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PAPER

The Application of Mobile Technology in Educational Administration to Foster Continuous Learning and Professional Development

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ABSTRACT

This study explores the application of mobile technology in educational administration to promote continuous learning and professional development. By conducting a quantitative analysis of the interaction level and activity consistency within mobile networks and proposing strategies based on mobile network knowledge sharing mechanisms, this research aims to enhance our understanding of how mobile technology operates in educational management. It also aims to offer theoretical support and practical guidance for educational management practices. Currently, the integration of mobile technology in educational management has become a prominent research topic. Existing studies, however, lack sufficient quantitative analysis regarding interaction levels and activity consistency within mobile networks. Moreover, research on mobile network knowledge-sharing mechanisms that foster continuous learning and professional development is relatively limited. Therefore, this study addresses these research gaps and offers new perspectives and methodologies for a deeper understanding of the application of mobile technology in educational management.

KEYWORDS

mobile technology, educational administration, continuous learning, professional development, mobile network interaction, knowledge sharing

1 INTRODUCTION

With the rapid development and popularization of information technology, mobile technology is becoming an important tool in the field of educational management, providing new possibilities for continuous learning and professional development [1–3]. Under traditional educational models, learning is often limited by time and space constraints, whereas the prevalence of mobile technology offers learners more flexible and convenient learning pathways, allowing learning to break free from fixed educational environments and schedules [4–7]. Therefore, exploring the

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application of mobile technology in educational management, especially in promoting continuous learning and professional development, has significant theoretical and practical implications.

Research indicates that the integration of mobile technology in educational management can significantly boost learners' interest and engagement in learning, leading to enhanced learning efficiency and outcomes. Through mobile devices, learners can access necessary learning resources anytime and anywhere, engage in personalized learning, and achieve customized and differentiated learning content [8–11]. Moreover, mobile technology can offer learners a more diverse array of learning methods, such as videos, audios, and games, thus better meeting the varying needs and preferences of different learners [12, 13].

Despite the numerous advantages and opportunities brought by the application of mobile technology in educational management, current research methods still have certain flaws and limitations. Firstly, existing studies often lack a quantitative analysis of the interaction levels and activity consistency within mobile networks, making it difficult to objectively assess the actual effects and mechanisms of mobile technology in educational management [14–17]. Secondly, current research on mobile network knowledge sharing mechanisms that promote continuous learning and professional development is still quite limited, lacking systematic and in-depth exploration [18–22].

Therefore, this paper aims to discuss the actual effects and mechanisms of mobile technology in promoting continuous learning and professional development in educational management. This will be achieved through a quantitative analysis of the interaction levels and activity consistency within mobile networks. Additionally, this paper proposes corresponding strategies and measures based on mobile network knowledge-sharing mechanisms to promote continuous learning and professional development. This research will contribute to a deeper understanding of the application mechanisms of mobile technology in educational management, providing theoretical support and practical guidance for educational management practices.

2 QUANTIFICATION OF INTERACTION LEVELS AND ACTIVITY CONSISTENCY IN MOBILE NETWORKS

This study first conducts a quantitative analysis of the interaction levels and activity consistency in mobile networks. This method allows for a detailed analysis and understanding of the interaction patterns among users, thereby effectively identifying and enhancing collaborative and content-sharing behaviors within learning communities. By accurately measuring the frequency of interactions between users and the consistency of activity areas, the research assists educational planners and technology developers in designing and implementing personalized learning paths and educational interventions that are more closely aligned with learners' actual needs and behavioral characteristics.

2.1 Interaction levels

Figure 1 illustrates the mobile network structure in educational management. In the mobile social networks of the educational management field, the frequency of interactions between users is a key indicator of the stability of social relationships and the willingness to share content. To effectively support continuous learning and professional development, this study proposes a quantitative method to measure the frequency of interactions between users. This indicator not only considers the number of times content is shared between users but also includes the average duration of these interaction activities. In the field of educational management, this quantitative approach is especially crucial as it can uncover interaction patterns and the depth of learning collaboration among students. By normalizing the number of interactions and the duration between users i_u and i_k, a comprehensive score for $Z_{i_u}^{i_k}$ can be obtained, which reflects the frequency and quality of interactions between users in learning activities. This method not only helps educational managers identify and enhance effective learning communities but also provides data support for designing more targeted and interactive educational content and activities. Specifically, if the number of times content is shared between users i_u and i_k is represented by $Z_{i_u}^{i_k}$, and the average duration of content sharing between users i_u and i_k is represented by $f_{i_u}^{i_k}$, then the calculation formula is:

$$Z_{i_u}^{i_k} = \frac{Z_{i_u}^{i_k}}{\sum_{i_k \in I} Z_{i_u}^{i_k}} \times \frac{f_{i_u}^{i_k}}{\sum_{i_k \in I} f_{i_u}^{i_k}} \quad (1)$$

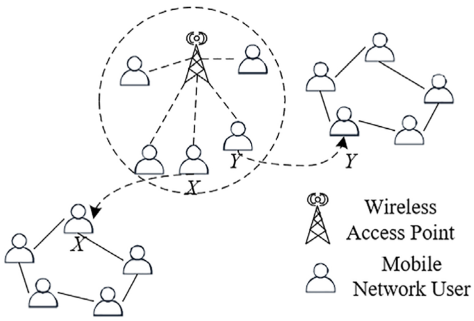

Fig. 1. Mobile network structure in educational management

2.2 Activity consistency

In mobile social networks used in educational management, users' activity areas are not only spaces for socialization but also critical settings for learning and professional development. Firstly, we define the behaviors of users who stay at specific times and places, as well as share learning content at these locations. If the distance between the locations $m_{i_u}^1$ and $m_{i_u}^2$ at two consecutive time points $s_{i_u}^1$ and $s_{i_u}^2$ for user i_u is less than the set maximum wireless communication distance, we consider user i_u to be staying within the same activity area. These communal spaces, particularly those facilitating content sharing, are highly valued by users as they serve as hubs for acquiring knowledge and engaging in professional interactions. Based on the above analysis, assuming the set of activity areas for user i_u is represented by $H_{i_u} = \{H_{i_u}^k, k = 1,2,\ldots,v^-\}$ the sense of belonging of user i_u to activity area $H_{i_u}^k$ is represented by $D(H_{i_u}^k)$, the average time user i_u stays at activity area $H_{i_u}^k$ is represented by $s(H_{i_u}^k)$, and the number of times user i_u stays at that activity area is represented by $f(H_{i_u}^k)$, then the calculation formula is:

$$D\left(H_{i_u}^k\right) = s\left(H_{i_u}^k\right) r^{d\left(H_{i_k}^k\right)} \quad (2)$$

Next, we quantify the users' sense of belonging to each activity area, an indicator based on the frequency and average duration of appearances in these areas. In educational management applications, the degree of belongingness indicates the user's level of engagement and frequency of interaction in learning and professional development activities. We operationalize this sense of belonging as the degree of belonging $q(H_{i_u}^k)$, a quantified value utilized to depict user i_u's reliance and inclination towards activity area $H_{i_u}^k$. The calculation formula is:

$$q\left(H_{i_u}^k\right) = D\left(H_{i_u}^k\right) \Big/ \sum_{H_{i_u}^k \in H_{iu}} D\left(H_{i_u}^k\right) \tag{3}$$

Thirdly, we analyze the overlapping characteristics of activity areas between users, a step that involves considerations of both spatial and temporal dimensions. The spatial overlap of activity areas between users i_u and users i_k is not sufficient to indicate effective interaction; the key is that their appearance times in these overlapping areas should be close. In other words, the time difference in appearance between user i_u and user i_k in the same activity area should be shorter than their minimum stay time threshold. This ensures the potential for actual interaction and content sharing between them. There is an inequality:

$$\left|s_{i_s} - s_{i_k}\right| < MIN\left(s\left(H_{i_u}^k\right), s\left(H_{i_k}^u\right)\right) \tag{4}$$

Finally, we evaluate the consistency of activity areas, $X_{i_k} i_u$, between user i_u and user i_k, based on the proportion of spatial overlap. This quantified indicator not only reflects the physical proximity between users but also indicates the potential frequency and quality of interactions and knowledge sharing within the same educational activity area. In the mobile social networks of educational management, a high degree of consistency in this activity can indicate stronger support for learning collaboration and professional development, thereby enhancing the continuity and depth of learning. Assuming the wireless transmission distance during the content sharing process between user i_u and user i_k is represented by e, and the overlap area of activity regions between user i_u and user i_k is represented by $P_{i_u}^{i_k}$, the calculation formula is:

$$X_{i_u}^{i_k} = \sum_{H_{i_u}^u \in H_{i_u}} \sum_{H_{ik}^k \in H_{ik}} \frac{P_{i_u}^{i_k} \cdot q\left(H_{i_u}^k\right) \cdot G_{i_k}^u}{\pi e^2} \tag{5}$$

3 MOBILE NETWORK KNOWLEDGE SHARING MECHANISMS TO PROMOTE CONTINUOUS LEARNING AND PROFESSIONAL DEVELOPMENT

This paper further explores the mechanisms of knowledge sharing in mobile networks that facilitate continuous learning and professional development. Figure 2 presents a model illustrating the factors that influence knowledge sharing in mobile networks, which facilitate continuous learning and professional development.

By delving deeply into and optimizing knowledge-sharing mechanisms, this study aims to enhance the efficiency of educational resources and increase learner engagement and interactivity, thereby improving learning outcomes and meeting individualized learning needs. Especially when facing rapidly changing job requirements and continuously updated knowledge systems, such optimized sharing mechanisms can support educational managers and learners in establishing more efficient and dynamic learning networks. This can promote innovation in educational content and teaching methods, ultimately enhancing the overall quality of education and the continuous progress of learners' professional development.

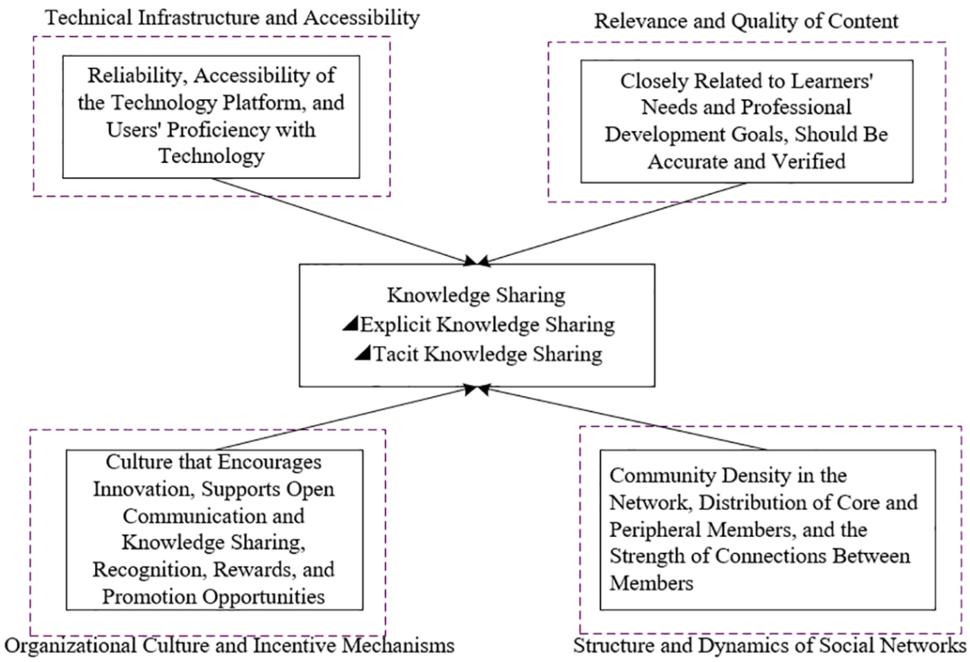

Fig. 2. Model of factors influencing knowledge sharing in mobile networks to promote continuous learning and professional development

In the field of educational management, the knowledge-sharing mechanisms of mobile social networks play a key role in promoting continuous learning and professional development. Since the similarity in attributes and interests among users affects the success rate of content sharing, this study proposes a community-building method based on user similarity to minimize differences between users and improve the efficiency of content sharing. Within the same community, where user similarity is high and attribute differences are minimal, this fosters frequent knowledge exchange and sharing, effectively supporting the deep learning and application of professional knowledge. For knowledge sharing between communities, a more refined content service provider selection mechanism is employed to facilitate cross-community content delivery, taking into account the significant differences in user attributes. This ensures the breadth and diversity of knowledge sharing. This knowledge-sharing mechanism for educational management not only improves the efficiency of learning resource utilization but also optimizes the learning process through the network community structure, enhancing the acceptability and practicality of educational content.

3.1 Community establishment

Firstly, the community-building process takes into consideration that users' interests may exhibit both stability and change. Therefore, user attributes are accurately detected by the server to assess the similarity between users. In this stage, the system randomly selects a certain number of users as the initial centers of the community, based on their stable and changing interests, to form different communities. This method ensures that each community can gather users with similar educational and professional development interests, establishing the groundwork for efficient knowledge exchange and sharing. Assuming z users are randomly selected as the initial central users $\left\{i_j^p, j = 1, 2, \ldots, z\right\}$, forming z communities Z_j. The following formula calculates the sum of similarities T among all users in the network:

$$T = \sum_{j=1}^{z} \sum_{i_u \in Z_j} T_{i_u}^{i_j^p} \tag{6}$$

Next, the system assigns other unclassified users to the community with which they have the highest similarity. This process involves calculating the similarity with the initial center users to ensure that each user can find the community that best aligns with their educational and professional interests. This allocation mechanism not only optimizes interactions among users but also enhances the efficiency of knowledge sharing within the community. The high level of consistency in learning needs and professional backgrounds within the same community can reduce communication costs and increase the relevance and value of content sharing. Specifically, user i_j^p is randomly replaced by $\bar{i}_j^p$, and the sum of similarities among all users T' is calculated as follows:

$$T' = \sum_{j=1}^{z} \sum_{i_u \in Z_j} T_{i_k}^{\bar{i}_j^p} \tag{7}$$

Finally, to further optimize the community structure and enhance user satisfaction, the system regularly evaluates and adjusts the key users of the community. This is done by comparing the total similarity T' of the community after redistribution with the original total T. If the new total similarity is higher, the newly selected central users will replace the original ones. This iterative process continues until the optimal community configuration is found, ensuring that the mobile social network in educational management maximizes its potential to promote professional development and continuous learning. This strategy particularly focuses on addressing the dynamic needs of users in development. It enables the community structure to not only meet current educational needs but also adapt to future changes.

3.2 Intra-community sharing mechanism

In educational management, the intra-community knowledge-sharing mechanism of mobile social networks is specially designed to support continuous learning and professional development. When a knowledge provider, $i_o^{n_u}$, encounters a knowledge seeker, $i_z^{n_u}$, within the community, they first exchange community tags to confirm their affiliations. This is a crucial step to ensure that the flow of information is correctly propagated within the appropriate learning group. If the knowledge seeker $i_z^{n_u}$ is present within the user set $V_{ioo}^{n_u}$ that the knowledge provider $i_o^{n_u}$ encounters, $i_o^{n_u}$ will directly share the educational content they carry with $i_z^{n_u}$. If $i_z^{n_u}$ is not within that set, the knowledge provider $i_o^{n_u}$ will share the content with all encountered users within the same community. This will be done by utilizing the high degree of interest alignment and frequency of interaction among community members to transmit knowledge through the community network until the content ultimately reaches $i_z^{n_u}$. This mechanism not only enhances the efficiency of disseminating educational content but also strengthens the interconnected interactions within the learning community. It ensures that educational resources can flow efficiently among learners in need, thereby promoting the continuous development of learning and professional skills.

3.3 Inter-community sharing mechanism

In the mobile social network environment of educational management, inter-community knowledge-sharing plays a crucial role in continuous learning and professional development. First, if a knowledge provider $i_o^{n_u}$ and a knowledge seeker $i_z^{n_u}$ belong to different communities Z_j and Z_u but meet at a moment when $i_z^{n_u}$ is in the user set $V_{i_o}^{n_u}$ that $i_o^{n_u}$ encounters, then $i_o^{n_u}$ will directly share the learning content with $i_z^{n_u}$. This direct method of content sharing simplifies the communication process and enhances the immediacy and effectiveness of educational resource transfer.

If the knowledge provider $i_o^{n_u}$ and knowledge seeker $i_z^{n_u}$ do not meet directly at the current time and there are other users from the same community as $i_z^{n_u}$ in $V_{i_o}^{n_u}$, then $i_o^{n_u}$ will share the content with these users from the same community. This capitalizes on the high level of interest, consistency, and frequent interactions among community members, which facilitate the rapid dissemination of knowledge within the community.

In the absence of users from the same community, it is necessary to select an appropriate high-level service provider to effectively share knowledge content across communities. High-level service providers are those who can frequently interact with users from the target community Zu. In this step, the system evaluates the frequency of interactions and consistency in activity areas between potential service providers and users of the Z_u community. It selects the user with the highest probability of interaction to be the service provider. In other words, the higher the probability, the stronger the service capability. The following formula calculates the service capability $R_{i_u^{Z_j}}$ of user i_u to provide content sharing services for community Z_u:

$$R_{i_u^{Z_j}} = 1 - \prod_{i_k^{Z_u} \in I^{Z_u}} \left(1 - Z_{i_u}^{i_k^{Z_u}} \cdot X_{i_u}^{i_k^{C_u}}\right) \tag{8}$$

Additionally, choosing high-quality service providers also involve assessing how well they align with the needs of the target community. By calculating the standard deviation of the similarity, we can assess the variability in the similarity of potential service providers as the community membership changes. Users with higher stability are more suitable as high-level service providers, as they can more reliably maintain good relationships with the community Z_u. Assuming the average similarity between user i_u and community Z_u is represented by ω, the formula for calculating the stability of similarity between i_u and community Z_u is as follows:

$$\delta_{i_u} = \frac{1}{w}\sqrt{\sum_{i_k^{Z_u} \in U^{Z_u}} \left(Z_{i_u}^{i_k^{Z_u}} \cdot X_{i_u}^{i_k^{Z_u}} - \omega \right)^2} \tag{9}$$

The formula for calculating ω is:

$$\omega = \sum_{i_k^{Z_u} \in I^{Z_u}} Z_{i_u}^{i_k^{Z_u}} \cdot X_{i_u}^{i_k^{Z_u}} \Big/ w \tag{10}$$

Finally, it is essential to ensure that high-level service providers have an interest level greater than 0 in the content they share. This is based on the practical needs in educational management to guarantee the effectiveness of content sharing and the enthusiasm of the service providers. In educational management, learners' interest in the content of knowledge not only influences learning outcomes but also directly affects the depth of exploration and application of knowledge. The following formula outlines the criteria for selecting high-level service providers:

$$\begin{cases} U_{i_j}^{n_u} > 0 \\ R_{i_j} > R_{i_o^{nu}} \quad i_j \in Vi_{u_o}^{n_u} \\ \sigma_{i_j}^{Z_u} > \sigma_{i_o^{nu}}^{Z_u} \end{cases} \tag{11}$$

Through this strategy, the mobile social network in educational management can more effectively achieve widespread knowledge distribution and continuous professional skill development.

4 EXPERIMENTAL RESULTS AND ANALYSIS

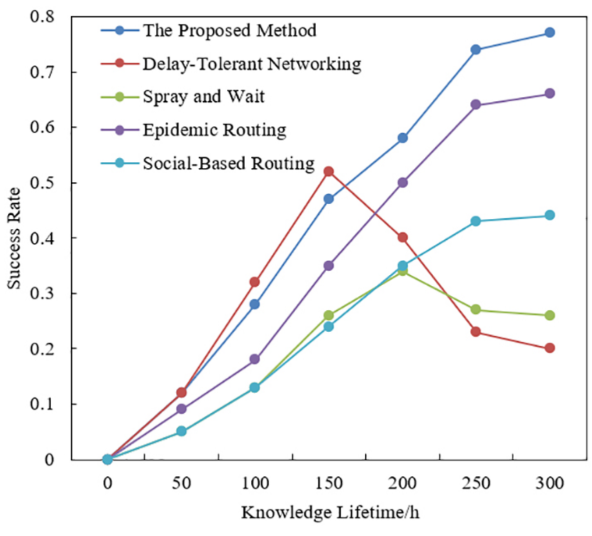

Fig. 3. Success rates of knowledge sharing by different mobile network knowledge sharing mechanisms at various knowledge lifetimes

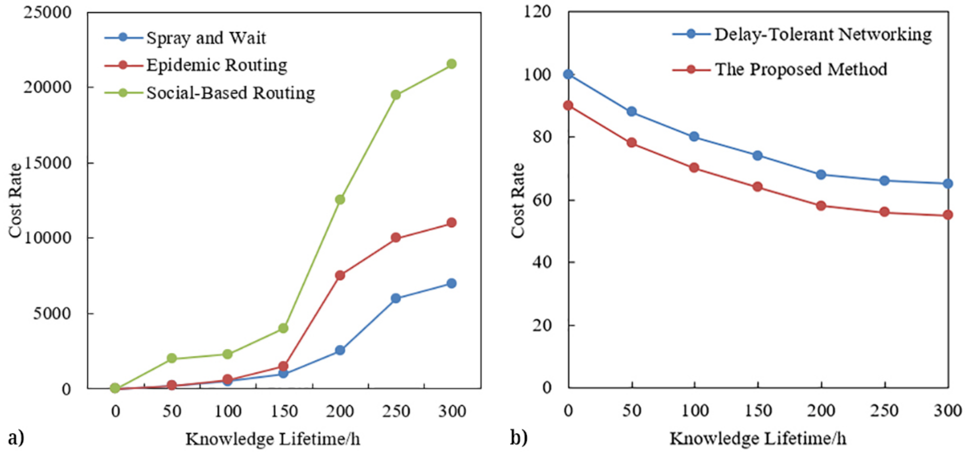

Fig. 4. Cost rates of knowledge sharing by different mobile network knowledge sharing mechanisms at various knowledge lifetimes

Figure 3 displays the success rates of various mobile network knowledge sharing mechanisms at different points in the knowledge lifetime. The data reveals that the success rate of the method proposed in this paper gradually increases over time, from 0.12 at 50 seconds to 0.77 at 300 seconds, demonstrating a strong and sustained capability for knowledge sharing. In comparison, delay-tolerant networking achieves its peak success rate of 0.52 at 150 seconds but then experiences a significant decline, possibly indicating challenges in maintaining consistent sharing over extended durations. The success rates of spray and wait and epidemic routing also gradually increase, but more steadily, with epidemic routing rising from 0.09 to 0.66, showing a decent gradual improvement. Social-based routing displays a trend of increasing from 0.05 to 0.44, which, although smaller in magnitude, is relatively stable. From these results, it can be concluded that the proposed method excels in terms of the effectiveness of sustained knowledge sharing. The continual increase in success rates demonstrates its potential application in educational management. Compared to other mechanisms, the proposed method maintains a higher success rate over longer knowledge lifetimes, emphasizing the effectiveness of strategies adopted through quantitative analysis of interaction levels and activity consistency in mobile networks.

Figure 4 displays the cost rates of knowledge sharing through various mechanisms in mobile networks at different knowledge lifetimes. Observing the data, we can see that the cost of social-based routing significantly increases over time, from 2000 at 50 seconds to 21500 at 300 seconds. This indicates that its processing and transmission costs greatly escalate with time and the amount of knowledge. Epidemic routing also exhibits a gradually increasing cost trend, from 200 at 50 seconds to 11,000 at 300 seconds. Although its growth rate is lower than that of social-based routing, it still indicates an increase in resource consumption over time. Relatively speaking, the cost of spray and wait increases from 200 to 7000, which is a significant rise but lower compared to social-based and epidemic routing. Delay-tolerant networking and the proposed method show lower and relatively stable cost growth. Particularly, the proposed method demonstrates a continuous decreasing trend from 90 to 55, indicating efficient resource utilization and optimized data transfer strategies. From this data, it can be concluded that although social-based routing may have higher transmission volumes at certain times, its long-term resource consumption is substantial and may not be suitable for resource-limited environments. The low-cost growth rate demonstrated by the method in this paper not only ensures efficient resource utilization but also enhances system sustainability, which is particularly crucial in the mobile network environment of educational management. Through quantitative analysis of interaction levels and activity consistency in mobile networks, this paper has successfully reduced the overall operating costs of the system while ensuring the quality of educational content and user engagement.

Figure 5 illustrates the variations in knowledge sharing success rates for various mobile network knowledge sharing mechanisms as the number of users increases. The data shows that the method described in this paper demonstrates a stable growth trend in success rate, gradually increasing from 0.71 to 0.87 as the number of users increases. In contrast, the other four mechanisms—delay-tolerant networking, spray and wait, epidemic routing, and social-based routing—also exhibit success rates that gradually improve as the number of users increases. However, their overall growth and final success rates are lower compared to those of the proposed method. For example, although epidemic routing increases from 0.68 to 0.84, which is relatively close to the proposed method, it still lags noticeably at higher user counts. Spray and wait and delay-tolerant networking exhibit lower success rates as the number of users increases, suggesting potential challenges these mechanisms may encounter as the scale expands. From this data, it can be concluded that the proposed system maintains a high knowledge sharing success rate even with larger user groups, demonstrating its efficiency and scalability in practical educational management applications.

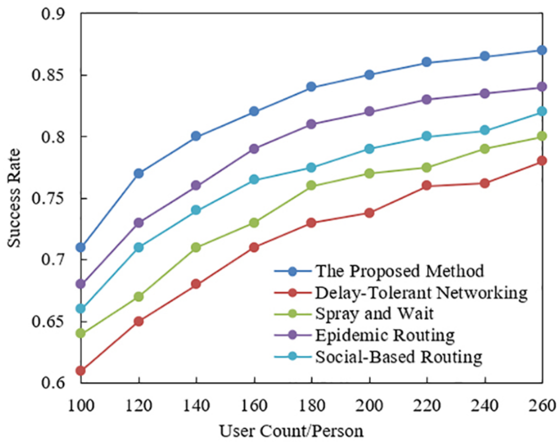

Fig. 5. Success rates of knowledge sharing by different mobile network knowledge sharing mechanisms at various user counts

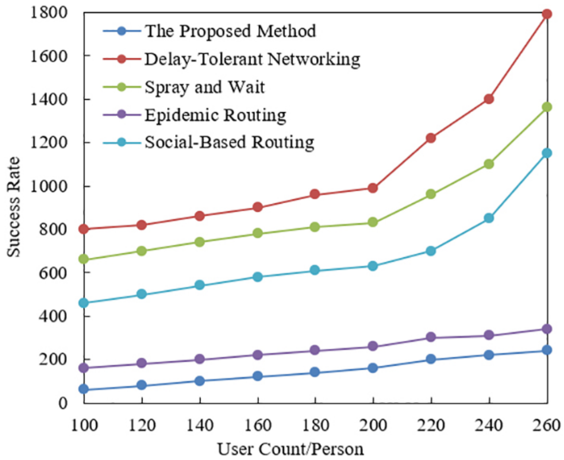

Fig. 6. Cost rates of knowledge sharing by different mobile network knowledge sharing mechanisms at various user counts

Figure 6 illustrates the variations in cost rates for various mobile network knowledge sharing mechanisms as the number of users increases. The data indicates that the cost associated with the method described in this paper grows linearly from 60 to 240 as the number of users increases, displaying a trend of linear growth. This cost is significantly lower compared to other mechanisms, especially when maintaining a low cost at higher user counts. In contrast, the cost of delay-tolerant networking significantly increases with the number of users, rising from 800 to 1790. This demonstrates a sharp escalation in resource consumption as the user scale expands. Although the costs for spray and wait and social-based routing are higher than for the proposed method, their growth trends are relatively mild. Epidemic routing demonstrates the most moderate cost growth, increasing from 160 to 340. While this growth is lower than that of delay-tolerant networking and social-based routing, its scalability at higher user counts is still inferior to the proposed method. The analysis concludes that the proposed method demonstrates outstanding cost-effectiveness and resource efficiency when handling large user groups, thanks to its optimized knowledge sharing strategy and efficient data processing mechanisms. The method is not only theoretically innovative but has also proven its effectiveness in practical applications, especially in resource-limited educational management environments. It effectively controls costs while ensuring the broad dissemination and acceptance of educational content.

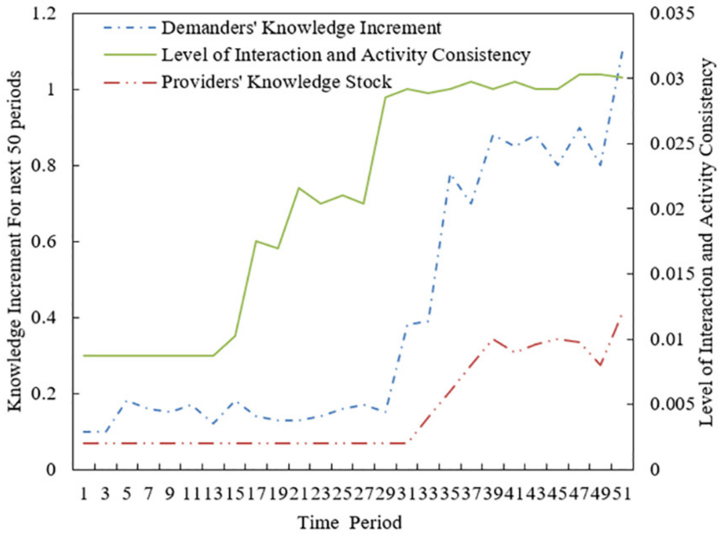

Fig. 7. Knowledge increment among different groups during mobile network knowledge sharing process

Figure 7 illustrates the knowledge increments for both demanders and providers over various periods, as well as the changes in interaction levels and activity consistency during these periods. The data shows that the knowledge increment of respondents grows slowly in the first 15 periods, fluctuating mostly between 0.1 and 0.18. However, starting in the 16th period, the increment significantly increases. This increase is particularly noticeable after the 31st period, sharply rising to 0.78 and continuing to increase to 1.1. In contrast, the rate of knowledge accumulation for providers remains significantly lower overall, remaining constant at 0.002 during the initial 15 periods, with a slight uptick beginning in the 16th period and accelerating after the 31st period. However, it still lags behind that of the demanders, reaching its peak at 0.012. Moreover, the levels of interaction and activity consistency remain around a low 0.3 during the first 15 periods but start to significantly improve from the 16th period, especially reaching nearly 1 in the 29th period, indicating a high level of consistency in interaction and activity. From this data, it can be concluded that as interaction levels and activity consistency improve, the efficiency of knowledge sharing significantly increases, especially the knowledge increment of respondents, which shows a notable leap. This trend highlights the effectiveness of the research in this paper, demonstrating that enhancing interaction levels and activity consistency in mobile networks can effectively promote the dissemination and absorption of knowledge. This is especially crucial in providing solid support for the continuous learning and professional development of individuals seeking information.

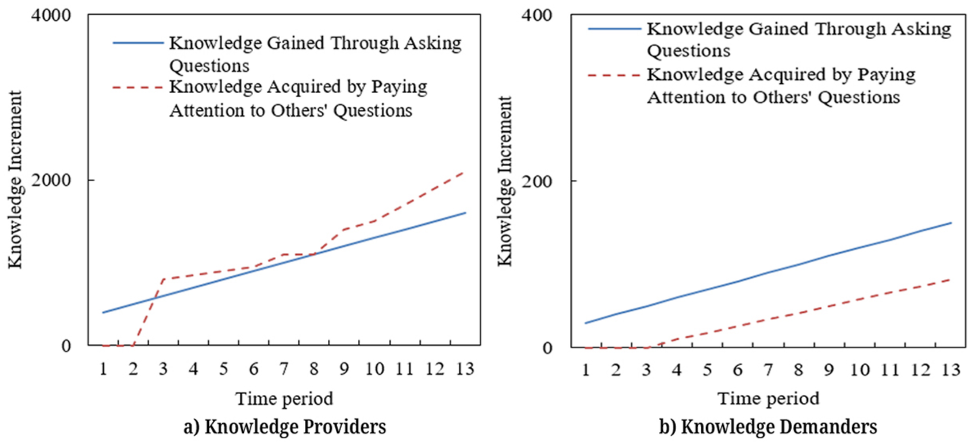

Fig. 8. Pathways through which different mobile network individuals acquire knowledge

Figure 8 illustrates the amounts of knowledge acquired by knowledge providers and demanders over 13 periods through two distinct pathways. For knowledge providers, the knowledge acquired through asking questions shows a linear growth per period, increasing from 400 to 1600, displaying a stable growth pattern. Meanwhile, knowledge acquired by paying attention to others' questions starts to significantly increase in the third period, rising from 800 to 2100. The growth rate in the later stages surpasses that acquired through asking questions. For knowledge seekers, although the rate of knowledge acquisition through asking questions increases gradually, it consistently rises from 30 to 150. Knowledge acquired by paying attention to others' questions starts being recorded in the fourth period, and although it grows slowly, it continues to rise, eventually reaching 82. This indicates that over time, both groups effectively increase their knowledge through two pathways: asking questions and paying attention to others' questions. From this data, it can be concluded that both knowledge providers and demanders can enhance their knowledge levels through active community interaction, with paying attention to others' questions being a particularly important pathway for knowledge growth for providers. This data analysis demonstrates the significant impact of community interaction on individual knowledge development. This finding supports the strategies and measures proposed in this research, demonstrating the potential to enhance continuous learning and professional development in the mobile social network environment by promoting user interaction. Therefore, this study not only contributes theoretically to the field of educational management but also provides empirical support for designing effective knowledge sharing and educational advancement strategies in practical applications.

5 CONCLUSION

This paper, through meticulous experimental design, conducted an in-depth quantitative analysis of the interaction levels and activity consistency within mobile networks. The aim was to evaluate how these factors promote continuous learning and professional development. The research covers multiple important areas: changes in the success and cost rates of knowledge sharing across different lifespans and user numbers, as well as analyses of knowledge increments and acquisition pathways. These experimental results reveal the efficiency and cost-effectiveness of various knowledge-sharing mechanisms. They also highlight the patterns of knowledge acquisition among different groups within the mobile network environment.

The findings indicate that the method proposed in this paper demonstrates high efficiency in promoting successful knowledge sharing and controlling costs, especially in scenarios where the number of users increases. The method effectively maintains a low-cost growth rate while sustaining a high level of success in knowledge sharing. Moreover, the analysis of knowledge increments obtained through interactions by knowledge providers and demanders shows that social interactions within mobile networks significantly promote the accumulation and dissemination of knowledge. This is especially true when the levels of interaction and activity consistency are high, significantly enhancing the efficiency of knowledge acquisition.

Despite its achievements, this study has some limitations. For example, the research relies on specific mobile network environments and user behavior patterns, which may require further validation and adjustment in different cultural or educational contexts. Additionally, the data model used in the study could benefit from incorporating more real-world application data to enhance its universality and adaptability.

Future research could expand in several directions. Firstly, by exploring various types of mobile network knowledge sharing mechanisms, identify strategies that are better suited to different learning environments. Secondly, the research could be extended to different cultural and educational systems to assess and verify the universality and adaptability of the methods proposed in this paper. Finally, further investigation into the specific impact mechanisms of interaction levels and activity consistency on knowledge-sharing efficiency is also an important direction for future research. Through these studies, more in-depth and specific guidance can be provided for the application of mobile technology in educational management and professional development on a global scale.

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