original titles were found to be significantly superior. These findings could be interpreted to mean that AI may offer equivalent or even more appealing titles in some clinical areas of plastic surgery compared to human experts. It might be better to interpret clinical sciences solely from article abstracts. Despite this potential, the tendency of human authors to use more innovative or field-specific jargon in experimental or cosmetic fields could make the original titles more appealing in these areas. AI can be creative in specific subject areas, but its abilities are still developing in fields requiring deep expertise and specialized jargon.

Studies have been conducted on how to put a better title while generating article titles (9). These studies have emphasized the need for conciseness, accuracy, and informativeness in a title. Bowman (10) has further emphasized the importance of an effective title, as it can influence readers' decisions to read the article, affect the author's reputation, and contribute to the journal's impact factor. He also highlighted the

benefits of shorter titles with appropriate punctuation. In this context, AI and machine learning techniques have high potential in the realm of automatic title generation. AI-based systems, with their ability to learn from large datasets, can create effective titles that reflect the main theme and content of an article using information derived from extensive literature databases. Studies like Putra's (11) research on improving summarization tasks using rhetorical categories demonstrate how far AI can advance in text summarization and identifying key concepts. These capabilities can be directly adapted to the title generation process, allowing for the production of titles that are both appealing and consistent with the content of the articles.

This study was a survey that asked participants to choose one of two options to understand which title was more suitable. Future studies could include more comprehensive data by adding information to the survey on aspects such as the attractiveness of the title, the alignment of the emphasis in the title with the article, conciseness, accuracy, and informativeness of the title.

The existence of at least a 26.6% preference rate for AI-generated titles (when evaluating each article) indicates that AI is competitive with humans in generating academic titles. However, significant barriers remain before AI can perform at a human level in all academic fields. The inability to deeply and successfully interpret abstracts, especially on niche topics like cosmetic and experimental subjects, serves as an indication of this.

In conclusion, AI can be considered an effective tool in academic publishing, but its use should be carefully evaluated, and such tools should remain under human oversight and intervention. A collaboration between AI and the human brain during the title creation process could lead to the derivation of more successful article titles.

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Authors' Contribution:

Conception: GY. Design: GY, HA, SD. Data collection and processing: SD, GY. Data analysis and interpretation: GY, SD, HA Writing: GY Critical review: ZT

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