

Seeking a Sense of Meaning and Companionship in Life: Informal Learning on Douyin Among Chinese Older Adults

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This study examines how Chinese older adults leverage Douyin, a short video platform, for informal learning purposes, analyzing their usage patterns, motivations, and encountered challenges. Although Douyin was not explicitly designed with educational features, it has emerged as a significant informal learning platform for this demographic. Through a qualitative investigation comprising participant observations and semi-structured interviews with 17 participants, we reveal the distinctive learning experience that Douyin facilitates. The platform's unique combination of short-form videos, live streaming capabilities, and interactive community features creates an engaging learning environment that particularly resonates with older adults. Our findings demonstrate that participants derive substantial social-emotional benefits beyond knowledge acquisition, including strengthened social connections, enhanced companionship, and a reinforced sense of purpose through their Douyin engagement. These social-emotional aspects emerge as crucial factors driving older adults' selection of Douyin as their preferred learning platform. By providing comprehensive insights into older adults' engagement with digital platforms for lifelong learning, this research offers valuable implications for HCI, particularly in understanding how technology can be optimized to support the learning needs of older populations.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**; **Empirical studies in collaborative and social computing**.

Additional Key Words and Phrases: older adults, technology adoption, technology engagement, social feature in e-commerce platform, technology-inclusive design, social-emotional support

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1 Introduction

Informal learning, *i.e.*, the unstructured learning occurring outside of institutions or not through systematic activities [12, 32, 36, 65], has enjoyed great popularity for allowing people to pursue

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knowledge and skills based on their interests and needs, fostering a sense of autonomy and personal growth [8, 53]. As the world ages, older adults are becoming one of the major groups of informal learning, which can help them realize lifelong learning intentions, enrich their spiritual and cultural life, and improve their quality of life and sense of self-worth in their later years [17, 24, 24, 65]. Therefore, it is of great value to explore and then accordingly improve the informal learning experiences of older adults.

In recent years, due to its great popularity, short video platforms, such as TikTok¹, Douyin(“抖音”) ², and Kuaishou (“快手”) ³, have become one of the main channels for the elderly to conduct informal learning. For example, a QuestMobile report in 2021 shows that 36.3% of Douyin users are over 41 years old, and 18.4% are over 50 years old⁴ [50]. A 2023 survey of more than 5,000 older adults in China found that about 90% watch short videos for a total of two hours a day on average [19]. Much existing work has studied user behavior and challenges when using traditional social media platforms, such as YouTube, Facebook, and Twitter, for informal learning [22, 38, 43, 60]. Rare research has focused on informal learning on short video platforms. Unlike lengthy videos that often take tens of minutes and texts and graphics on traditional social media platforms, short video platforms feature videos that are typically less than 60 seconds in length and live streaming services with more interaction and user engagement [42]. As a result, existing findings and design implications on traditional social media platforms may not apply to informal learning on short video platforms. In addition, existing work mainly investigates the informal learning of young adults and pays rare attention to older adults, while the requirements of older adults will be quite different. Therefore, it is essential to examine the informal learning patterns and challenges that older adults face on short video platforms to optimize platform design and enhance their experience.

In this study, we explored various types of informal learning activities among older adults. These activities encompass a wide range of skills and interests, including language learning, artistic skills, fitness and brain-boosting skills, and practical life skills. The table 1 below categorizes the types of informal learning activities and provides examples of specific areas that older adults are engaged in:

In this paper, we conduct a case study investigating the challenges that Chinese older adults face when using Douyin for informal learning. We Study Douyin because it is the most popular short video platform in China and attracts the largest number of older users [19]. Previous work points out that the platform usage behaviors, motivations, and experiences of older adults are deeply influenced by their specific social and cultural backgrounds [27, 57, 58]. Existing work mainly investigates the informal learning of older adults in WEIRD (western, educated, industrialized, rich, and democratic) countries, e.g., U.S., Canada, Australia, and Italy [20, 24, 52, 63, 64]. On the contrary, we study the rarely noticed group, Chinese older adults, whose socio-cultural background and experience with technology are very different from those of older people in the WEIRD countries. This is another contribution of this work.

¹TikTok (<https://www.tiktok.com>) is a popular short-form video hosting service owned by ByteDance, launched in 2017. It hosts user-submitted videos, which can range in duration from 3 seconds to 10 minutes [68].

²Douyin(<http://www.douyin.com>), the Chinese version of TikTok, was launched by ByteDance in September 2016. As of the end of 2022, it emerged as a leader in the short-video app market in China. The user base of Douyin has been rapidly expanding, from 639.4 million in 2021, with an expectation to reach around 835 million by 2025 [31].

³Kuaishou (<http://kuaishou.com>), is China's first short video platform, developed in 2011 by Hua Su and Cheng Yixiao. As of 2019, it has a worldwide user base of over 200 million, leading the “Most Downloaded” lists of the Google Play and Apple App Store in eight countries, such as Brazil [59].

⁴The definition of “older adults” in our study corresponds to the legal retirement age in China, which is 60 years for men and varies for women, being 55 for female civil servants and 50 for female workers, as per current regulations [67].

This work aims to investigate the suitability of a fragmented and entertainment-focused platform like Douyin for informal learning purposes. By examining the behaviors, motivations, and challenges of older adults engaging in informal learning on Douyin, we hope to gain deep insights into the platform design improvement to enhance the experience of older adults' learning journeys on Douyin. To achieve this, we propose the following three research questions:

RQ1: How do Chinese older adults engage in informal learning on Douyin?

RQ2: What motivates older adults to engage in informal learning on Douyin?

RQ3: What are the facilitators and obstacles perceived by older adults while engaging in informal learning on Douyin?

This study addresses specific research questions through a qualitative methodology, incorporating both observations and semi-structured interviews. The participants included 17 older adults, aged between 60 and 79, engaged in informal learning via Douyin, a popular platform in China. Our research reveals a multifaceted informal learning ecosystem on Douyin, characterized by dynamic live-streaming interactions and various other modalities such as short videos and online community engagement. This ecosystem notably diverges from traditional social media platforms by offering tailored support at different stages of informal learning. We identified that older adults are drawn to Douyin for informal learning due to its ability to provide a sense of purpose and companionship, aspects highly valued in their later years. Despite the advantages of interactivity and diversity in Douyin's learning ecosystem, our study also highlights significant challenges. These include difficulties in locating suitable learning resources, revisiting previously learned content, and disruptions stemming from commercial advertisements. In conclusion, our findings shed light on potential strategies to enhance the usability of social media platforms for senior-friendly informal learning.

This work mainly has these contributions: Firstly, it enriches the HCI literature by examining the viability of short video platforms, such as Douyin, for informal learning. This examination includes an analysis of user motivations, behavioral patterns, and challenges encountered in using Douyin for educational purposes. Secondly, the study highlights Douyin's effectiveness as an informal learning tool for Chinese older adults, addressing their socio-emotional needs for companionship and a sense of purpose. This is particularly significant for supporting positive aging, as it demonstrates how technology can be leveraged to enhance the quality of life in older adulthood. Moreover, our research sheds light on the specific requirements of this demographic and how socio-cultural context influences their choice and use of technology.

The rest of this paper is as follows. We first review related HCI literature on elderly technology use and online learning. We then provide background on Douyin and describe our qualitative study methodology. Then, we present our key findings on how Douyin's features facilitate the informal learning of older adults, as well as their motivations and challenges for learning on that platform. Finally, we conclude by discussing the design implications to better promote informal learning among aging populations.

2 Related Work and Background

In this section, we begin by situating our work within the broader context of literature on informal learning on social media, which is the primary research area to which our study contributes. Next, we provide an overview of older adults' online learning behaviors and requirements, our specific case study objects. Finally, we introduce the features of Douyin to give readers the background to understand this work.

2.1 Informal Learning Practices on Social Media Platforms

Informal learning, often defined as unstructured learning taking place outside of formal educational institutions or systematic activities [12, 32, 36, 65], has gained significant recognition and popularity. This form of learning allows individuals to pursue knowledge and develop skills according to their interests and immediate needs. It empowers learners, fostering a profound sense of autonomy and personal growth [8, 53]. In the field of HCI, research on informal learning has focused on exploring how digital technologies influence and facilitate individuals' self-directed learning processes [13, 14, 34, 75]. This research area encompasses topics such as informal learning on social media platforms, personalized learning experiences, and the design of user-friendly learning interfaces [4, 13, 29, 34].

Social media platforms have become an important channel for informal learning [54]. Studies find that informal learning on platforms like YouTube and Facebook allows users to gain various skills and knowledge efficiently and flexibly outside formal education systems [55, 60]. Hashtag conversations allow users with shared interests to come together as learning communities [48]. Users learn on social media platforms in a variety of ways. Previous work finds that users leverage the massive video repository and the community features in YouTube to learn [38, 55, 60]. Users benefit from on-demand access to tutorial videos on diverse topics, learning through repeated video viewing at their own pace and need [60]. Users also learn on platforms like Twitter, Instagram, WhatsApp, Facebook, and Snapchat, through media sharing, peer knowledge exchange, and self-presentation [25, 33, 43, 48]. In addition, users can acquire skills in areas like photography, design, and styling by browsing others' creations for inspiration and feedback [25].

Existing work focuses mainly on traditional social media platforms, such as YouTube, Facebook, and Twitter. Little attention is paid to informal learning based on short video platforms, e.g., TikTok, and Kuaishou. These platforms are now quite popular. For example, as of April 2022, Douyin (The Chinese version of TikTok) and Kuaishou, the two most popular short-video sharing platforms in China, have approximately 680 million and reached 400 million monthly active users respectively [11]. Studying on short video platforms has become very common. For instance, according to a 2021 report, over 73% of users learn on Douyin [62]. Since short video platforms have very different characteristics from traditional social media ones, e.g., in terms of video length and interaction ways, more research should focus on informal learning based on short video platforms.

These HCI studies reveal social media's expanding and important role as platforms for interest-driven, social, and self-directed informal learning across diverse knowledge domains [55, 75]. Existing findings demonstrate that even systems not purpose-built for education can support valuable informal learning if they offer discoverable content, interactive features, and participatory cultures. Users informally learn on social media platforms with specific purposes or motivations different from those of formal learning. Key motivations include the ability to access personalized and interested content [13, 20], benefit from peer modeling [22, 55], and feel empowered through creating and sharing one's content [44, 75].

It is worth noticing that while many studies are focusing on youth, relatively few explore how and why older adults learn informally online. A recent survey conducted in China with 1150 participants from 28 provinces found that over 20% of older adults use Douyin for learning [19]. In addition, previous research has shown that older adults who use YouTube are proactively seeking instructional videos to acquire digital skills and pursue leisure activities [48]. Facebook is also utilized by older adults for informal social connections and knowledge exchange related to hobbies [17]. These studies highlight the potential for older adults to engage in informal learning on social media platforms. However, it is important to recognize that older adults face various challenges in informal learning, such as a lack of operational guidance [14] and poor platform

accessibility and usability [10, 34, 41]. Therefore, it is crucial to pay close attention to the informal learning needs of older adults, particularly those who receive little attention, such as the elderly population in China. Their specific social and cultural backgrounds make their requirements for informal learning distinct from those of older people in the West.

2.2 Older Adults' Online Learning

Online learning is popular among individuals of all ages. Older adults, in particular, have found substantial meaning and value in participating in online learning [34]. Therefore, a significant number of elderly individuals engage in online learning activities. Some work has investigated motivations and perceived benefits among older users participating in online courses [34, 69]. It examined user experiences in an online social science course offered by the UK's Open University specifically for learners over 60 years old. Through qualitative interviews, they found intellectual stimulation, social connections, and personal development to be major motivations and perceived benefits among the senior learners. The most engaged older users were driven by intrinsic motivations to keep mentally active and derive a sense of personal growth from acquiring knowledge [26, 69].

Therefore, several studies have focused on developing and evaluating platforms for formal online tailored to the needs and preferences of older adult users. For instance, Smit Desai *et al.* developed Health Buddy, a voice agent integrated into commercially available Voice User Interfaces (VUIs) to support informal self-regulated learning (SRL) of health-related topics through multiple learning strategies and examine the efficacy of Health Buddy on learning outcomes for older adults [13]. Through surveys and focus groups, they identified several key principles for senior-friendly online informal self-regulated learning design, including taking accountability for failed interactions, accommodating longer responses, keeping interactions simple, and incorporating auditory affordances to promote participation. These works focus on enhancing the experience of formal learning for older adults.

However, previous research has highlighted that, for older adults, informal learning is more prevalent than formal or non-formal learning [14, 20, 65]. Social media platforms, such as Facebook and YouTube have become popular mediums for older adults to acquire knowledge and develop skills. Older adults use social media platforms, like YouTube, to learn new hobbies, skills for daily activities, and digital literacy [60]. Older patients participate in health discussion forums and communities to obtain informational and social support for chronic disease management [14]. Informal learning has highlighted benefits including self-empowerment, social connectedness, and overcoming mobility barriers through virtual access [24, 26]. While it is common for older adults to learn informally, rare studies focused specifically on older adults' technology-enabled informal learning practices.

Existing work finds that older adults face distinct barriers to fully capitalizing on social media's learning potential, including technological access and literacy, perceptions of irrelevance, cognitive and physical user interface challenges, and exclusion from youth-dominated online spheres [20, 64]. Much literature has examined core interaction design and user experience challenges in developing technologies for older adult populations. Wang *et al.* outline key factors that can constrain technology adoption among older users, including self-management, self-compensation, self-image, negative perception of technological products, technology adoption barriers, technology adoption and usage, refusal to change to new technological products, and technology value seeking [66]. They recommend design principles to account for these age-related changes, such as minimizing complex menu navigation, providing clear audiovisual feedback, and supporting progressive disclosure of information.

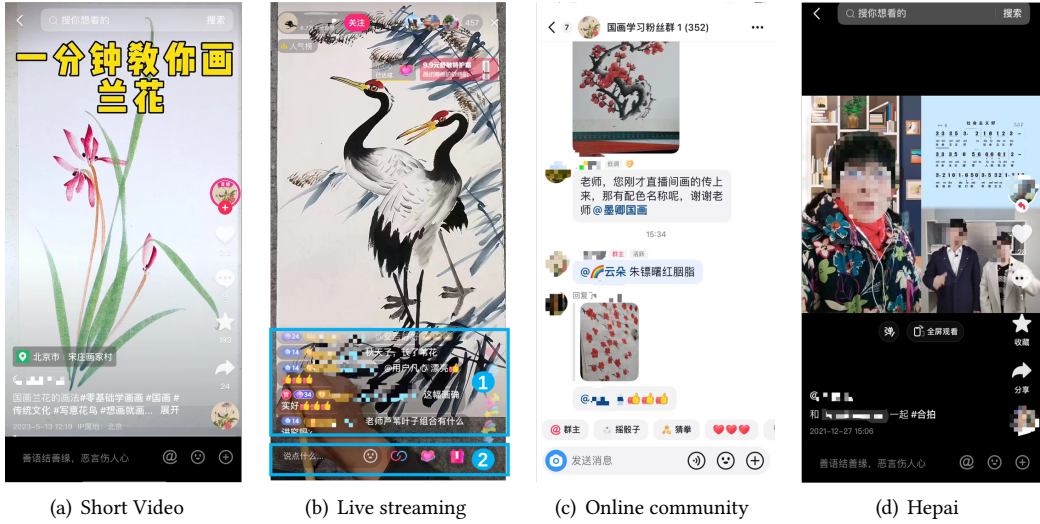


Fig. 1. Screenshots of Douyin. These screenshots were captured in September 2023. Figure 1(a) shows a short video, which is the main feature of Douyin. Figure 1(b) shows the feature of live streaming. In ②, viewers can interact with the anchor by commenting with text or voice messages, sending gifts, or talking directly to the anchor. ① shows the public screen, where viewers can see the comments and gifts. Figure 1(c) shows the community which is typically built by content creators to communicate asynchronously with followers. Figure 1(d) shows the feature of Hepai (合拍), where users can create new videos based on others' videos.

Previous studies have focused mainly on how to ensure accessibility, usability, and age-inclusive design is critical for enabling older adults' online learning participation, and less on how to increase the motivation of the elderly use from the perspective of motivation [1, 45, 47, 71]. These studies point to core technical and social challenges in crafting online experiences suited to the capabilities and motivations of older users [21, 34]. Our study expands and in-depth the previous study by examining how the non-study aimed at, the social media platform, Douyin, addresses these considerations to create an engaging informal learning platform for Chinese older adults.

2.3 Background: Douyin and Chinese Older Adults

Douyin, known internationally as TikTok, provides a valuable context for examining social media-enabled informal learning. Launched in 2016, Douyin pioneered the popular 15-60 second short video format [42]. The main features of Douyin are shown in Figure 1. Specifically, users can share and browse personal interest short videos 1(a) of various topics, like comedy, talent shows, and self-created products. There are also live streaming rooms 1(b) where viewers can interact with anchors in real-time by commenting with text, voice, and emojis or sending gifts. Some content creators, like anchors and short video makers, can build communities 1(c) to facilitate interacting asynchronously with followers. Douyin has another feature, Hepai (合拍), with which users can create videos based on those of others.

Douyin has enjoyed great popularity in China. A report in 2022 showed that its monthly active users are approximately 680 million [11]. Even though the primary user is youth, Douyin has also attracted a large number of older adults in China [50]. The QuestMobile report in 2021 shows that 36.3% of Douyin users are over 40 years old, and 18.4% are over 50 years old [50]. Despite the entertainment characteristics of Douyin, over 73% of users learn on it [62]. The elderly have become

the main group using Douyin for online learning. A 2023 survey of more than 5,000 older adults in China found that about 90% watch short videos for a total of two hours a day on average [19].

China's large aging population faces significant barriers to continued learning and digital inclusion [46]. Biases persist that older adults lack motivation and ability to learn new things [56], especially lacking digital access and skills for online participation [16, 30, 74]. Though the government has promoted vocational continued education initiatives, enrichment learning valued by older adults has been neglected, reducing educational options [40]. Pervasive ageist attitudes and exclusion from youth-dominated online spheres have created the digital divide reducing older Chinese adults' educational and social participation [16, 30, 72]. Closing these digital and learning divides through creating accessible pathways that leverage older adults' needs and motivations will be critical as China's population ages. Understanding how platforms like Douyin could promote informal learning for Chinese older adults, is greatly meaningful for facilitating technology adoption and engagement for marginalized older groups holds important potential.

3 Methods

This study investigates how and why Chinese older adults learn informally on Douyin by employing participant observations and semi-structured interviews with 17 participants. The research methodology is designed to comprehensively understand these experiences. Our approach aims to capture the essence of informal learning in the context of new media, focusing on the unique ways older adults interact with and learn from Douyin. The research was conducted from June 2023 to September 2023. All data collection processes have been informed and got permission from the participants, adhering to ethical standards.

3.1 Participant

We recruited older adults over 60 years old as participants with the following criteria: opening Douyin every day, using Douyin for more than 20 hours per week, and having more than one year of informal learning experience on Douyin. For informal learning, we refer to activities such as watching educational short videos, participating in learning-based live streams, and engaging in knowledge-sharing group chats. To better illustrate the diverse range of informal learning activities participants engaged in on Douyin, Table 1 provides examples of various learning activities, including language skills, artistic skills, and practical life skills. These activities represent the broad spectrum of knowledge and skills that older adults seek to acquire through informal learning on Douyin.

To enhance the recruitment process, we detailed our outreach strategies and participant compensation, ensuring that our methods were transparent and fair. We recruited participants in three ways: First, we asked relatives and friends to introduce older adults and then asked whether they had ever participated in at least one year of informal learning activity in Douyin. Through this method, we recruited 2 participants. Then, we sent invitations to elderly users of learning-related live-streaming rooms and group chats. Although many of them refused our invitations, we still recruited 10 participants in this way. Finally, we recruited the other 5 participants through the recommendation of the already recruited ones. Through the informal learning process on Douyin, all participants not only passively consumed videos but also actively contributed to the platform by creating content.

Table 2 presents the socio-demographic characteristics of the 17 participants. We tried to diversify the interviewee pool by considering their age, level of education, and previous job. The participants' age range was between 60 and 79, with an average age of 68.41, ensuring a diverse representation of the older adult population. Among the participants, 8 were male and 9 were female. The educational background of the participants was also diverse, ranging from primary

Type of Informal Learning	Example
Language Skills	Mandarin, English, Korean, etc.
Artistic Skills	Musical Instruments: Ocarina, Guitar, Erhu (二胡), Saxophone, etc.
	Painting: Oil Painting, Illustration, Chinese Painting, etc.
	Singing: Songs, Operas (Peking Opera 京剧, Shaoxing Opera 越剧, Yu Opera 豫剧, etc.)
	Video/Photo Production: Photography, Videography, Post-production Editing, etc.
	Handicrafts: Woodworking, Seal Engraving (篆刻), Knitting, Silk Flower Making (丝网花), Sewing, etc.
Fitness and Brain-Boosting Skills	Brain-Boosting Activities: Board Games (Go, Chinese Chess, International Chess), Sudoku, etc.
	Fitness Activities: Yoga, Tai Chi (太极), Baduanjin (八段锦), etc.
Practical Life Skills	Growing vegetables or flowers, Cooking, Fixing plumbing, etc.

Table 1. Types and Examples of Informal Learning Activities

school dropouts to those with graduate school education. Their occupational backgrounds were varied, including roles such as teachers, farmers, engineers, workers, merchants, accountants, a tailor, and a public servant. This variety contributed to a holistic understanding of informal learning engagement across different contexts. The participants have been using Douyin for informal learning for a duration ranging from 1 to 4 years. The frequency of Douyin usage among the participants varies, with the majority accessing the app more than 5 times per day, while others use it 2-3 times or 3-5 times daily. In terms of weekly usage, participants spend between 22 and 41 hours on Douyin, with a median of 28 hours and a mean of 30.06 hours. These statistics, collected in August 2023, reflect the participants’ extensive use and familiarity with the Douyin platform for informal learning activities.

3.2 Observation

The research was conducted from June 2023 to September 2023. At first, we informed participants of the purpose of the study, the data collection methods, and the confidentiality of their information. We obtained their informed consent before the study. The data collection process included two phases, *i.e.*, observations, and semi-structured interviews. The first author entered into the live-streaming studio and the community to observe participants’ interactions and behaviors while using Douyin for informal learning. This helps her capture real-time engagement patterns and user experiences within the platform’s natural context. To enhance observational details, we employed field notes and video recordings (with participant consent) to capture nuances in user interactions and behaviors. Each participant was observed for two weeks, with observation sessions occurring twice a week, each lasting approximately two hours. We focused specifically on how users engaged in informal learning on Douyin, observing their learning processes in live-streaming sessions and community interactions over a longer period. In the live-streaming sessions, we recorded their interactions, including comments, questions, and other forms of engagement with the content and the streamer. For community learning, we documented their participation in group discussions, questions asked, and interactions with other community members. Participants were given

Table 2. Sociodemographic and Douyin Usage Information of Participants.

Name	Age	G	Edu.	Previous Job	Exp. (Yrs)	Freq. (/Day)	Usage (Hrs)
Jianfen	66	F	Prim. dropout	Farmer	3	>5/day	28
Caigen	73	M	Grad.	Engineer	1	2-3/day	23
Wenxing	68	M	Sr. high	Merchant	2	>5/day	24
Wenyu	73	F	Tech. sec.	Teacher	2	>5/day	36
Xiuju	69	F	Jr. high	Worker	3	>5/day	41
Yanling	72	F	Jr. high	Merchant	4	>5/day	35
Jianmin	71	M	Jr. high	Worker	2	2-3/day	28
Lily	65	F	Sr. high	Merchant	3	>5/day	32
Wenzhang	79	M	Tech. sec.	Merchant	3	3-5/day	22
Maogen	76	M	Jr. high	Worker	2	2-3/day	26
Wenying	68	F	Prim.	Worker	3	>5/day	31
Junmei	64	F	Jr. high	Accountant	2	>5/day	36
Yue	67	F	Jr. high	Tailor	1	2-3/day	27
Bo	63	M	Prim.	Worker	1	2-3/day	26
Zhongjing	60	M	Tech. sec.	Teacher	1	3-5/day	33
Jianya	64	M	Tech. sec.	Public servant	2	>5/day	25
Xiulin	65	F	Prim. dropout	Farmer	3	>5/day	38

Abbreviations:
G: Gender, F = Female, M = Male.
Edu.: Education, Prim. = Primary school, Jr. high = Junior high school, Sr. high = Senior high school, Tech. sec. = Technical secondary school, Grad. = Graduate school.
Exp. (Yrs): Number of years participants have used Douyin for informal learning.
Freq. (/Day): Frequency of Douyin usage per day, e.g., >5/day = more than 5 times per day, 2-3/day = 2 to 3 times per day.
Usage (Hrs): Number of hours participants use Douyin per week.
All these statistics were collected in August 2023.

instructions to use Douyin as they normally would, without altering their usual routines. This allowed us to observe their genuine interactions and engagement with the platform.

A detailed note-taking approach was adopted to capture participants’ interactions and engagement accurately. While absolute objectivity in observation is challenging, we sought to minimize bias by following a structured method, which included field notes and careful documentation of behaviors without interpretation. This allowed us to capture the natural use of Douyin without the interference of preconceptions.

3.3 Semi-structured Interviews

Semi-structured interviews were conducted individually with each participant, and the duration of each interview ranged from 50 to 90 minutes, with an average of 62 minutes. The interviews followed a flexible outline of topics to allow participants to share their experiences freely. The interview questions covered a range of aspects, including participants’ demographic information, their patterns of informal learning on Douyin, encountered challenges, and motivating factors for engaging in informal learning activities.

3.4 Data Analysis

We collected data through observations and interviews. To ensure data trustworthiness, we kept a reflective journal to record our thoughts, assumptions, and potential biases throughout the research process. The interview records were transcribed into text and manually checked for accuracy. Since the text was in Chinese, we translated key passages into English for this publication while trying to stay as faithful as possible to the meaning of the original. Each participant was assigned a pseudonym to ensure anonymity and protect their privacy.

We adopted reflexive thematic analysis for our qualitative data analysis [7, 23]. This process involved several key stages: familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report. During the familiarization stage, we thoroughly reviewed all collected data, including interview transcripts and observation notes, to immerse ourselves in the material and gain a comprehensive understanding. The first author conducted open inductive coding on the transcripts, identifying significant features and patterns relevant to our research questions. This initial coding was open-ended and data-driven, allowing themes to emerge naturally from the data.

As we progressed, we grouped the initial codes into potential themes, looking for broader patterns and overarching concepts that captured the essence of the participants' experiences. This step involved organizing and collating codes into meaningful clusters. The research team collaboratively reviewed the themes to ensure they accurately reflected the data. We refined the themes by merging, splitting, or discarding them as necessary to better represent the data's complexities. Each theme was then clearly defined and named to succinctly convey its core essence, ensuring that each theme was distinct and captured specific aspects of the data. Initially, we focused on how participants used Douyin as an informal learning platform. Example codes in the initial stages included: "low entry-level", "cost little", and "diverse content". During the analysis, we began to explore why our participants remained long-term active learners on the Douyin platform despite facing many challenges. We started identifying themes with deeper meanings, such as "constructing new supportive relationships", "compensating for missed learning opportunities", and "gaining a sense of purpose in life". The coding process resulted in the emergence of significant themes, notably the role of social companionship and the search for life meaning in the context of Douyin's informal learning. These themes offer valuable insights into the underlying motivations of older adults in choosing Douyin as a platform for informal learning. The themes also underscore the importance of social interactions and personal growth in their learning journey.

In the final report, we integrated the themes into a coherent narrative that addressed our research questions and provided deep insights into the participants' informal learning experiences on Douyin. This narrative synthesis involved writing up the themes in a structured manner, supported by direct quotes from the data. The subsequent sections will detail the findings derived from this methodological framework, shedding light on the complex interplay between social media, informal learning, and the unique needs of older adults.

3.5 Statement of Research Position

The authors who conducted the observations, interviews, and data analysis were born and raised in China, and are familiar with Chinese traditional culture and the Chinese people's lifestyles. This cultural familiarity was advantageous for understanding the nuances of participants' interactions.

To ensure the credibility of our findings, we engaged in reflexive practices such as maintaining a research diary. Through reflective journaling, we documented our own biases, expectations, and cultural assumptions that may have influenced our interpretation of the data. After each observation or interview session, we reflected on how our cultural familiarity with Chinese learning

traditions may shape our understanding of participants' experiences on modern platforms like Douyin. Additionally, we used reflective journals to delve deeper into our personal responses and biases. These journals were updated regularly and included more detailed reflections compared to the research diary. Through these reflexive practices, we ensured that our understanding of how older adults use Douyin for informal learning was deeply informed by their actual experiences.

4 Research Context: Informal Learning Practices of Chinese Older Adults on Douyin

To demonstrate how Chinese older adults informally learn Douyin in detail, we combined their usage details to create a story of Mrs. Sun. The story was based on real experiences we learned through our interviews and observations.

Ms. Sun is a retired teacher. She uses Douyin to learn to practice Tai Chi (太极). She starts by browsing short videos on this topic. Douyin allows Ms. Sun to easily pause, rewatch, and resume videos in her own space. When Ms. Sun finds some videos hard to understand but interesting, she usually plays them over and over again, which helps her better understand the content. The recommendation algorithm of Douyin picked up Ms. Sun's preference and recommended more similar videos to her.

Once, Ms. Sun found a Tai Chi video. She watched it several times and practiced along with it. After practicing for a while, Ms. Sun wanted to demonstrate and evaluate her learning results so that her efforts could be noticed by others. Ms. Sun used the Hepai feature to create a video of her practicing Tai Chi and compare it to the instructor's demo. This enables her to evaluate her movements. Douyin's algorithm also recommends some relevant live-streaming sessions, where users can ask questions in real-time chat and get direct feedback from instructors. In a live-streaming room, Ms. Sun made personal connections with teachers and fellow learners. Beyond real-time interaction, Ms. Sun also participated in a community created by the anchor of the live-streaming, where she shared a video of herself practicing Tai Chi and got suggestions from the instructor.

In our study, we found that all participants start by browsing short videos, which they can easily pause, rewatch, and resume at their own pace. The platform's design allows videos to replay automatically if not manually skipped, which is particularly useful for older adults who may need to watch the same content multiple times to fully grasp it. After learning, in our study 64.7% of participants use the Hepai feature to create collaborative videos, enabling them to compare their progress with instructors or peers. Additionally, all participants watch live streaming, which provides a real-time interactive learning environment. Participants can ask questions in the chat, engage in discussions with the instructor and other viewers, and even use voice interactions for more direct communication. This real-time feedback is invaluable for clarifying doubts and enhancing understanding. Furthermore, over 76% of participants join Douyin communities related to their interests, where they share their learning experiences, seek advice, and receive feedback. These communities offer a platform for continuous learning and social engagement. Participants share their completed tasks in these communities for feedback and corrections from instructors. They can also discuss related topics with fellow learners, creating a collaborative and supportive learning environment.

Chinese older adults in our study engage in a rich variety of informal learning on Douyin. They learn English, Korean; learn to play musical instruments like the Ocarina, Guitar, Erhu (二胡), and Saxophone; learn Yoga, Tai Chi (太极), Baduanjin (八段锦), learn Chinese Chess, learn cooking, and fixing plumbing, are also popular (see Table 1). In our study, participants averaged over five different learning activities on Douyin, encompassing all the categories mentioned above. Many

of these activities were new to them. For example, Caigen had never encountered Baduanjin before but started learning it step-by-step after discovering it on Douyin. Nearly every participant expressed that Douyin provided opportunities to explore a wealth of content unimaginable in traditional offline senior learning courses.

Douyin facilitates highly engaging informal learning, with 10 out of 17 elderly participants (over half) opening Douyin more than 5 times a day for learning. Additionally, they spend a substantial amount of time on the platform. Our survey found that participants spent an average of 24.05 hours per week on Douyin, dedicating this time to informal learning. Live streaming occupies nearly 60% of their learning time, averaging 14.22 hours per week, followed by short video learning and community interactions. This Douyin ecosystem centered around short videos, live streaming, and online communities caters well to Mrs. Sun's diverse and evolving learning needs as an older Chinese adult. The informal learning on Douyin is self-paced, interactive, and driven by her interests, providing a rewarding learning experience.

5 Findings

5.1 Seeking Social Companionship: Rebuilding Connections in a Changing Society

5.1.1 Building Supportive Relationships Through Shared Interests and Local Connections. One compelling motivation for Chinese older adults to use Douyin for informal learning is the opportunity to build supportive relationships based on shared interests. Whether it's hobbies like Yue Opera, knitting, or playing the kalimba, Douyin enables older adults to connect with like-minded individuals in a meaningful way. Douyin not only allows older adults to connect with like-minded individuals through hobbies and interests but also facilitates the transition of these online connections into meaningful offline relationships.

Jianfen, a 66-year-old farmer with a passion for Yue Opera, has made several friends in Douyin who share her interest. *"I've met friends online who love Yue Opera (越剧) like I do. We chat on Douyin and WeChat, and one even sent me wedding candies from Shanghai when her daughter got married," Jianfen shared. "This year, she and her sister visited me in Yuyao during the Qingming Festival. Although it was our first time meeting in person, we've known each other for two or three years and have become very close. We talk every few days, and it feels like we've found a new family through Douyin and Yue Opera."*

Douyin's recommendation algorithm, which includes location as a factor, enhances the potential for these relationships to transition from online to offline. By connecting geographically close users, Douyin makes it easier for older adults to interact with people from their local communities, facilitating deeper and more meaningful relationships. For example, Lily, a 65-year-old retired merchant, benefited from localized connections. *"I love baking and joined several Douyin communities for learning, where we share recipes and tips. Through these groups, I met a few women who live nearby, and now we often bake together."* She recounted how her newfound friends helped her during the pandemic: *"When my family had people sick and we couldn't go out, they would drop off ingredients at my house and even helped me with grocery shopping."*

Similarly, Wenxing, a 68-year-old retired merchant, connected with fellow chess enthusiasts through Douyin. *"I met a chess friend from Ningbo on Douyin. We recently had lunch together and played chess. We connected in a live stream and found that we share similar views. We started chatting and quickly became good friends,"* he explained. *"I've met many chess enthusiasts on Douyin, and we often add each other as friends and chat regularly."* Through shared interests and localized connections, Douyin facilitates meaningful and supportive relationships that often extend into the offline world. For older adults, this helps address the social isolation they may face in a rapidly changing society, allowing them to rebuild a sense of community and belonging.

5.1.2 Providing Companionship Amidst Changing Family Structures. In recent decades, Chinese society has experienced profound changes due to the one-child policy and rapid economic development. These changes have resulted in smaller family sizes and a significant increase in urban migration, as many young people move from rural areas and small towns to larger cities in search of better opportunities. As a result, the number of Chinese older adults living alone has risen dramatically [18, 73]. This shift has left many older adults feeling isolated and in need of new ways to find companionship.

For example, Wenyu, a 73-year-old retired teacher, finds herself living alone because her children have moved to different cities for work. *“I started learning Tai Chi in Douyin. Live streaming is great. I’ve made so many friends through live streaming. We even have a group chat. It feels like having a big family.”* Wenyu shared that the sense of companionship extends beyond the live streaming. *“Sometimes, when I cannot sleep at night, I open Douyin and watch our Tai Chi group videos. Hearing familiar voices makes me feel less alone.”* Similarly, Junmei, a 64-year-old former accountant, often feels lonely with her children busy in their own lives. *“My kids have their families to care for, so they don’t have much time for me”,* she shared. *“I joined Douyin to learn to knit and became hooked. Live streams allow me to interact with the host and viewers, sharing tips like a knitting club. Even if I miss a session, I can watch the videos anytime and it feels like I always have company.”* Checking in with her knitting group has become a daily routine, offering the companionship that her family’s absence leaves behind.

Douyin provides a platform for older adults to find companionship through informal learning activities. The live-streaming sessions and community interactions on the platform offer real-time support and a sense of belonging, addressing the loneliness that many older adults face. Through Douyin, they not only learn new skills but also form meaningful relationships that provide companionship and support.

5.2 Seeking a Sense of Meaning: Making Up for Lost Opportunities, Redefining the Meaning of Life Today

In this section, we explore the primary motivations for Chinese older adults to engage in informal learning on Douyin: making up for lost educational opportunities and redefining the meaning of life in their later years. Douyin offers them a platform to find a renewed sense of purpose and self-worth through learning, fulfilling their desire to compensate for past educational gaps and to experience personal growth.

5.2.1 Compensating for Missed Educational Opportunities. For many Chinese older adults of this generation, the education process during their youth is interrupted, partially due to China’s Cultural Revolution in the 1970s [3]. Douyin offers them a chance to compensate for these lost opportunities and fulfill their unmet desire for knowledge. For instance, Caigen expressed: *“My youth coincided with the Cultural Revolution period when learning was a luxury. Now, after retirement, I finally have time to learn and make up for what I missed. The live streams on Douyin feel like studying with classmates; answering questions in the chat feels like raising my hand in class—it makes me so happy.”* Wenyu echoed this sentiment, noting, *“I regret missing school when I was young. Learning on Douyin feels like reclaiming a bit of my youth.”* Through its accessible educational content, Douyin helps fulfill their lifelong curiosity.

Xiujie found joy in making up for missed learning opportunities by studying Korean on Douyin. *“I always wanted to learn a new language, but life got in the way. Douyin’s short, easy lessons helped me pick up basic phrases, and sharing my progress with my granddaughter made me feel proud”,* she shared. Similarly, Jianfen, who missed out on formal education, now learns traditional Chinese medicine on Douyin. *“I follow experts and even started a small herb garden from what I’ve learned. My*

family now asks for my advice, which makes me feel valued”, she said. Bo, with minimal schooling, expressed excitement about learning the erhu, a traditional instrument, through Douyin’s tutorials, saying, *“Playing music has become a big part of my life, and my children are amazed. It’s something I never thought I’d achieve.”*

5.2.2 Rediscovering Personal Value and Social Significance in Retirement. Douyin plays a crucial role in helping older adults redefine their self-worth and social significance after retirement. On Douyin, they are not merely consumers but active contributors. By participating in Douyin communities, older adults find themselves valued and needed. For example, Xiuju serves as a moderator in a Korean learning live stream, where she manages discussions, answers questions, and shares learning materials. She describes this role as giving her a sense of responsibility and purpose within the community. Through roles like this, older adults stay active and engaged, using their knowledge and experience to benefit others. Such participation provides a renewed sense of purpose, countering the notion of idle retirement.

Similarly, Wenxing, who had a career as a merchant, found a new sense of purpose in Douyin. He shared, *“I always felt lost after retiring like I wasn’t contributing anymore. But on Douyin, I started sharing my knowledge about traditional Chinese medicine and local herbs. People began to follow me and ask for advice. It made me feel important and needed again.”* Similarly, Maogen, a senior woodworker, started posting videos of his projects and tutorials. *“The feedback has been incredible. Young people tell me they’re inspired by my work. It feels great to pass on my skills and be appreciated,”* he remarked.

Many participants emphasized the importance of leading a purposeful life. The values and beliefs of Chinese older adults are shaped by their previous experiences in the specific historical context, like the lack of material resources. They view leisure as shameful and prioritize diligent, meaningful use of their time. Douyin aligns with these values, as it allows older adults to learn to enhance their knowledge and skills even in their spare and fragmented time. For instance, Jianmin, who grew up during a time when resources were scarce, said, *“I never had time for leisure; it felt wasteful. Douyin lets me use my free time productively. I learn new things and share my knowledge, which makes me feel accomplished.”* This sentiment is echoed by many others who find Douyin’s learning-focused content resonates with their lifelong commitment to self-improvement.

6 Factors Influencing Informal Learning on Douyin

The popularity of Douyin as a platform for informal learning among Chinese older adults underscores its unique blend of accessibility, affordability, and engaging content. This section examines why older adults favor learning on Douyin over traditional offline or online courses, identifying key factors that shape their preference.

6.1 Facilitators of Informal Learning on Douyin: Bridging Modernity and Tradition

6.1.1 High Accessibility and Mobility Considerations. Compared with offline courses, Douyin has high accessibility due to its ease of use and the only requirement is a smartphone. Offline senior education courses are typically offered only in big cities, making it difficult for seniors in small towns to attend. Participants like Jianfen, Xiulin, Wenying, and Maogen shared that educational opportunities for seniors in rural villages and small towns are scarce. Even in big cities like Shanghai, the spots that provide elderly university programs are limited compared to the high demand. Lily, a senior living in Shanghai, said, *“I couldn’t get a spot in the elderly university program this year because there were too many applicants. It’s very frustrating.”* Learning on Douyin has no such geographical and quota restrictions, providing equal opportunities for seniors regardless of their location.

China's strong family values emphasize the care and safety of elderly parents. For many older adults, physical mobility can be a barrier to attending offline courses. Participants Caigen and Wenzhang mentioned their declining mobility as a hindrance to participating in physical classes. Caigen shared, *"In recent years, my legs have gotten worse, making it difficult to go out. My health condition limits my ability to attend offline courses."* Wenyu echoed this sentiment, stating, *"My children worry about the safety risks if I travel alone to classes. They prefer I stay home and learn through Douyin."* In China, it is common for children to worry about their parents' safety and well-being, and they often prefer solutions that keep their parents close to home. Douyin eliminates this obstacle, offering a safe and convenient learning environment at home. This feature makes it possible for seniors with mobility issues to continue learning without the need to leave their homes, aligning with traditional family values of safety and care.

6.1.2 Cost-Effectiveness: Reflecting Frugality from Planned Economy Era. Douyin's learning format offers a time-efficient and cost-effective alternative to offline courses. Live streaming is usually free on Douyin, and some pre-recorded courses cost 1-100 RMB, far cheaper than offline classes. Lily shared, *"The money needed for one semester of offline courses could cover years of learning on Douyin. It's a much more affordable option."* This cost-effectiveness resonates deeply with China's older generation, who developed a habit of frugality from growing up in an era of economic scarcity and the planned economy. Jianya explained, *"Back then, we had to make do with what little we had, so we learned to save and not waste. Now, with Douyin, I don't have to spend on travel or classes—I can just open the app and start learning. It's simple and economical, just like we were taught."* For older adults, Douyin's affordability not only meets their financial needs but aligns with the values of careful resource management ingrained from youth.

Douyin's flexibility in learning schedules is particularly appealing to older adults who often balance family responsibilities. In China, it is common for grandparents to take care of grandchildren and assist with household duties. Unlike offline classes with fixed schedules, Douyin allows for learning in fragmented time slots, like while waiting for a bus or between chores. Yue shared, *"I couldn't commit to weekly offline classes due to childcare duties, but I can take spare time for learning on Douyin without disrupting my routine."* This flexibility ensures that seniors can integrate learning into their daily lives seamlessly, allowing them to fulfill their family responsibilities while also engaging in self-improvement. Junmei also mentioned, *"With Douyin, I can learn anytime, even while doing household chores. It fits perfectly into my daily schedule."*

6.1.3 Engaging and Interactive Content: Embracing Collective and Participatory Learning Styles. Douyin has a low barrier to entry and high accessibility compared to online education. Traditional online learning platforms, like MOOCs, require users to own PC equipment and have PC skills, which introduces technological barriers for Chinese older adults. In China, few older adults own computers and have ever used PC [70]. Chinese older adults mainly access the internet through mobile devices such as smartphones [6, 49]. For older adults with lower tech skills and literacy, Douyin offers an important barrier-free educational opportunity. Bo said, *"I don't know how to use a computer, but I can easily use my smartphone to access Douyin. It's very convenient."* This accessibility aligns with the rapid digital adoption in China, where mobile internet usage is predominant.

Douyin's interactive and short-format videos cater to seniors' attention spans and learning preferences, but it is primarily the interactive features such as live streaming, comments, and user engagement that foster a sense of collaborative learning and community. In a society where communal activities and collective learning were emphasized during the earlier years, this resonates well with the older generation. Caigen, who had previously experimented with recorded lectures on various platforms, found the experience isolating. He said, *"Watching prerecorded lectures makes me feel very lonely, akin to reading a book in isolation. With Douyin, I experience a vibrant sense*

of collaborative learning. *It's like having classmates again.*" This sense of community is enhanced through real-time interaction with both content creators and other learners, making the learning experience more dynamic and collective.

Douyin offers diverse content tailored to seniors' needs. Online courses tend to be lengthy and over-professionalized. Bo shared, *"I just want simple tips on growing bamboo at home, but online classes start with in-depth botany. Douyin's short-sized content gives straightforward advice for my needs."* Online courses also lack diversity, unable to cover the breadth of interests seniors want to learn. Junmei explained, *"Douyin has content relatable to my everyday life, from crafts to home skills to music, whereas online classes focus on academic fields seniors don't need."* This practical, everyday content is highly relevant to seniors who seek to apply what they learn directly to their daily lives. Jianya added, *"I like how Douyin recommends content based on my interests, whether it's learning English phrases for travel or massage techniques for my neck pain. It's very personalized."*

Douyin serves as a powerful platform for informal learning among Chinese older adults by providing high accessibility, cost-effectiveness, and engaging relevant content. These features bridge the gap between modernity and tradition, enabling older adults to enhance their knowledge and skills while overcoming barriers related to mobility, geographical location, and financial constraints.

6.2 Barriers to Informal Learning on Douyin: Navigating Digital and Cultural Hurdles

While the advantages of utilizing Douyin for informal learning among Chinese older adults are evident, it is crucial to acknowledge the challenges they encounter. Douyin was not primarily designed as an educational platform, which gives rise to specific obstacles.

6.2.1 Difficulty in Managing Learning Materials: Overcoming Digital Organization Challenges. One significant barrier is saving and finding learning materials, which was mentioned by almost every participant. Despite Douyin's "Favorites" feature to bookmark videos, the lack of labels and organization makes finding saved videos later hard for seniors. For example, Wenzhang has to tediously scroll through his bookmarked calligraphy videos to find one he wants to rewatch. Keyword search is also unhelpful since many titles lack keywords. Some older adults download videos to work around this, but copyright restrictions and limited storage prevent saving everything useful. Wenzhang explained, *"I need to open Douyin's favorites and constantly scroll down to find the calligraphy video I want. It's very time-consuming."*

Other participants expressed similar frustrations about navigating the app and managing saved videos. Junmei shared, *"I often lose track of previous chats, and navigating the app is sometimes confusing. It would be better if the interface was more senior-friendly"*. The issue extends beyond just managing materials to the overall navigation of the app. Many older adults find Douyin's interface overwhelming, making it difficult to navigate, especially when it comes to live sessions and keeping track of chat history. Wenying echoed this sentiment: *"Sometimes I accidentally close the chat window and lose all the messages. It's frustrating because I can't remember everything that was said."*

6.2.2 Barriers in Voice Interaction: Addressing Linguistic Diversity. Voice interaction barriers persist despite Douyin's low barrier to entry. While Douyin enables commenting by voice message without literacy or typing skills, which greatly helps less educated older adults, vocal interactions in live streams still have downsides. For instance, Jianfen's rural Southern dialect isn't recognized accurately in the text. Broadcasters relying on transcribed text can't understand her livestream comments, and since Jianfen only uses voice because she can't type, failed communication attempts are frustrating. Jianfen shared, *"I can't type. I only can send voice messages. But my dialect isn't recognized correctly, and the broadcaster can't understand me. It made me sad."* Another participant, Xiulin, from a rural area, said, *"I speak in my local dialect, and sometimes Douyin just doesn't*

get it. It's annoying because I can't type well either, so I'm stuck." This reflects the linguistic diversity in China and the challenges faced by those who do not speak standard Mandarin, which is more common among older generations from rural areas.

6.2.3 Finding Appropriate Live Streams: Aligning Skill Levels with Content. Another barrier is the difficulty of finding high-quality live streams well-suited to older adults' skill levels among Douyin's vast content. As Zhongjing shares, he often starts watching painting lessons that seem good, before realizing some require existing skills unlike him as a total beginner. Clear labeling of suitability for different foundations would help seniors like him avoid wasting time on unsuitable lessons. Zhongjing noted, *"I often find painting lessons that seem good at first, but then I realize they're for people with prior knowledge. It would be helpful if they were clearly labeled for beginners."* Lily also experienced this: *"I joined a knitting livestream thinking it was for beginners, but they started with advanced techniques. I felt lost and frustrated because I couldn't keep up."* This highlights the need for clear communication of content levels to cater to the varying skill levels of older adults.

6.2.4 Interruptions by Advertisements: Minimizing Disruptions to Learning. Livestream learning often gets interrupted by ads. Lily, Wenying, Jianya, and Zhongjing complained that these sales pitches during learning sessions disrupted their concentration. Since many live streams rely on advertisements for revenue, these interruptions are common and can be frustrating for learners. Lily commented, *"I get annoyed when my learning session is interrupted by ads. It breaks my concentration and makes it hard to follow the lesson."* Jianya added, *"I understand that they need to make money, but sometimes the ads are just too frequent. It feels like every few minutes there's an ad, and it ruins the flow of the lesson."*

Despite its benefits, Chinese older adults face several barriers to Douyin, including difficulties in managing learning materials, voice interaction challenges, and frequent interruptions by advertisements. Additionally, finding appropriate live streams and navigating the app can be confusing and frustrating. Addressing these issues is essential to improving the learning experience and making Douyin more senior-friendly.

7 Discussion

This study sheds light on the unique motivations and preferences of Chinese older adults engaging in informal learning through Douyin. While much of HCI research emphasizes learning efficiency, our findings reveal that these individuals prioritize the enjoyment and social engagement that come with the learning process. Their focus extends beyond mere knowledge acquisition, with personal fulfillment and social connections playing a central role in their learning experiences. The discussion is organized into three key sections. The first examines how learning on Douyin fulfills social-emotional needs, emphasizing the importance of connection and well-being. The second explores the socio-cultural factors that influence the learning behaviors and motivations of Chinese older adults. The final section offers design recommendations based on these insights, suggesting ways to create more inclusive and supportive digital platforms for older adults.

7.1 Beyond Learning Efficiency: Meeting Social-Emotional Needs in Learning Experiences

The use of Douyin by older adults in China challenges existing design paradigms in HCI. It underscores the need for designs that are not only user-friendly and accessible but also social-emotional fulfilling. As suggested by the Socio-emotional Selectivity Theory, aging individuals increasingly seek emotionally meaningful relationships [5]. While traditional designs in older adult technology often focus on functional utility [51], our research underscores the significance of fulfilling social-emotional needs within learning environments. These insights suggest that future platforms must

not only minimize technical barriers but also create environments where emotional well-being and social interaction are prioritized.

Contrary to the assumption that short video platforms lack educational value, our research reveals that Douyin offers Chinese older adults a valuable medium for informal learning across diverse topics, including language, arts, health, and practical life skills. Initially drawn to Douyin for entertainment, older adults discovered that the platform's features enriched their sense of self-worth and deepened social connections [15]. The short video format, with its brief, repeatable content, caters to older adults' learning preferences and is especially effective as cognitive needs evolve with age. Videos under one minute in length hold attention more effectively than longer formats, providing quick, rewarding learning experiences that support motivation and engagement [55, 60].

Douyin further supports peer-to-peer learning by leveraging live streams and personalized content recommendations, creating a network of co-learners who exchange knowledge and encouragement. This communal learning environment nurtures both social connection and a sense of contribution, satisfying older adults' desire for meaningful engagement. The platform's ability to foster real-time interactions allows users to connect over shared interests, offering a sense of belonging that extends beyond the typical solitary experience of digital learning.

The implications of these findings extend to other learning platforms, underscoring the value of integrating brief, engaging video content with more traditional educational materials to enhance accessibility for older adults. Real-time interaction through live streams, discussion forums, and peer support networks can further elevate the learning experience, addressing the social and emotional dimensions that are especially important for older users.

7.2 Socio-Cultural Influences on Informal Learning Behavior

Our study reveals that the informal learning behaviors of Chinese older adults on Douyin are shaped profoundly by socio-cultural factors, including a preference for cost-effective solutions, a strong inclination toward community interactions, and a desire to compensate for missed educational opportunities. These behaviors stem from both historical experiences and enduring cultural values that continue to influence their daily learning activities [2, 57, 58].

One key socio-cultural factor is the emphasis on cost-effective learning opportunities, reflecting the practical mindset of Chinese older adults. Participants frequently highlighted Douyin's affordability, with its free live streams and low-cost courses, as an essential aspect that enables them to pursue their interests without financial strain. This focus on affordable learning options aligns with their lifelong habits of resource-consciousness, especially among those who lived through economic hardships in the past [3]. Douyin's capacity to provide meaningful and accessible content at minimal cost underscores the importance of financial accessibility in their decision to engage, as older adults seek quality learning experiences without a significant monetary commitment.

The social interactions available on Douyin also align closely with the cultural values of this generation, who place high importance on social connections and community engagement. Rather than seeking knowledge solely for personal growth, many older adults use Douyin to forge meaningful social relationships. In a society where traditional family structures have been disrupted by factors like the one-child policy and widespread urban migration, many older adults experience social isolation [28]. Douyin's interactive features, such as live streaming and comment sections, create a space for real-time engagement and collective learning, which in turn helps mitigate feelings of isolation. Through shared interests, these connections often transition into offline friendships, reinforcing the cultural emphasis on maintaining social bonds and finding companionship in a society undergoing rapid change.

Traditional Chinese values place a strong emphasis on education and self-improvement [61], and for many older adults, Douyin provides a means to continue learning in their later years, particularly as a way to compensate for lost educational opportunities. As highlighted in the findings, several participants shared how the disruption of formal education during the Cultural Revolution left them with an unfulfilled desire for knowledge. For these individuals, Douyin offers a way to make up for missed chances to learn and provides a sense of personal fulfillment. This reflects the traditional Chinese belief in the moral duty of self-improvement and lifelong learning, which continues to influence the attitudes of older adults today.

In summary, the informal learning behaviors of Chinese older adults on Douyin are deeply influenced by socio-cultural factors, such as their frugality, desire for community interaction, and the cultural importance of continuous education. These factors not only shape how they engage with the platform but also highlight the need for digital learning environments that cater to their unique cultural and social needs.

7.3 Design Implications

7.3.1 Supporting Older Adults Gain Recognition and Build a Sense of Achievement. Recognizing the diverse motivations and preferences of older adults in adopting technology requires a nuanced understanding of their socio-cultural background, as highlighted in the HCI, CHI, and CSCW literature [58]. The implementation of design features that acknowledge and celebrate their contributions can significantly enhance their sense of achievement. For instance, platforms should incorporate profile customization and visibility features that allow older adults to display their learning interests and achievements prominently. In addition, recognition badges and certificates for various learning milestones can provide tangible acknowledgment of their efforts, fostering a sense of pride and accomplishment. This strategy resonates with the concept of legitimate peripheral participation in communities of practice, where starting with light yet meaningful activities can build confidence for online participation. Community highlights, where stories and achievements of older learners are featured, can inspire others and reinforce a sense of collective achievement, further supported by the insights from social learning theories [39].

7.3.2 Supporting Users Build Deeper Interpersonal Relationships. Building deeper interpersonal relationships on digital platforms is another critical aspect. Prior research in HCI suggests that intentional spaces such as sub-forums and group chats are valuable for setting boundaries, developing community norms, and constructing collective identities, especially for marginalized groups [37]. Mentorship programs and group learning sessions can facilitate inter-generational learning and personal connections. This approach is supported by studies showing that community support and interaction significantly enhance user engagement and satisfaction [35]. To facilitate this, platforms like Douyin could introduce dedicated interest-based groups that promote interaction over shared hobbies and learning goals, offering a structured space for ongoing discussions and exchanges. These groups can be enhanced with features like video diaries where users share personal learning journeys, creating more intimate and personalized connections. Additionally, peer mentorship programs could be integrated, matching older adults with others based on expertise or shared interests to foster deeper, sustained relationships through one-on-one interaction.

Platforms can also introduce regular virtual meetups or workshops, allowing participants from the same geographic region or with similar interests to interact in real-time, helping to bridge the gap between online and offline relationships. This would foster a stronger sense of community and belonging. Additionally, emotion-driven interaction features, such as sending virtual support (e.g., “cheers” or “high-fives”), could be designed to facilitate emotional exchanges and recognition

between users, further deepening interpersonal relationships. These design ideas build on the findings that Chinese older adults highly value social connection and support through shared learning experiences.

7.3.3 Enhancing Accessibility and Engagement for Older Adults on Short Video Platforms. To effectively support informal learning, short video platforms need to integrate mechanisms that enhance the learning experience and facilitate seamless interaction. Advanced voice recognition technology is crucial for ensuring smooth and accurate voice interactions, helping older users navigate the platform and interact with content more easily. This implementation is in line with findings from HCI research, which emphasizes the importance of intuitive and accessible interfaces for older adults [9].

A robust bookmarking system that allows users to save and categorize content based on their learning interests is essential for tracking learning progress and revisiting important content. This system should include categories such as subjects, difficulty levels, and specific learning goals, making it easier for users to find relevant content. Besides, platforms can offer incentives for creators who produce high-quality educational content that can enhance the learning experience by ensuring that valuable learning materials are available without intrusive advertisements that disrupt the learning experience. This approach aligns with the need for economic prudence and cost-effective learning solutions highlighted in the socio-cultural context of older Chinese adults [58].

Additionally, introducing a crowd-sourced tagging system where users can tag and rate educational content can help identify the quality and relevance of content for different learning levels. This system ensures that users can find content that best matches their learning needs, whether they are beginners or advanced learners. Interactive learning tools such as quizzes, flashcards, and discussion prompts within video content can make learning more engaging and help users retain information better. Personalized learning recommendations based on the user's learning history and preferences can ensure that learners receive relevant and beneficial content tailored to their progress and interests.

7.4 Limitations and Future Work

While our study provided comprehensive insights into the practices and motivations of Chinese older adults using Douyin for informal learning, some limitations need to be addressed in future work. Firstly, our findings are specific to Douyin and older adults in China, so we cannot generalize them to other regions or demographics. Future studies could explore older adults from different economic backgrounds and rural areas to provide more diverse perspectives. Secondly, this study primarily relied on qualitative research methods, including interviews and observations. While these methods provide in-depth understanding, they may not capture the full spectrum of behaviors and motivations across a larger population. The lack of quantitative data limits the ability to statistically validate the findings, and future research could incorporate mixed methods to offer broader generalizability. Thirdly, while we identified differences among elderly participants based on factors such as age, class, and gender, we did not explore these dimensions in detail due to the scope of the study. Future work could further subdivide the elderly group to provide richer insights for senior-focused HCI and CSCW research. Lastly, future research could build on our suggested design strategies by implementing and evaluating proposed enhancements to Douyin's features. Such studies could provide practical feedback for further optimization and might also extend to other disadvantaged or underserved groups, not limited to seniors.

8 Conclusion

This study explored how Chinese older adults engage with Douyin for informal learning. Our findings show that, beyond focusing on learning efficiency, these older adults highly value the social-emotional aspects of their learning experiences. Social connection and companionship are central motivators for their participation. Their cultural background profoundly shapes their learning preferences and behaviors. Furthermore, the study highlights the critical role of accessibility in modern technology platforms. These insights suggest that HCI research and design should prioritize developing platforms that are not only accessible but also emotionally resonant and culturally attuned. Our research calls for a shift in design philosophy, encouraging HCI practitioners to adopt a more holistic approach when addressing the learning needs of older adults. This study contributes to the growing body of research at the intersection of technology, aging, and informal learning, offering valuable direction for creating more inclusive and supportive digital learning environments for older adults.

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