Research on the Construction and Application of a Short Video Evaluation System for Scientific Papers in Chinese Sci-Tech Journals

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Abstract

Objective: To evaluate short videos of scientific journal papers on commonly used video media platforms in China, and to provide references for improving the quality of academic short videos and promoting the short-video dissemination of scientific journal papers. Methods: Based on understanding audience viewing experiences and preferences regarding short videos of scientific journal papers through questionnaire surveys, combined with the dissemination requirements of scientific journal papers and the production and evaluation elements of short videos, an evaluation index system for short videos of scientific journal papers was constructed, and the Analytic Hierarchy Process (AHP) was utilized to assign weights to the indicators, thereby establishing an evaluation model for scientific journal paper videos. This model was applied to conduct a comprehensive evaluation of short videos of scientific journal papers. Results: The evaluation system for short videos of scientific journal papers comprises four dimensions: content production, overall effect, video elements, and dissemination channels, corresponding to 17 evaluation indicators. Among them, indicators such as video title, background music, color, cover, and narration are the main factors affecting the viewing of scientific journal paper videos. The comprehensive scores of the four production modes for scientific journal paper videos, from highest to lowest, are as follows: paper narration style (3.96), animation style (3.42), experiment sharing style (3.16), and author monologue style (3.00). Conclusion: The paper narration style is currently the mode with the highest average score in the comprehensive evaluation of short videos of scientific journal papers, featuring relatively simple production and complete video elements, which deserves wider adoption by journals in dissemination practice. Although animation-style short videos are more difficult to produce and selective regarding paper content, they offer good visual experience and dissemination effects, making them worthwhile for scientific journals with suitable content to attempt. Suggestions are proposed to promote the video-based dissemination

of scientific journal papers, including drawing on the experience of excellent knowledge-based short videos, clarifying content advantages, improving the dissemination matrix, and enhancing the new media dissemination awareness of relevant personnel.

Full Text

Preamble

Research on the Construction and Application of a Short Video Evaluation System for Scientific and Technical Journal Papers in China

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Abstract

[**Purpose**] This study evaluates short videos of scientific and technical journal papers on popular Chinese video platforms to provide reference for improving academic short video quality and promoting the video-based dissemination of scientific papers. [**Methods**] Based on questionnaire surveys investigating audience viewing experiences and preferences for scientific paper short videos, combined with the dissemination requirements of scientific papers and the production and evaluation elements of short videos, we constructed an evaluation index system for scientific journal paper short videos and used the Analytic Hierarchy Process (AHP) to assign indicator weights, thereby establishing a comprehensive evaluation model for scientific paper videos. This model was then applied to evaluate scientific journal paper short videos. [**Findings**] The evaluation system comprises four dimensions—content production, overall effect, video elements, and dissemination channels—corresponding to 17 evaluation indicators. Among these, video title, soundtrack, color, cover, and commentary are the primary factors influencing viewership. The comprehensive scores of the four production modes, from highest to lowest, are: article narration (3.96), animation (3.42), experiment sharing (3.16), and author narration (3.00). [**Conclusions**] The article narration mode currently achieves the highest average score in the comprehensive evaluation of scientific journal paper short videos. It is relatively simple to produce while maintaining complete video elements, making it worthy of adoption in journal dissemination practices. Although animation short videos are more difficult to produce and require selective content, they offer excellent viewing experience and dissemination effects, making them worthwhile for journals with suitable content. The study proposes recommendations for

promoting video dissemination of scientific papers, including learning from successful knowledge-based short videos, clarifying content advantages, improving dissemination matrices, and enhancing new media awareness among relevant personnel.

Keywords: scientific and technical journal articles; short videos; evaluation system; Analytic Hierarchy Process (AHP); questionnaire survey method

Introduction

In recent years, short video platforms have increasingly become the dominant traffic source among major social networks. According to a report by the China Internet Network Information Center (CNNIC), as of July 25, 2023, China's online audio-visual user base reached 1.04 billion, with short videos becoming a universal application medium accounting for 94.8% of all internet users. Compared to traditional text and image-based information dissemination, short videos offer advantages in diversity, immediacy, intuitiveness, mobility, and social interaction. Their unique media characteristics—personalized content presentation, explicit representation of tacit knowledge, and popularization of complex knowledge—enable rapid and wide-ranging dissemination with low production barriers, high user engagement, and broad audience reach. The outbreak of COVID-19 in 2020 marked a boom year for knowledge-based short videos, with major video platforms launching dedicated knowledge sections. Covering humanities, social sciences, natural sciences, and other professional fields, this trend has driven scientific journals to establish presence on short video platforms and disseminate journal papers through video editing.

Short videos of scientific and technical journal papers refer to short-form videos that introduce scientific papers using abstract text, images/tables, and experimental footage as primary materials. Leveraging the immediacy, appeal, science communication capacity, and interactive promotion of short videos, scientific journals transform papers into video content, fragmenting academic content, visualizing communication language, and artisticizing presentation formats. This approach lowers the barrier to knowledge comprehension, enhances academic communication efficiency, expands audience reach, and enables the rapid dissemination of academic papers characterized by specialization, novelty, and cutting-edge insights through the "fast, broad, and interactive" features of short videos. This better adapts to new requirements for knowledge dissemination in the internet age and significantly increases the visibility of scientific papers while expanding the social influence of scientific journals.

Regarding short video evaluation, China's National Radio and Television Administration has proposed an evaluation system for educational and popular science short videos, establishing four primary indicators: theme conception, content creation, content production, and dissemination effect. Chaiken proposed that video content quality includes work content and characteristics, logical argumentation, and readability. Tao Shanshan suggested expanding evaluation dimen-

sions from multiple angles, including platform factors and visual aspects such as color and texture. Kuang Wenbo et al. argued that title formulation influences user decisions to open content. Gao Xiaojing et al. found that different types of background music significantly enhance interaction and dissemination compared to videos without music. Wang Yan et al. and Xu Zulong et al. emphasized that commentary plays a vital role in videos by establishing common interest points between communicators and audiences. Chen Nuan discovered that videos with durations between 31-60 seconds achieve maximum dissemination. Yang Dasen et al. proposed that video tags can effectively reduce information search costs for users and increase exposure rates. Huang Nannan et al. suggested that graphics, animations, and special effects can bridge the distance between audiences and content.

However, to date, few studies have reported on the evaluation of scientific journal paper short videos, hindering improvements in production quality and dissemination effectiveness. Building on our previous research summarizing the operational status and production modes of scientific journal paper short videos, this study combines scientific paper dissemination requirements with short video production and evaluation elements. Using questionnaire surveys, we investigated content quality, production modes, dissemination status, and audience viewing patterns of existing scientific journal paper short videos to initially determine evaluation dimensions and establish a comprehensive evaluation index system. We then employed AHP to assign weights to each indicator, constructing an evaluation system for scientific paper short videos. Finally, we organized expert evaluations to summarize optimal production modes, providing references for improving the production, dissemination, and influence of scientific journal paper short videos.

1. Research Design

1.1 Questionnaire Survey on Public Viewing Experience and Preferences for Scientific Journal Paper Short Videos

To comprehensively understand audience preferences for scientific paper short videos, we designed a questionnaire covering four aspects: respondent basic information, short video app usage habits and viewing behaviors, follow status of scientific journal accounts publishing short videos, and attention-related issues regarding scientific journal paper short videos, including 27 questions on content types, viewing factors, and expected content. The questionnaire was created using Wenjuanxing V2.0 and released on November 18, 2022, through the WeChat public account "Journal of Nanjing Forestry University," with invitations sent to 15 scientific journal reader WeChat groups totaling approximately 1,500 people.

1.2 Determination of Evaluation Indicators and Scoring Standards for the Comprehensive Evaluation System

Based on questionnaire results and combining scientific paper dissemination priorities with short video characteristics, we determined evaluation dimensions and corresponding indicators for scientific paper short videos, establishing scoring standards for each indicator.

1.3 Determination of Indicator Weights Using Analytic Hierarchy Process

We designed an expert consultation form for evaluation indicator weights, using the expert scoring method to determine weights. Expert selection criteria followed reference [18]. The evaluation panel comprised publishing science researchers (3), scientific journal communication experts (4 new media editors with over 5 years of editorial experience in scientific journal communication), scientific paper communication audiences (20 researchers including 5 graduate students, 5 intermediate-level, 5 associate senior-level, and 5 senior-level professionals), and short video production experts (3 master's students in directing). Surveys were conducted through questionnaires or interviews, with each evaluator making independent judgments. The questionnaire included indicator judgment matrices using a 1-9 scale method [18]. Yaahp10.5 software was used to test the consistency of evaluator data.

Based on judgment matrices from 30 experts, AHP was used to determine project-level weights (X) and indicator-level weights (Y). Indicator weights (W) were calculated using the formula W = X Y , where i represents project level and j represents indicator number.

1.4 Construction of the Comprehensive Evaluation Model for Scientific Journal Paper Short Videos

Based on the evaluation system indicators and their corresponding weights, we constructed a comprehensive evaluation model for paper short videos. The calculation formula is: V = Σ W S , where W represents the weight value of indicator j, S represents the score of indicator j for the short video, and n represents the number of indicators (n=17, j=1-17).

1.5.1 Empirical Evaluation Objects

According to the scientific and technical journal directory in *China Science and Technology Journal Development Blue Book (2022)*, we searched for scientific journals on platforms including Bilibili, Douyin, WeChat Video Channel, Weibo, and Toutiao using journal names combined with keywords such as "journal," "magazine," "periodical," "publishing house," "editorial office," and "press." Corresponding journals were retrieved from CNKI and Wanfang databases for verified new media accounts. The survey period was November

1-31, 2022. Following the classification of scientific journal paper short video production modes [16], we selected well-performing paper short videos from various platforms and journals as evaluation objects. Due to the limited sample size of animation-style scientific journal paper short videos, all such videos were included as evaluation objects. We ultimately selected 103 scientific journal paper videos: the top 30 by view count for article narration style, top 30 for experiment sharing style, all 13 animation-style videos, and top 30 for author narration style.

1.5.2 Expert Scoring of Short Videos

We invited 10 evaluation experts (6 research experts, 2 journal editors, and 2 video production experts) to score each of the 17 indicators for every selected short video according to the evaluation standards. Each expert independently scored after viewing the videos, with the average of the 10 experts' scores for each indicator serving as the final score (S) for that short video.

1.5.3 Calculation of Comprehensive Scores and Correlation Analysis with View Count

Comprehensive scores were calculated using the formula from section 1.4 based on indicator scores and weights. Excel was used for calculations.

2. Results

2.1 Questionnaire Survey Results on Audience Viewing Experience and Preferences

The questionnaire was distributed via WeChat public account and collected over 45 days, yielding 175 responses. After screening, 14 invalid questionnaires were removed, retaining 161 valid questionnaires (92% validity rate). Analysis of the 161 valid questionnaires revealed that regarding viewing platforms, most respondents preferred Bilibili, Douyin, and Weibo for watching scientific paper short videos. Regarding video duration, most preferred videos shorter than 3 minutes. Most users identified video title, soundtrack, color, cover, commentary, and content as primary factors affecting their viewing of scientific journal paper short videos. The majority preferred short videos featuring overall article explanation and animated science popularization formats, believing that scientific journal paper short videos have promising dissemination prospects. Additionally, video aesthetic quality and content originality also influenced audience viewing.

2.2 Construction of the Comprehensive Evaluation Index System for Scientific Journal Paper Short Videos

Based on questionnaire results and combining scientific paper dissemination priorities with short video production and evaluation elements [4-15], we divided the comprehensive evaluation system into four dimensions (primary indicators),

each corresponding to different secondary indicators totaling 17. Secondary evaluation indicators were scored manually according to quality levels based on short video production principles and scientific paper communication characteristics. The scoring standard assigned values of 5, 3, and 1 from excellent to poor, with 5 as the highest and 1 as the lowest. The specific indicator system and evaluation standards are shown in Table 1 .

2.3 Determination of Indicator Weights Using AHP

Yaahp10.5 software was used to test the consistency of evaluator data, yielding CR = 0.0450 < 0.10, indicating reasonable judgment matrix construction. AHP was applied to determine project-level and indicator-level weights X and Y , with indicator weights (W) calculated using the formula W = X Y . The weight calculation results are shown in Table 2 .

As shown in Table 2, at the project level, weights in descending order are: content production, overall effect, video elements, and dissemination channels. This indicates that content production-related indicators are crucial factors affecting comprehensive evaluation scores for scientific journal paper short videos. At the indicator level, color has the highest weight (0.1339), followed by media linkage (0.1338), then opening sequence and special effects (both 0.0791), and title (0.0670). This reveals that color is the primary element for capturing viewers, while multimedia linkage effectively increases short video visibility to attract audiences. Well-produced opening sequences and special effects also strongly attract viewers.

2.4.1 Comprehensive Evaluation Results of Scientific Journal Paper Short Videos

Ten experts scored each selected short video according to the secondary indicator scoring standards (Table 2), with average values serving as indicator scores (S). Comprehensive scores were then calculated using the formula V = Σ W S . The results are shown in Table 3 ; due to space limitations, only the top 10 videos for each of the four modes are displayed.

Correlation analysis using Pearson's method was conducted between view counts and comprehensive scores for 60 videos from four accounts ("Journal of Nanjing Forestry University" Douyin account, "Radar Journal," "Acta Sedimentologica Sinica," and "Journal of Hydrobiology" Bilibili accounts) where view data was available. The results showed significant positive correlation (correlation coefficient = 0.313, P < 0.05), indicating that the evaluation system covers core factors affecting scientific paper short video viewership and is relatively objective and scientific.

2.4.2 Analysis of Comprehensive Evaluation Results for Four Production Modes

(1) Article Narration Mode. The article narration mode achieved an average score of 3.96. High-scoring accounts included *Journal of Nanjing Forestry University (Natural Sciences Edition)*, *Acta Geodaetica et Cartographica Sinica*, and *Acta Sedimentologica Sinica*. These accounts' videos featured: first, complete video elements with at least two of three key factors (title, soundtrack, commentary) and durations under 3 minutes; second, exquisite content production with coordinated and aesthetically pleasing color schemes and moderate special effects; third, excellent overall viewing experience with high audio-visual matching and strong content logic.

(2) Experiment Sharing Mode. The experiment sharing mode averaged 3.16 points. High-scoring accounts included *Journal of Nanjing Forestry University (Natural Sciences Edition)*, *JoVE Video Journal*, and *Acta Sedimentologica Sinica*. These videos shared commonalities beyond relatively complete video elements: they contained rich enhanced publication content such as experimental materials, venues, laboratory interiors, and experimental processes with accompanying explanatory commentary, enhancing content comprehensibility. Although *Journal of Hydrobiology* videos also included substantial experimental footage, their lack of essential video elements like commentary and soundtrack significantly reduced viewing appeal and resulted in lower comprehensive scores.

(3) Animation Mode. Animation-style scientific paper short videos averaged 3.42 points. Top-ranked videos were from *Horticulture Research*, all scoring above 4 points. These videos designed paper materials into vivid and interesting animated characters, used child voiceovers, began with popular science knowledge, and introduced main paper points progressively, resulting in high viewing appeal and guidance. However, because these videos were generally short and omitted some elements like opening sequences, their scores were affected within this evaluation system. The small sample size of animation-style videos indicates this mode represents a developmental weakness for scientific journal paper short videos that warrants journal attention and increased adoption.

(4) Author Narration Mode. Author narration-style scientific paper short videos averaged 3.00 points. Higher-scoring accounts included *Chinese Journal of Stomatology* and *Chinese Journal of Perinatal Medicine*. These videos featured authors personally interpreting paper content, helping readers better understand research topics and writing approaches. They also had aesthetically pleasing backgrounds, typically recorded in classrooms, conference rooms, or offices, enhancing the sense of presence and authenticity. However, these videos commonly suffered from excessively long titles, cluttered interfaces, and other issues affecting comprehensive evaluation scores.

3. Discussion

3.1 Comprehensive Evaluation Indicators and Model for Scientific Journal Paper Short Videos

Among the 17 indicators in the evaluation system, weights in descending order are: media linkage, color, title, opening sequence, special effects, dissemination media, commentary, content appeal, content comprehensibility, completeness of paper innovation points, soundtrack, tags, content logic, audio-visual matching, duration, ending sequence, and paper guidance. This shows that media linkage can effectively increase the visibility of scientific journal paper short videos to attract audiences. Currently, scientific journal paper short videos suffer from low media utilization and single dissemination channels, resulting in insufficient dissemination power. Journals should establish accounts across multiple platforms to disseminate scientific paper videos. Title, commentary, and opening sequence are also important indicators for attracting viewers. For knowledge-based videos, titles and opening sequences serve a guiding function, with concise titles and exquisite openings instantly capturing audience attention. Commentary is the soul of videos, enhancing understanding and attraction. Color and special effects are the finishing touches that further improve video aesthetics. Overall, title, color, soundtrack, and other indicators should be prioritized in scientific journal paper short video production.

3.2 Evaluation of Production Modes

(1) Research results show that article narration mode has the highest average score, followed by animation mode, then experiment sharing mode, with author narration mode scoring lowest, indicating that article narration short videos receive better audience response. Article narration is also the most commonly used mode for converting journal papers to short videos. From a production perspective, these videos can be created directly from PPTs made of core paper content, with materials easily extracted from the paper itself, minimal production constraints, and enhanced quality when supplemented with additional publication materials. This mode easily achieves complete video elements, rich content, and optimal overall effects with relatively simple technology that can be accomplished by non-new media editorial staff using common software, making it suitable for most types of scientific papers.

Animation-style scientific journal paper short videos are currently published more frequently by *Horticulture Research* with relatively high view counts, but rarely by other journals. Possible reasons include: first, animation video production is difficult, requiring professional animation software beyond common new media editing tools, which most journal staff and authors are unfamiliar with, and animation production is time-consuming; second, animation short videos have high content requirements, making them unsuitable for highly specialized papers. For example, *Horticulture Research* animation videos feature easily designed and appealing animated characters based on materials like toma-

toes, pears, and gourds, whereas papers from *Acta Geodaetica et Cartographica Sinica* with extensive data and formula derivations are unsuitable for animation.

Many journals currently use experiment sharing mode, but its comprehensive score is relatively low, possibly because existing videos lack complete elements such as explanatory commentary, increasing comprehension difficulty. Author narration mode requires authors to appear on camera, with production difficulty not particularly high but closely related to author cooperation. Experiment sharing mode requires authors to provide substantial experimental materials, while author narration mode requires authors to record explanation videos. Authors often lack understanding of video elements and production techniques, frequently resulting in issues like overpowering soundtracks, unattractive color schemes, heavy dialect pronunciation, unengaging delivery, and lack of special effects, leading to lower scores.

(2) When selecting production modes, paper content is the primary basis for matching different video production modes. Scientific journals should clarify their content advantages, carefully categorize journal papers, extract innovation points, enrich video production materials, and select matching production modes. Multiple modes should be attempted, with dissemination effects and audience feedback monitored to summarize compatibility between modes and paper content. For example, medical journals with rich experimental materials can experiment more with experiment sharing mode; forestry and agricultural journals can create animation videos based on paper subjects; geoscience and information communication journals with highly specialized content are recommended to use article narration or author narration modes. Additionally, journal accounts should maintain innovative awareness to develop other production modes such as the currently underdeveloped conference forum mode.

3.3 Recommendations for Scientific Journal Paper Short Video Production and Dissemination

(1) Learn and apply film and television audio-visual language to facilitate the transformation from scientific to audio-visual language. Scientific paper short videos use audio-visual language to tell scientific stories, requiring mastery of film and television language. First, scientific paper videos commonly use horizontal framing with documentary style, requiring overall color tones consistent with real scenes. Audio-visual matching should be achieved, with music resonating with vivid short video scenes. When presenting hypotheses, audio-visual contrast can be applied, where music contradicts the emotion, rhythm, and theme of video footage to highlight dramatic effects. Second, encourage synchronous voice and picture, including voice-over, dialogue, and synchronous sound, all of which enhance authenticity. Additionally, clear role positioning and establishing a "persona" for journal accounts can better match video production methods and determine dissemination channels and approaches.

(2) Enhance new media awareness among journal editors and authors. Producing aesthetically pleasing and viewable scientific journal paper short videos requires extensive use of new media production software. Journal new media editors should promptly learn these software tools, understand application techniques of new media technology in media convergence product production and dissemination, and familiarize themselves with characteristics and patterns of different media communication forms and symbols to cultivate composite publishing talents. Simultaneously, journal editors need to develop keen news awareness, pay attention to platform hot topics and traffic support, and focus on current hot issues. For example, Bilibili and Weibo allow selection of corresponding knowledge sections and "knowledge topic tags" when publishing videos, while Douyin has fixed topics like "Knowledge Creator" to promote knowledge-based videos. Selecting appropriate traffic support when publishing videos can achieve precise push, reach more potential audiences, stimulate audience interaction, and enhance influence.

Authors should strengthen awareness of integrated media dissemination of scientific papers in the new media era, enhance new media communication thinking, actively cooperate with editorial offices to provide rich paper content materials, record paper explanation videos, and jointly promote the all-media dissemination of scientific journal paper short videos.

4. Conclusion

Based on questionnaire survey results of public viewing experiences and preferences for scientific journal paper short videos, combined with scientific paper dissemination priorities and existing short video production and evaluation points, this study constructed for the first time a comprehensive evaluation system for scientific journal paper short videos comprising 17 indicators. Using AHP to assign weights to each indicator, we established a comprehensive evaluation model for scientific journal paper short videos. Applying this model to evaluate well-performing scientific journal paper short videos yielded comprehensive scores, with further analysis showing significant positive correlation between these scores and view counts. This demonstrates that the evaluation model covers production elements and core factors affecting dissemination effectiveness, making it suitable for guiding scientific paper short video production and evaluation.

However, this study only selected five popular short video platforms as search platforms, which, although covering different media types, is not sufficiently comprehensive. Future research should increase the number of search platforms. Additionally, evaluation indicators should be further refined with classification, and principal component analysis should be used for factor selection [19]. Multiple weight determination methods such as the entropy weight method should be employed to improve the scientific rigor of evaluation model weights [20]. Furthermore, this study only evaluated short videos themselves without evaluating scientific journal short video accounts, although journals themselves are

decisive factors affecting dissemination. Therefore, future research will continue with evaluations of scientific journal short video accounts to fundamentally improve scientific paper short video production and account operation management levels, thereby promoting short video dissemination of scientific papers.

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Author Contributions

Wu Zhuhua: Proposed the research topic, designed the research framework, determined the basic paper structure, revised the initial draft, and provided funding support.
Hong Chunwei: Participated in data collection, acquisition, cleaning, and analysis, and revised the manuscript.
Liu Ruojin: Determined the research scope, collected data, performed data acquisition, cleaning, and analysis, and wrote the initial draft.
Qin Min: Provided paper revision suggestions and participated in manuscript revision.
Wang Guodong and Meng Miaojing: Participated in manuscript revision and finalized the paper.

Note: Figure translations are in progress. See original paper for figures.