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Postprint of a Study on Influencing Factors of Graduate Students' Academic Video Browsing Behavior Based on the ELM Model

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Abstract

Academic videos, as a medium for academic communication, are becoming increasingly important. Graduate students constitute an important audience for such videos, and factors influencing their viewing behavior require in-depth analysis. This study aims to construct a systematic model of factors influencing graduate students' academic video viewing behavior, thereby providing theoretical support and practical guidance for the production and dissemination of academic videos. Data were collected through questionnaire surveys from valid graduate student samples across multiple regions nationwide. Structural Equation Modeling (SEM) was employed for data analysis, and AMOS software was utilized to validate the model and analyze the significance of each factor's influence path on graduate students' academic video viewing behavior. The findings reveal that viewing demand is a key factor in the central path affecting graduate students' perceived usefulness and perceived ease of use, while functional diversity and operational professionalism significantly influence perceived usefulness and perceived ease of use through the peripheral path. Furthermore, perceived usefulness exerts a significantly stronger impact on academic video viewing behavior than perceived ease of use.

Full Text

A Study on Influencing Factors of Graduate Students' Academic Video Browsing Behavior Based on the ELM Model

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Abstract: Academic videos have become an increasingly important medium for academic communication. Graduate students represent a crucial audience for academic videos, yet the factors influencing their browsing behavior require

in-depth analysis. This study aims to construct a systematic model of the factors influencing graduate students' academic video browsing behavior, providing theoretical support and practical guidance for the production and dissemination of academic videos. Through a questionnaire survey, valid samples were collected from graduate students across multiple regions in China, and structural equation modeling (SEM) was employed for data analysis. The model was validated using software to examine the significance of various influencing pathways. The results indicate that browsing needs constitute the key factor in the central route, significantly affecting graduate students' perceived usefulness and perceived ease of use. Functional diversity and operational professionalism, as peripheral route factors, also exert significant influence on perceived usefulness and perceived ease of use. Moreover, perceived usefulness demonstrates a substantially stronger impact on academic video browsing behavior than perceived ease of use.

Keywords: Academic video; Browsing behavior; Graduate student; ELM model; Structural equation modeling

As the primary medium of information transmission, video accounts for 95.1% of all internet users (China Internet Network Information Center, China Internet Development Statistics Report). China's online video user base has reached 1.079 billion, with short video users totaling 1.074 billion, representing 95.2% of all internet users. While traditional academic media primarily use text and images to abstractly describe objective facts, video enables more direct dynamic documentation by integrating audio-visual elements, making information easier to comprehend. For those new to academia, particularly master's students, the often obscure and difficult passages in academic journal papers frequently become barriers to reading. The emergence of academic videos provides a more accessible alternative. Graduate students constitute one of the key audiences for academic videos. Although academic videos have not yet become the mainstream dissemination method for academic journals, their potential and prospects should not be underestimated.

In the field of academic communication, informal academic exchange through online forums, Twitter, Mendeley, ResearchGate, Kudos, and other social network platforms has developed rapidly. Some academic journals have begun experimenting with producing academic videos and publishing them on internet platforms. Examples include the Bilibili account of *Library and Information Service*, the WeChat video channel of *Chinese Journal of Lasers*, and the TikTok account of *Light: Science & Applications*. Academic videos, as an emerging form of academic research knowledge dissemination, have arrived at a mature stage of development. Deep exploration of the factors influencing graduate students' academic video browsing behavior not only helps us better understand this group's information reception habits but also provides a basis for the future development and improvement of academic videos. This study focuses on academic journals as its foundation to investigate the factors influencing graduate

students' academic video browsing behavior, aiming to enhance their enthusiasm for browsing academic videos.

1. Related Research

Domestic research on academic videos predominantly consists of theoretical studies, while foreign research has made more practical attempts. Scholars have explored academic videos from multiple perspectives. Li Xinyue [4] noted that it is significant for authors and publishers to strictly adhere to copyright law. Jamali et al. [5] found through research that independent video articles continuously improve research methodology and process transparency, which has important implications for copyright protection. Ning et al. [6] proposed the need to establish universal and operable standards and mechanisms to enhance the legitimacy and standardization of academic video publishing. As a pioneer in video journals, JoVE has established strict standards [6]. Taking the Southwest University Journal Press as an example, scholars have explored the practice of integrated publishing combining text and video [7], demonstrating the potential of this innovation in enhancing academic communication effectiveness and optimizing reader experience. Some scholars have categorized academic video content into supplementary materials and video abstracts [8]. Luo Haifeng [12] studied the development path and operational strategies of academic videos from different perspectives. Foreign academic publishers such as Springer, Elsevier, and Wiley have actively explored creating video journals and promoting academic short videos [8]. Research on browsing behavior has entered a new stage, with scholars analyzing it as a fundamental human behavior for information acquisition [17][18].

2. Research Model and Hypotheses

The Elaboration Likelihood Model (ELM), developed by psychologists Petty and Cacioppo, was originally used to study advertising persuasion effects, emphasizing that advertising effectiveness depends on consumers' level of elaborative processing of advertising information [26]. The model divides consumers' information processing pathways into central and peripheral routes. The central route requires consumers to think rationally based on relevant knowledge, evaluating the content of advertising information, while the peripheral route is simpler, relying on superficial factors such as advertising entertainment value, color, and music for subjective judgment.

Academic video browsing behavior is similar to commodity advertising behavior. This study selects the ELM model as the foundation for building the influencing factors model for graduate students' academic video browsing behavior. Academic video browsing behavior includes both active searching for academic

videos driven by research or learning needs and passive encountering of academic videos, such as coming across them on social media or through sharing by others.

2.1 Central Route Influencing Factors Analysis

When users are in a state of high information need, they are more likely to process information deeply and thoroughly [27]. The central route is also used to evaluate the most essential and critical clues of information, namely information quality [28]. Information quality represents the core value of information [29]. In this study, the consideration of information quality is mainly reflected in the browsing quality and content quality that academic videos provide to graduate students.

Browsing Needs: Browsing needs refer to the multidimensional requirements of graduate students when watching academic videos, including fragmented browsing needs, intensive browsing needs, reflective browsing needs, and extensive browsing needs. Existing research has found that videos can satisfy browsing needs, and when academic videos meet these needs, graduate students are more likely to understand and recognize the usefulness of the videos, thereby enhancing perceived usefulness. Meeting browsing needs reduces cognitive load during use and improves perceived ease of use. Zhang Ning et al. [30] found that in the metaverse context, entertainment and learning motivations not only enhance users' perceived usefulness of digital cultural tourism experiences but also deepen their multi-level information browsing needs. Meng Meng et al. [31] noted that digital libraries providing personalized automatic information recommendations and online consultation services can effectively meet users' browsing needs. Therefore, this study proposes:

- **H1:** The degree to which academic video browsing needs are satisfied has a significant positive impact on graduate students' perceived usefulness and perceived ease of use.

Browsing Quality: Browsing quality refers to the comprehensive experience that academic videos provide to graduate students during browsing, including demonstration quality, attractiveness, logical explanation structure, and appropriate pacing. High-quality browsing experiences help graduate students achieve better immersion and learning outcomes. Wen Bo et al. [32] pointed out that stable and reliable access experiences are key to enhancing students' perceived usefulness of services. When users are focused and in a good mood, this strengthens the positive impact of browsing quality on perceived ease of use [33]. Therefore, this study proposes:

- **H2:** The degree to which academic video browsing quality is satisfied has a significant positive impact on graduate students' perceived usefulness and perceived ease of use.

Content Quality: Content quality refers to graduate students' evaluation of

the academic content in videos, including scientific rigor, timeliness, and amount of knowledge transmitted. When content quality is high, users can more effectively acquire and understand required knowledge, improving efficiency. Cai Hongyu et al. [29] showed that when health information quality is high, users tend to believe the information has practical value for the present or future, thereby enhancing perceived usefulness. Therefore, this study proposes:

- **H3:** The degree to which academic video content quality is satisfied has a significant positive impact on graduate students' perceived usefulness and perceived ease of use.

2.2 Peripheral Route Influencing Factors Analysis

Under the peripheral route, individuals focus more on external factors not directly related to the main information itself [35], such as video perspective, classification and style positioning techniques [36], interactive and vivid functional features [37], and editing techniques and video duration [36]. For academic video viewers, these factors belong to external characteristics not directly related to the main information, so this study treats them as peripheral route influencing factors.

Positioning Accuracy: Positioning accuracy refers to how accurately academic video producers (such as academic journals) position their content in terms of user and discipline orientation. Precise positioning can help academic videos directly reach target audiences. Content highly matched with graduate students' professional needs increases their perceived usefulness. Clear positioning can effectively filter out irrelevant information, reducing the time and effort graduate students spend searching for information, thereby improving perceived ease of use. Zhao Wenjun et al. [38] noted that accurate information positioning can significantly enhance users' perceived usefulness of platforms. Xu Xiaojun et al. [39] believed that accurate service positioning can effectively reduce users' cognitive load and provide smoother interaction experiences, significantly improving perceived ease of use. Therefore, this study proposes:

- **H4:** The positioning accuracy of academic videos has a significant positive impact on graduate students' perceived usefulness and perceived ease of use.

Functional Diversity: Functional diversity refers to the richness of functions provided by academic videos, including discussion and interaction features, key point review functions, Q&A functions, and hotspot recommendation functions. Diverse functions can help graduate students deeply understand complex academic content, improve learning convenience and efficiency, and thereby increase perceived usefulness. Functional diversity also gives users more choices and flexible operation methods to meet different learning scenarios, effectively simplifying the usage process and enhancing perceived ease of use. Zhou Wenlu et al. [40] noted that when digital reading platforms provide diverse functions such as communication communities and incentive mechanisms, they can sig-

nificantly improve platform practicality and user satisfaction. Guo Sulin et al. [41] believed that optimizing intrinsic attributes such as information system interactivity and functional integrity can enhance users' perceived ease of use. Therefore, this study proposes:

- **H5:** The functional diversity of academic videos has a significant positive impact on graduate students' perceived usefulness and perceived ease of use.

Operational Professionalism: Operational professionalism refers to the professional degree of operation of academic video accounts by academic journals and other institutions. Professional operation teams have the capacity to align academic video content quality with graduate students' browsing needs. Professional operation is reflected in clean interfaces, intuitive functions, and smooth interactive experiences, which can greatly reduce operational difficulty during learning and enhance convenience. Min et al. [42] noted that information source professionalism has a significant impact on users' perception and behavioral intention; the higher the professionalism, the more reliable the content is perceived to be, enhancing perceived usefulness. Shi Min et al. [43] further demonstrated that user-friendly interface design directly enhances perceived ease of use of personalized recommendation services. Therefore, this study proposes:

- **H6:** The operational professionalism of academic videos has a significant positive impact on graduate students' perceived usefulness and perceived ease of use.

2.3 Impact of Attitude on Academic Video Browsing Behavior

Perceived usefulness refers to the degree to which a new system or technology can improve work efficiency, while perceived ease of use refers to the effort an individual needs to expend when using a new system or technology [44]. The stronger the perceived usefulness and perceived ease of use, the more positive the attitude toward the new technology, and the more likely it is to be adopted. Perceived usefulness and perceived ease of use are both important factors affecting users' information behavior, with the former having a greater impact than the latter [44]. This study mainly includes graduate students' perceived usefulness and perceived ease of use regarding academic videos. Therefore, this study proposes:

- **H7:** Perceived usefulness has a significant positive impact on graduate students' academic video browsing behavior.
- **H8:** Perceived ease of use has a significant positive impact on graduate students' academic video browsing behavior.

Based on the above, this study constructs a model of factors influencing graduate students' academic video browsing behavior, with variable relationships and measurement items derived from existing research and mature scales.

3. Model Validation

To ensure questionnaire quality, this study conducted a pilot survey of graduate students with academic video browsing experience. Based on pilot feedback and expert opinions, unclear or ambiguous items in the initial questionnaire were revised or deleted, resulting in the final survey instrument. The questionnaire includes basic information and measurement items, using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree).

The formal survey was conducted via the Questionnaire Star platform from [dates]. A total of [number] questionnaires were collected. Responses with excessively short completion times, consecutive identical answers, or other quality issues were deemed invalid and removed, yielding [number] valid questionnaires (effective recovery rate = [percentage]).

3.1 Sample Characteristics

The sample data show balanced gender distribution and reasonable distribution across academic disciplines and university tiers (see), indicating good representativeness.

[TABLE:1 Sample Basic Information]

3.2 Common Method Bias Test

Factor analysis of observed variables yielded $KMO = 0.906$, Bartlett's test $\chi^2 = 651.85$, $p < 0.01$, indicating data suitability for factor analysis. Principal component analysis with varimax rotation converged after [number] iterations, extracting [number] factors with cumulative variance explanation of [percentage]%, suggesting good overall variance contribution. All item factor loadings exceeded 0.5, indicating no serious common method bias.

3.3 Reliability Analysis

Cronbach's Alpha values for all measurement items ranged between 0.934 and [value], exceeding the 0.7 threshold, indicating high data reliability (see).

[TABLE:2 Reliability Analysis Results]

3.4 Validity Analysis

Validity was assessed through content validity and construct validity. Content validity is assured as all items were adapted from established scales in existing literature. Convergent validity is demonstrated by all factor loadings exceeding 0.7 and AVE values above 0.5. Discriminant validity is confirmed as the square root of each factor's AVE exceeds its correlations with other factors.

3.5 Model Testing and Modification

This study used AMOS software for structural equation modeling analysis. Maximum likelihood estimation was employed to estimate path coefficients. Initial model testing found that H2a, H2b, H3a, and H3b were not significant and were therefore deleted. The revised model shows all paths are significant (see

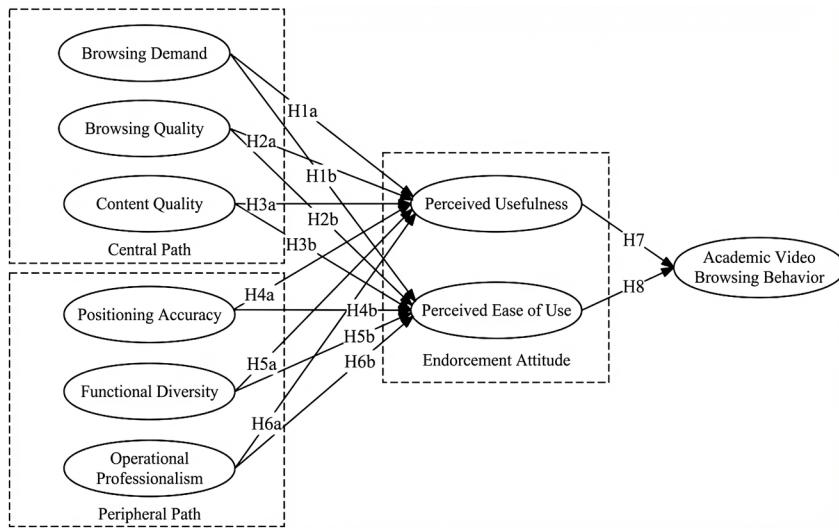


Figure 1: Figure 1

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[FIGURE:1 Graduate Students' Academic Video Browsing Behavior Influence Model]

Path coefficient estimates (see) show all latent variable relationships are significant at $p < 0.05$. Model fit indices (CMIN/DF = [value], RMSEA = [value], GFI = [value], AGFI = [value], NFI = [value], IFI = [value], CFI = [value]) all meet optimal standards, indicating good model fit.

[TABLE:3 Path Coefficient Test Results]

4. Results Analysis and Discussion

4.1 Central Path Analysis

The central path examines how browsing needs, browsing quality, and content quality affect perceived usefulness and perceived ease of use, thereby influencing academic video browsing behavior.

Impact on Perceived Usefulness: Browsing needs significantly and positively affect perceived usefulness (H1a supported), while browsing quality and content quality show no significant effect (H2a, H3a not supported). This indicates that browsing needs determine graduate students' focus and learning investment, influencing their perception of academic video usefulness. Qi Yijin et al. [58] found similar results in health short videos, where content meeting users' information-seeking needs enhanced perceived usefulness.

Impact on Perceived Ease of Use: Browsing needs and browsing quality significantly affect perceived ease of use (H1b, H2b supported), while content quality does not (H3b not supported). This suggests that for graduate students, content quality directly affects browsing behavior rather than ease of use perception. When graduate students can smoothly obtain needed information from academic videos, they develop a perception of ease of use. Liu Xiaoli et al. [62] found that professionalism characteristics of university library digital reading significantly affect perceived ease of use.

Direct Effects: Content quality has a direct and significant impact on browsing behavior. This is because content quality largely determines whether graduate students choose to continue browsing academic videos. If they don't perceive high content quality within the first few minutes, they may stop watching immediately.

4.2 Peripheral Path Analysis

Impact on Perceived Usefulness: Positioning accuracy, functional diversity, and operational professionalism all significantly affect perceived usefulness (H4a, H5a, H6a supported), with functional diversity having the strongest effect. Diverse functions help graduate students quickly achieve learning goals, enhancing perceived usefulness.

Impact on Perceived Ease of Use: Positioning accuracy, functional diversity, and operational professionalism all significantly affect perceived ease of use (H4b, H5b, H6b supported), with operational professionalism having the strongest effect. Professional operation ensures high content quality while optimizing user experience, significantly reducing learning barriers and cognitive load.

4.3 Attitude Impact Analysis

Perceived usefulness and perceived ease of use both significantly and positively affect academic video browsing behavior (H7, H8 supported), with perceived usefulness having a slightly stronger effect than perceived ease of use. This confirms that graduate students' attitudes toward academic videos significantly influence their browsing behavior. Fan Zhe et al. [65] found similar results regarding users' knowledge-sharing behavior in knowledge-based virtual communities.

5. Conclusions and Recommendations

This study constructed a systematic model of factors influencing graduate students' academic video browsing behavior based on the Elaboration Likelihood Model (ELM). The findings provide a new theoretical framework for explaining this behavior and offer insights for optimizing academic video platform content, functionality, and operations.

Key Conclusions: 1. Browsing needs is the key influencing factor in the central path, significantly affecting both perceived usefulness and perceived ease of use. 2. Functional diversity is the most influential factor for perceived usefulness in the peripheral path. 3. Operational professionalism is the most influential factor for perceived ease of use in the peripheral path. 4. Perceived usefulness has a greater impact on browsing behavior than perceived ease of use.

Recommendations: 1. **Content Strategy:** Academic journal videos should closely align with graduate students' academic interests and research directions, focusing on high-quality research findings. Content should be serialized by integrating key points from multiple papers in the same field, using clear explanations and visual elements to transform obscure knowledge into understandable formats.

2. **Functional Design:** Optimize video platform functionality by: (a) introducing intelligent recommendation systems based on browsing history and preferences, (b) adding video content search functions to locate specific chapters or key information via keywords, and (c) increasing interactive discussion features with regular expert participation in online Q&A sessions.

3. **Professional Operation:** Establish professional operation teams responsible for video production, maintenance, updates, and user feedback. Create a unified brand style and unique identity to differentiate from other platforms. Strengthen cooperation with field experts to enhance content authority and attractiveness, and use social media for multi-channel promotion.

Limitations and Future Research: This study has certain limitations, such as not fully covering all factors influencing graduate students' academic video browsing behavior. Future research could explore additional potential influencing factors and employ different experimental methods to validate findings, thereby enhancing the model's explanatory power and practical application value.

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Figures

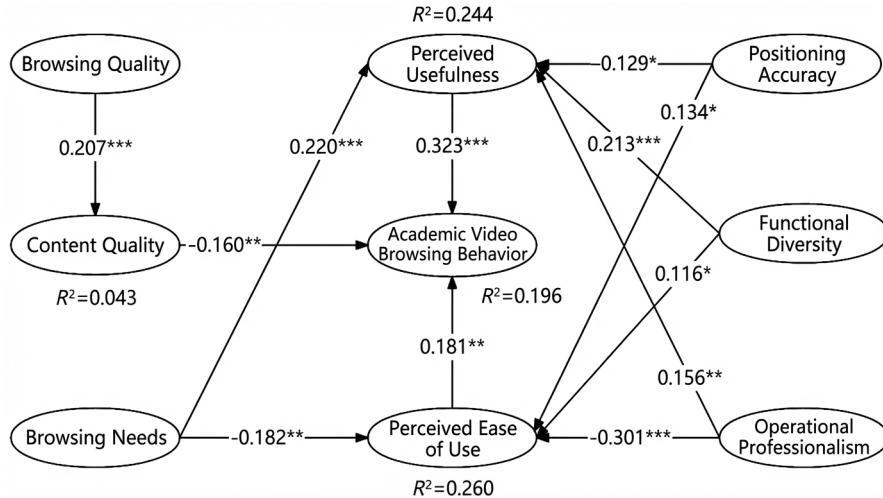


Figure 2: Figure 2

Source: ChinaXiv — Machine translation. Verify with original.