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## Comparative Study of User Participation Behavior in Free and Paid Online Q&A Communities: Postprint

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### Abstract

[Purpose/Significance] As the predominant models of online Q&A communities, free and paid platforms provide users with distinct information interaction scenarios that cater to differentiated needs. Through a comparative analysis of user participation behaviors across these two community types, this study profoundly reveals the behavioral differences between them and offers strategies and recommendations for optimizing their respective service models. [Method/Process] This research employs contingency table analysis, non-parametric tests, and negative binomial regression to examine user participation characteristics and interaction influence relationships in free versus paid online Q&A communities. [Results/Conclusion] The findings indicate that users of free and paid online Q&A communities exhibit significant differences in information needs, participation features, and interaction effects. Specifically, free communities predominantly feature opinion-oriented questions, while paid communities have the highest proportion of advice-seeking questions. Free questioners tend to formulate queries in abstract and general terms, whereas paid questioners prefer providing detailed contextual information. Question length negatively impacts both the quantity and length of free responses, yet positively influences the length of paid responses. Both question length and answer length positively affect the number of evaluations in both community types. This research enriches the literature on user participation behavior in online Q&A communities and provides managerial insights for optimizing the service models of free and paid platforms.

## Full Text

### A Comparative Study of User Participation Behaviors in Free and Paid Online Q&A Communities

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#### Abstract

**[Purpose/Significance]** As the dominant models of online Q&A communities, free and paid platforms provide users with distinct information interaction scenarios that cater to differentiated user needs. This study compares user participation behaviors across these two community types to reveal behavioral differences and offer optimization strategies for both service models. **[Method/Process]** Contingency table analysis, non-parametric tests, and negative binomial regression were employed to analyze participation characteristics and interaction effects among users in free and paid online Q&A communities. **[Results/Conclusions]** The findings reveal significant differences in information needs, participation patterns, and interaction relationships between the two community types. Free Q&A communities feature the highest proportion of opinion-seeking questions, while paid communities contain the most advice-seeking questions. Free questioners tend to pose abstract, generalized questions, whereas paid questioners prefer providing detailed background information. Question length negatively affects the quantity and length of free answers but positively influences the length of paid answers. Both question length and answer length positively impact the number of evaluations in both community types. This research enriches the literature on user participation in online Q&A communities and provides managerial recommendations for optimizing free and paid community services.

**Keywords:** online Q&A community; paid Q&A platform; knowledge payment; user information interaction

**Classification Number:** G250

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## 1. Introduction

Online Q&A communities are platforms where users engage in information production, exchange, and practice through question-and-answer interactions driven by personal needs and incentives. These platforms exhibit distinct social characteristics and diverse collaborative patterns, serving as important tools for collective intelligence aggregation, knowledge management optimization, and innovation. Over time, numerous well-known online Q&A communities have emerged. In 2002, Google launched Google Answers, the first web-based paid knowledge community. Subsequently, platforms like Yahoo! Answers, Baidu Knows, and Zhihu gained popularity by offering free information exchange channels. In 2016, driven by the sharing economy and Internet Plus initiatives, China witnessed a surge in knowledge payment services, giving rise to new paid Q&A platforms such as Zhihu Live (Value) and Fenda. By 2018, however, these platforms began facing development bottlenecks as the once-booming knowledge payment market cooled, prompting industry and academic reflection on this emerging model.

As the two mainstream online Q&A community models, free and paid platforms differ substantially in platform architecture, participation mechanisms, and incentive systems. Free platforms like Yahoo! Answers, Zhihu, and Baidu Knows adopt a social Q&A model where users search, share, and evaluate information based on personal interest, with communities primarily using virtual rewards such as reputation points and badges to motivate participation. In contrast, new paid platforms like Zhihu Live and Fenda employ an expert Q&A model where users pay to ask questions of community experts. Unlike Google Answers, these platforms feature redesigned interaction forms and revenue distribution rules that allow both questioners and answerers to earn monetary rewards. These functional and structural differences inevitably influence user participation behaviors, as individuals select platforms based on their needs and drive the formation of unique information interaction patterns. This study analyzes user behavioral data to identify differences in information needs, participation characteristics, and interaction relationships between free and paid environments, exploring optimization methods that highlight each community's distinctive features and providing targeted recommendations.

Current research on online Q&A communities has primarily focused on either free user participation motivations or paid user purchasing strategies, with few comparative studies examining participation behaviors across both models. Consequently, systematic understanding of the unique characteristics of free versus paid Q&A models remains limited. This study first reviews relevant literature on free and paid Q&A communities and user participation behaviors. It then employs contingency table analysis, hypothesis testing, and regression analysis to compare participation characteristics and interaction effects. Finally, it identifies key challenges facing both community types and proposes optimization strategies.

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## 2. Literature Review

### 2.1 Online Q&A Community Research

**2.1.1 Free Online Q&A Communities** Free online Q&A communities typically adopt a social Q&A model that constructs information exchange channels through community mechanisms, hence the term “social Q&A communities.” Representative platforms include Yahoo! Answers, Quora, and Stack Exchange. Research has examined user participation behaviors from perspectives of user needs, answering patterns, and content quality. Regarding user needs, Choi et al. note that social Q&A communities suit users seeking opinions, ideas, and recommendations, while collaborative and expert Q&A better serve needs for objective, factual information. Shah et al. identify that users turn to social Q&A communities to gain diverse perspectives and engage in social interaction, obtaining more targeted content. In terms of information sharing, opinion-seeking, advice-seeking, and social questions tend to receive more responses. Regarding content quality, Morris et al. argue that social Q&A communities provide more personalized, diverse, and thought-provoking perspectives, while Shah and Kitzie contend that these communities offer advantages in production cost, volume, speed, participation, and collaboration compared to reference services, though they lack accuracy and authority. Harper et al. find that social Q&A content exhibits high diversity and responsiveness but varying quality levels.

**2.1.2 Paid Online Q&A Communities** Zhihu Live (Value), Fenda, and similar platforms represent a new generation of paid Q&A communities in China. Compared with early paid platforms like Google Answers, these incorporate more social elements while redesigning pricing rules, interaction forms, and incentive mechanisms. Regarding pricing, traditional platforms like Google Answers used questioner-set pricing, making it difficult for users to set appropriate prices without knowing experts’ backgrounds. New platforms adopt answerer-set pricing, allowing experts to set prices based on their expertise and profit needs, simplifying the pricing process while ensuring earnings. Incentive mechanisms also differ: Google Answers split revenues between experts and the platform, with higher revenue shares reducing experts’ community reputation. Platforms like Zhihu allow users to “eavesdrop” on answers for a small fee, with revenues split between questioners and answerers, providing monetary benefits to both parties. Regarding interaction objects and forms, Google Answers assigned answerers by the platform and limited interactions to text, whereas new platforms allow questioners to select answerers and support text, images, and voice interactions.

## 2.2 User Participation Behavior Research

**2.2.1 Types of User Participation Behaviors** Online Q&A communities offer rich information interaction scenarios where users participate through questioning, answering, and evaluating, assuming roles as questioners, answerers, and evaluators. Questioners initiate discussions with peers or paid experts, with question types reflecting their information needs. Researchers have categorized questions into types such as information search, advice-seeking, opinion-seeking, and non-informational. Answerers share perspectives, opinions, and suggestions, motivated by internal and external factors. In free communities, altruism and empathy drive internal motivation, while reputation and reciprocity serve as key external motivators. In paid communities, price significantly affects expert sharing, with higher prices increasing answer length, quantity, and archival value, making monetary gain an important incentive. Social satisfaction also plays a crucial role in motivating sustained expert-user interaction, moderating and catalyzing financial incentives. Evaluators assess community-generated content based on personal experience, with evaluation criteria influenced by need type, cognitive level, emotional experience, and social environment.

**2.2.2 Interaction Effects in User Participation** In online Q&A communities, users participate under specific information needs, achieving collaborative production and filtering of search content through interaction. Faced with different information needs, interaction partners, and community environments, users adopt varying interaction strategies, forming unique interaction relationships. In questioner-answerer interactions, questioning approaches affect answering strategies, with factual, policy, and value-oriented questions showing significant differences in answer quantity, relevance, and effectiveness. Question type and answerer expertise significantly impact answer quality and speed. In interactions among questioners, answerers, and evaluators, different post types show significant variation in answer quantity, speed, comments, and likes. Research based on cumulative advantage theory reveals first-mover advantages in answer-evaluation interactions, where early respondents typically receive more evaluations. Increased questioner participation and more complex interaction processes can improve answer quality, suggesting that optimizing negotiation processes may enhance information search effectiveness.

In summary, online Q&A communities' unique interaction models enable diverse participation forms, jointly completing knowledge sharing, filtering, and dissemination. While existing research has revealed common behavioral patterns, insufficient attention has been paid to unique user behaviors shaped by different community models. This study compares free and paid Q&A communities across three dimensions: information needs, participation characteristics, and interaction relationships, clarifying user purposes for accessing each community type and revealing distinctive participation patterns and differential interaction effects.

### 3. Research Methods

#### 3.1 Data Collection

**3.1.1 Data Source** This study selected Zhihu as the research object for two primary reasons. First, since its establishment in 2010, Zhihu has experienced rapid growth, accumulating large user bases for both free and paid services and representing a mainstream online Q&A community. Second, Zhihu integrates both free and paid Q&A models, making it ideal for comparative research.

**3.1.2 Crawling Targets** This study required crawling data from both free and paid Q&A communities, covering multiple indicators including questions, answers, and evaluations. Topic is a crucial factor affecting user participation, so data was crawled across multiple topics. Due to significant user number variations across topics that could affect statistical accuracy, four popular topics—film, psychology, gaming, and medicine—were selected. These topics included 1,891 paid answerers, representing 52.4% of the total answerer population, providing a sufficiently representative sample.

**3.1.3 Crawling Process** The study first used Firefox browser to capture packets from Zhihu to obtain APIs for free and paid Q&A data, then crawled relevant data through Python programming, and finally stored the data in a MongoDB database. The detailed process was as follows: (1) For paid data, the study first crawled the personal IDs of 1,891 paid answerers, then randomly selected 150 answerers from each topic and crawled their historical answer counts, pricing, question content, answer publication time, answer duration, and evaluation numbers. Finally, 600 questions were randomly selected (150 per topic) for manual coding. (2) For free data, the study first searched for questions in the four topics from the topic square, crawling question content, publication time, and IDs. It then crawled answer counts, answer publication times, answer content, evaluation numbers, and follower numbers for each question. Finally, 600 questions (150 per topic) were selected for manual coding. The data collection workflow is shown in [FIGURE:1].

#### 3.2 Data Processing

As illustrated in [FIGURE:1], the crawled free and paid Q&A data contained considerable unstructured data requiring preprocessing before analysis.

**3.2.1 Question Type Coding** This study employed content analysis to code question types in both free and paid communities. Based on classification frameworks by Kim et al. and Harper et al., a preliminary coding framework comprising factual, advice-seeking, and opinion-seeking question types was developed. Pre-coding of the first 20% of questions revealed that these three types could not accommodate all data. The study therefore introduced recommendation, self-expression, and social question types from Morris et al.'s framework, further

subdividing recommendation questions into subjective and objective categories. The final coding framework included seven question types, with definitions and examples shown in . Two coders coded all questions, achieving 84.5% inter-coder reliability. Discrepancies were resolved through discussion.

**3.2.2 Variable Processing** The crawled data contained unstructured elements requiring conversion to structured format for analysis. Since free questions, free answers, and paid questions were all text-based, Python programming was used to count character lengths, stored as variables for free question length, free answer length, and paid question length. As paid answers used voice format, the study randomly sampled 100 paid voice answers, calculated average speaking speed, and multiplied this by answer duration to estimate paid answer length. For question topics, free questions had unified topic IDs, while paid questions only had answerer IDs. Since paid answerers could belong to multiple topics, question content was used to determine topic assignment. To control for the effect of publication timing on participation frequency, the study calculated days elapsed between publication and data crawling for free questions, paid questions, and free answers. Paid answer timing was not calculated due to the two-day response requirement in paid communities.

### 3.3 Data Analysis

**3.3.1 Research Variables** This study involved 15 variables obtained through automated crawling, manual coding, and programmatic calculation. Detailed variable definitions and processing methods are shown in .

**3.3.2 Analysis Methods** The study compared user participation behaviors across three dimensions: information needs, participation characteristics, and interaction effects. Descriptive statistics first examined distributions of question types, answer lengths, and evaluation counts. Contingency table analysis and non-parametric tests then compared question, answer, and evaluation quantities between community types. Finally, negative binomial regression analyzed interaction effects in question-answer and question-answer-evaluation relationships. Categorical variables like question type and topic were dummy-coded, with opinion-seeking questions as the baseline for free communities and advice-seeking questions for paid communities, and film as the baseline topic. Vuong tests confirmed the appropriateness of robust standard error negative binomial regression.

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## 4. Research Results

### 4.1 Comparison of Free and Paid Question Types

**4.1.1 Distribution of Question Types** To identify differences in information needs between community types, chi-square tests compared question type

distributions. Results showed significant differences (Pearson  $\chi^2 = 134.279$ ,  $p < 0.001$ ; Tau coefficient = 0.029,  $p < 0.001$ ). As shown in

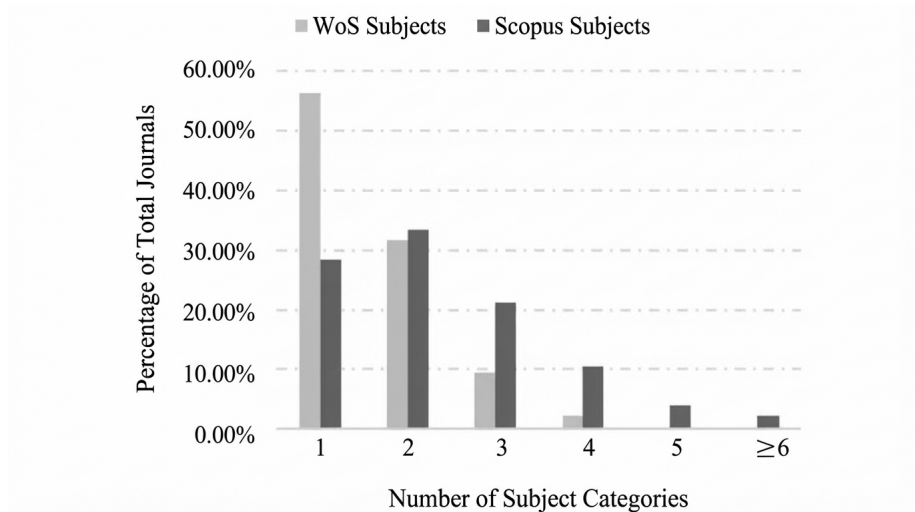


Figure 1: Figure 2

, opinion-seeking questions dominated free communities (51%), followed by subjective recommendation questions, while self-expression questions were least common (2.5%). Social questions did not appear in Zhihu's free community due to its answerer recommendation system that doesn't reveal specific respondents. In paid communities, advice-seeking questions were most prevalent (35.3%), followed by opinion-seeking questions (30.3%), with social questions again being least common (3.2%).

**4.1.2 Topic and Question Type Relationships** Topic represents an important contextual factor affecting community interaction. Multiple contingency table analysis examined differences in question type distributions across topics. Results showed significant differences for all four topics: film ( $\chi^2 = 67.009$ ,  $p < 0.001$ ), psychology ( $\chi^2 = 47.893$ ,  $p < 0.001$ ), gaming (URE:3] and

illustrate these patterns, with film showing the most pronounced differences between free and paid question types, and medicine showing the least.

## 4.2 Comparison of Participation Behaviors

**4.2.1 Comparison of Questioning, Answering, and Evaluation Characteristics** Kolmogorov-Smirnov non-parametric tests compared questioning, answering, and evaluation features between community types. As shown in , significant differences existed in question length, answer length, and evaluation counts. Paid questions averaged 48.81 characters, significantly longer than free

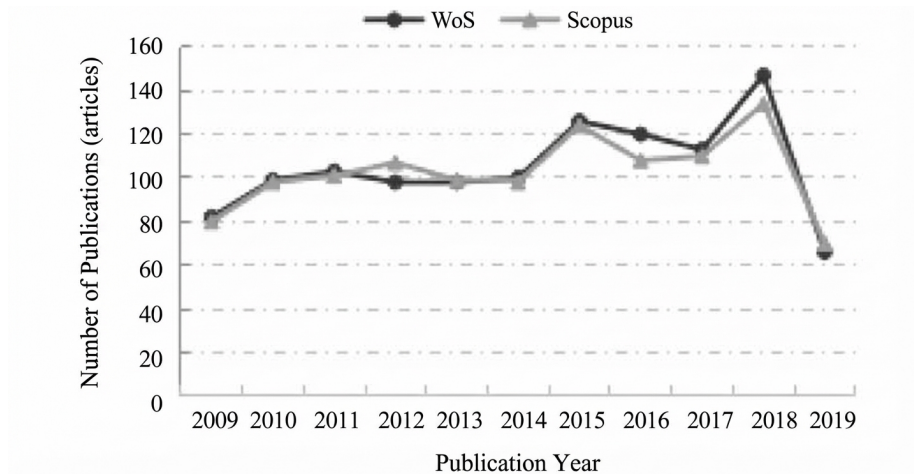


Figure 2: Figure 4

questions. Free answers averaged 802.61 characters, significantly longer than paid answers. Free answers received an average of 548.45 evaluations, significantly more than paid answers.

**4.2.2 Comparison of Free Answer and Follower Counts** Since each paid question has only one answerer, analysis focused on free community answer and follower counts. Kruskal-Wallis tests revealed significant differences across question types and topics (answer count  $\chi^2 = 34.93$ ,  $p < 0.001$ ; follower count  $\chi^2 = 40.27$ ,  $p < 0.001$ ; topic-based answer count  $\chi^2 = 51.9$ ,  $p < 0.001$ ; topic-based follower count  $\chi^2 = 21.37$ ,  $p < 0.001$ ).

shows that self-expression and subjective recommendation questions received more answers, while factual questions received the fewest. Psychology topics garnered the most answers and followers, while gaming topics received the fewest followers.

### 4.3 Comparison of User Interaction Effects

**4.3.1 Model Construction** To compare unique interaction patterns among questioners, answerers, and evaluators, regression models were constructed with question length, question type, answer length, and topic as independent variables, and question publication time and answer publication time as control variables. The models examined effects on free answer length, answer count, and evaluation count, as well as paid answer length and evaluation count.

**4.3.2 Analysis Results Free Community Results** (see ): Question length significantly negatively affected answer length, answer count, and evaluation count. All question types except factual showed significantly higher answer

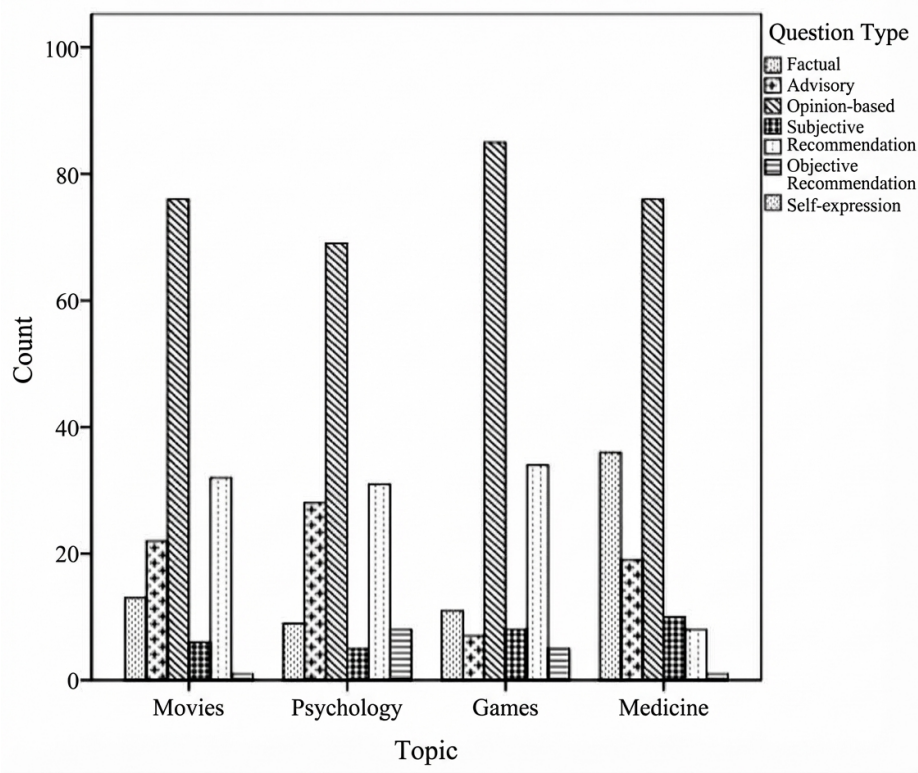


Figure 3: Figure 5

lengths than opinion-seeking questions. Psychology topics showed significantly higher answer counts and evaluation counts than film topics, while gaming and medicine showed significantly lower values. Answer length significantly positively affected evaluation counts.

**Paid Community Results** (see ): Historical answer count, price, and answer length significantly positively affected answer length and evaluation counts. Except for objective recommendation questions (which had significantly lower evaluation counts than advice-seeking questions), other question types showed comparable evaluation counts to advice-seeking questions. Psychology, gaming, and medicine topics showed significantly lower evaluation counts than film topics.

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## 5. Discussion and Implications

The analysis reveals significant differences in information needs, participation patterns, and interaction effects between free and paid Q&A communities. The following discussion integrates statistical results with specific optimization recommendations.

### 5.1 Comparison of User Information Needs and Questioning Approaches

Free and paid Q&A users exhibit distinct information needs. Free Q&A's social model provides access to diverse survey targets, helping users obtain varied perspectives, leading to more opinion-seeking questions. Paid Q&A users seek expert advice and guidance, prioritizing answer objectivity over diversity, resulting in more advice-seeking questions.

Regarding questioning strategies, free questioners use abstract, generalized questions to attract broader participation, while paid questioners provide detailed background information to obtain objective answers, resulting in longer questions.

**Recommendations:** Free communities should establish dedicated social survey sections and increase answerer recommendation limits to better satisfy diverse perspective-seeking needs. For factual questions that receive fewer answers and followers, communities should enhance rewards and promotion while improving answerer recommendation accuracy. Paid communities should optimize question posting functions for easy multimedia integration and provide intelligent assistance to help users clearly articulate needs.

### 5.2 Comparison of User Answering Approaches

Free questions typically receive multiple answers with high diversity, while paid questions receive single answers from selected experts. Free answers are signifi-

cantly longer due to absence of format restrictions, allowing expression through images, links, and text. Paid communities constrain answer format and time; while voice interaction enhances social presence, it demands greater conciseness from experts.

Interaction patterns also differ: in free communities, question length negatively affects answer length, as concise, open-ended questions attract more responses without contextual constraints. In paid communities, question length positively affects answer length, as detailed descriptions enable more accurate expert judgment and longer responses.

**Recommendations:** Free communities should provide more efficient content editing tools to reduce the effort required for complex responses. They should also incentivize answers to diverse question types beyond open-ended ones. Paid communities should remove restrictions on answer length and frequency, allowing flexible use of text, voice, and video to increase interaction frequency and richness.

### 5.3 Comparison of User Evaluation Approaches

Free answerers receive significantly more evaluations than paid answerers, due to larger user bases and diversified content promotion. Payment may reduce user gratitude and increase quality expectations, decreasing evaluation counts. Both communities show that question length negatively affects evaluation counts while answer length positively affects them, suggesting users prefer evaluating simple, abstract questions and longer answers. Simple questions require less expertise to evaluate, while answer length may serve as a quality indicator for non-expert evaluators.

**Recommendations:** Free communities should improve content recommendation accuracy to match content with interested, capable evaluators. Paid communities should diversify evaluation methods beyond star ratings to include text reviews, enabling more complete expression of opinions.

### 5.4 Comparison of User Incentive Measures

Free answering helps users gain community attention and build structural capital that enhances influence. Previous research suggests price increases paid answer quantity and length, but this study finds no significant price effect on answer length, possibly because answerer-set pricing in new paid platforms transforms price from an incentive into a user acquisition tool. Historical answer count and question length significantly increase answer length, indicating that rich experience and clear question articulation motivate information sharing.

**Recommendations:** Both community types should employ multiple incentives targeting internal and external motivations. Paid communities should learn from free platforms by designing virtual reward systems (badges, honors) to enhance intrinsic motivation. Free communities should help users monetize

accumulated social capital, facilitating conversion from free to paid participation.

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## 6. Conclusion

This study analyzed user information needs and participation characteristics in free and paid Q&A communities, finding that both models serve different user needs with significant differences in participation patterns and interaction strategies. Theoretically, this research enriches user behavior theory in online Q&A contexts and provides foundations for exploring participation 影响因素. Practically, the proposed optimization strategies highlight each community's unique advantages, supporting differentiated development.

**Limitations** include single-source data from Zhihu and reliance on behavioral data without subjective user intention surveys. Future research will employ interviews and questionnaires to investigate search strategies and sharing intentions, exploring subjective reasons for behavioral differences. Additionally, future work will examine paid questioners' decision-making processes and answerers' willingness to share in free versus paid contexts, aiming to achieve differentiated yet integrated development of both community models.

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## Author Contributions

**Qi Yunfei:** Data collection, results analysis, paper writing

**Zhao Yuxiang:** Research conceptualization, framework revision, data analysis guidance

**Liu Zhouying:** Literature collection assistance, paper review and verification

**Sun Xiaoning:** Paper structure adjustment, writing guidance

**Zhu Qinghua:** Research topic determination, study design guidance, paper review and verification

Figures

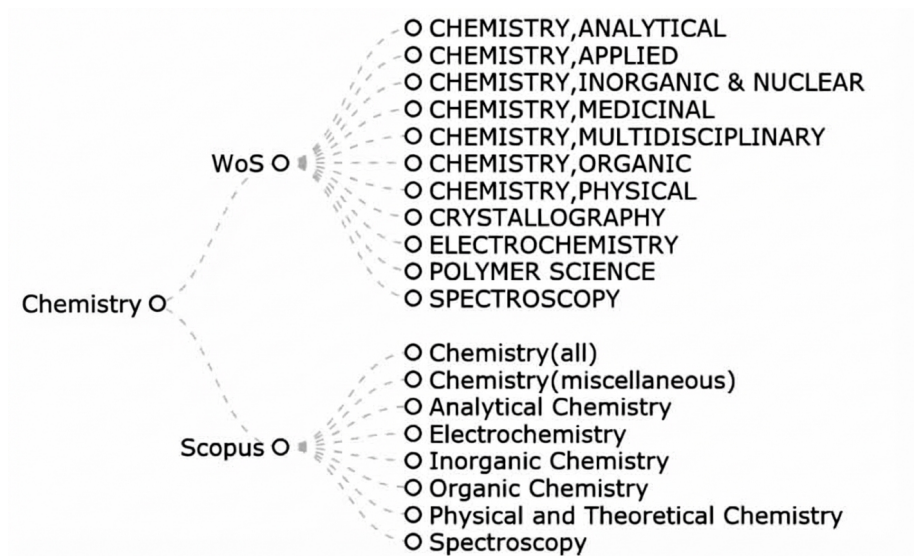


Figure 4: Figure 3

Source: ChinaXiv — Machine translation. Verify with original.

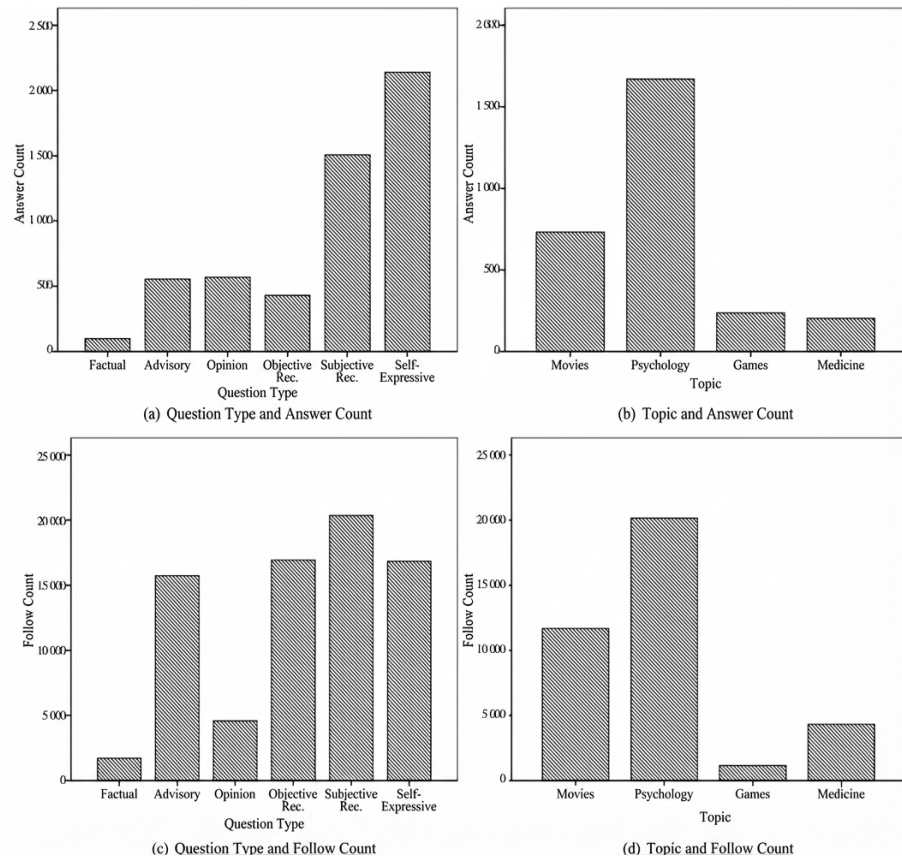


Figure 5: Figure 6