

Study on the Design of Online English Instructional Videos Based on the Age-Friendly Concept: A Case Study of Douyin Platform

Yanyi Ma, Ling Liang*

School of Foreign Languages, Nanfang College, Guangzhou, Guangdong, China

*Corresponding author: Ling Liang, liangl@nfu.edu.cn

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Abstract: Against the background of deepening population aging and active aging strategy in China, this study focuses on the digital divide and insufficient age-friendly English teaching resources for elderly learners on Douyin. Based on age-friendly design, adult learning, educational technology, and cognitive theory of multimedia learning, this study constructs a three-dimensional framework including age-friendly experience, learning support, and motivational interaction. Using literature research, questionnaire survey, textual analysis, and empirical research, this study explores design defects, core elements, and optimization paths of age-friendly English teaching videos. Results show that current videos are incompatible with elderly outbound travel scenarios, with high sensory and operational barriers and a lack of emotional motivation. Four core design elements are extracted, and empirical videos verify that the proposed strategies significantly improve completion rate, interaction rate, and user acceptance. This study enriches the application of age-friendly theory in short-video language teaching and provides practical references for platforms and creators to support elderly English learning and a lifelong learning society.

Keywords: Age-friendly design; Online English teaching; Short-video design; Douyin; Elderly education

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1. Introduction

Against China's deepening population aging, those aged 60+ accounted for 22.0% of the total population by 2024 (see **Table 1**). Elderly learners face a digital divide in online English learning, while Douyin lacks age-friendly English teaching resources. Integrating age-friendly design, adult learning, and multimedia learning theories, this study builds a three-dimensional framework, identifies age-friendly defects, extracts core design elements, and verifies strategies via empirical research to support elderly English learning and active aging.

Table 1. Population and its composition at the end of 2024

Indicator	Year-end population (10,000 persons)	Percentage (%)
National Population	140828	100.0
Urban	94350	67.0
Rural	46478	33.0
Male	71909	51.1
Female	68919	48.9
0–15 years old (including under 16)	23999	17.1
16–59 years old (including under 60)	85798	60.9
60 years old and above	31031	22.0
65 years old and above	22023	15.6

(Source: National Bureau of Statistics ^[1])

2. Literature review

Age-friendly design has become an important research orientation in response to the needs of older adults in the digital society. It focuses on the physiological, cognitive, and social participation characteristics of the elderly, and provides guidance for interface simplification, visual optimization, and fault-tolerant interaction in digital products ^[2,3]. Relevant studies have laid a user-centered design foundation, but most focus on general digital products rather than short-video English teaching for elderly learners.

Research on online learning among older adults indicates that this group is mainly motivated by practical and social demands, and prefers repeated, situational, and collaborative learning methods ^[4,5]. Major learning obstacles include cognitive aging, insufficient digital literacy, and mismatched teaching resources, which increase the difficulty of informal language learning ^[6]. Although diversified learning models have been proposed, systematic design for elderly English learning on short-video platforms is still insufficient. Educational short videos are suitable for informal learning due to fragmentation and intuitiveness ^[7]. However, current English teaching videos on Douyin show obvious deficiencies in age-friendly adaptation. Content is not closely connected with high-frequency outbound travel scenarios; presentation speed, subtitle size, and interface layout do not match the physical and cognitive characteristics of elderly users; and emotional motivation and social interaction mechanisms are absent ^[8].

The existing literature presents obvious research gaps. Age-friendly concepts have not been systematically integrated into short-video English teaching for the elderly. Designs combined with the platform characteristics of Douyin are rare. Research focusing on outbound travel scenarios is limited, and a complete and operable design framework has not yet been formed. This study carries out targeted design and empirical verification to fill the above gaps.

3. Theoretical foundation

This study is supported by four interrelated theories that together form a solid theoretical basis for the design of age-friendly English instructional videos on Douyin.

Age-friendly design theory focuses on physiological decline, cognitive features, and operational convenience of older adults. It highlights simplified interfaces, enlarged text, clear visual cues, and fault-tolerant interaction to lower usage barriers and enhance usability ^[9]. This theory provides direct guidance

for optimizing visual presentation, speech rate, and operational logic in short videos to match elderly users' conditions. Adult learning theory, centered on Knowles' self-directed learning, stresses autonomy, practicality, and situatedness of adult learners. Older adults learn more effectively when content is closely related to real-life needs and learning procedures are controllable ^[10,11]. This theory determines that video content should prioritize practical outbound travel scenarios and support repeated learning and self-paced progress. Educational technology theory emphasizes technology-enabled situated and personalized instruction. It advocates the integration of technical tools and teaching design to fit learner characteristics and improve learning efficiency ^[12]. This theory supports the technical implementation of short-video production, interactive functions, and empirical research design. Cognitive theory of multimedia learning proposes dual-channel, limited-capacity, and active-processing assumptions. It suggests reducing extraneous cognitive load, controlling information density, and highlighting key points to avoid overload ^[13]. This theory regulates video duration, subtitle arrangement, explanation rhythm, and multimodal presentation to reduce cognitive pressure.

The four theories are complementary and integrated. They jointly support the construction of the three-dimensional analytical framework including age-friendly experience, learning support and motivational interaction, and provide theoretical principles for element extraction, strategy formulation, and effect verification in this study.

4. Research methods and tools

This study aims to identify the age-friendly deficiencies of existing English instructional videos on the Douyin platform, extract core design elements for elderly learners, and propose and verify practical design strategies. It provides targeted guidance for age-friendly English short-video design and delivers accessible English learning resources for older users. The entire study is guided by three clear research questions. What are the main age-friendly problems of current English instructional videos on the Douyin platform? What key design elements should age-friendly English instructional videos include to meet the needs of elderly learners? How to design and verify effective age-friendly English instructional videos for the Douyin platform?

The research objects cover two parts. One part is elderly users aged 50 and above who use Douyin and have English learning needs for outbound travel. The other part is English instructional videos on the Douyin platform. Video samples are selected from those published between 2024 and 2026 with more than 100 likes and substantial teaching content. Advertisements and non-instructional videos are excluded from the sample scope. The questionnaire survey is used to collect learning needs and behavioral characteristics of elderly users. The questionnaire is structured in three dimensions and has passed reliability and validity tests. The overall Cronbach's α coefficient is 0.923, and the KMO value is 0.867, which suggests satisfactory reliability and validity. A total of 230 questionnaires are distributed, and 205 valid samples are collected. Content analysis is applied to diagnose age-friendly defects of existing English instructional videos. Three representative videos are selected and analyzed from the three dimensions of the age-friendly experience layer, learning support layer, and motivational interaction layer. Empirical research is implemented in the design, production, and effect verification of age-friendly English instructional videos. A total of 24 videos are produced focusing on high-frequency outbound travel scenarios with unified age-friendly standards. Data processing and analysis are conducted using SPSS 26.0 and Excel, including data cleaning, descriptive

statistics, reliability and validity tests, correlation analysis, and cross-tabulation analysis.

The research follows a standardized and systematic procedure. It begins with a comprehensive literature review to build a solid theoretical foundation. Then, a questionnaire survey and content analysis are used to capture user needs and diagnose defects of current videos. Afterward, explicit age-friendly design strategies are proposed, and empirical videos are produced and released. Finally, platform data and user feedback are collected and analyzed to verify the effectiveness of the strategies. Research conclusions, innovations, and limitations are summarized on the basis of data analysis.

5. Results and analysis

This part presents the findings obtained from questionnaire surveys, content analysis, and empirical video tests. A total of 205 valid questionnaires were collected with an effective recovery rate of 89.13%. All data were processed and analyzed by SPSS 26.0 and Excel to answer the three core research questions of this study.

5.1. Basic sample information

The sample shows a balanced gender structure, in which males account for 53.66% and females 46.34%. Most respondents are aged between 50 and 65, accounting for 89.27% of the total sample, which matches the group with strong willingness for outbound travel. Regarding English proficiency, 61.95% of the respondents have no English foundation and 26.83% have only basic knowledge, making up 88.78% of the total participants at the initial learning stage. In terms of Douyin usage, 90.24% of the respondents use the platform frequently or regularly, indicating high familiarity with short-video applications. In addition, 69.76% of the respondents have clear outbound travel plans and 21.46% are interested in overseas travel, which reflects a strong demand for practical English related to outbound travel.

5.2. Age-friendly deficiencies of current English teaching videos

Content analysis of three representative popular English teaching videos on Douyin shows prominent age-friendly defects. Most videos are not closely integrated with high-frequency practical scenarios for elderly outbound travel, and the content focuses on isolated vocabulary rather than usable expressions. The explanation speed is too fast without slow-to-normal contrast reading or sentence-by-sentence repetition. Subtitle size, interface layout and interactive functions such as pause and replay fail to adapt to the physical and operational characteristics of elderly users. Emotional encouragement and social interaction mechanisms are also insufficient. These problems lead to a structural mismatch with the physiological and cognitive characteristics as well as practical learning needs of elderly learners.

5.3. Core design elements for age-friendly English videos

The questionnaire data show clear learning needs and behavioral characteristics of elderly users. The most popular outbound travel destination is Southeast Asia, accounting for 75.12%, followed by Northeast Asia, Europe, Australia, and New Zealand, all exceeding 60%. The demand for scenario-based learning content is strong. Key sentences and high-frequency words in restaurant dining and emergency help scenarios reach the highest level, both exceeding 80%. Slow-to-normal speed reading, sentence-by-sentence pause repetition, and Chinese prompts are highly demanded in all scenarios. In terms of learning behaviors, the like function

is most frequently used, with 46.34% of users using it always. The functions of collection, pause and replay, and progress bar positioning also show high usage frequency. The pause and replay function receives the highest recognition of helpfulness, with 45.37% rating it very helpful. For video duration, 45.37% prefer 1–2 minutes, and 28.78% prefer 2–3 minutes. A total of 70.73% of users favor the ready-to-use explanation style with short sentences, Chinese prompts, and repeated practice.

Based on the above findings, three core dimensions of age-friendly design are extracted. The age-friendly experience layer focuses on simplified operation and sensory adaptation to reduce barriers. The learning support layer centers on practical content and appropriate rhythm to lower cognitive load. The motivational interaction layer emphasizes emotional encouragement and interactive guidance to enhance learning initiative.

5.4. Effectiveness verification of age-friendly design strategies

A total of 23 age-friendly empirical videos were produced and released with unified standards. Subtitles are no less than 28pt, the speaking rate is controlled at 120–150 words per minute, the duration is limited within 1–3 minutes, and the interface is simplified to reduce interference. The videos were viewed by 783 users, including 264 males and 519 females.

As shown in **Table 2** and **Figure 1**, correlation analysis indicates that emergency and medical help content has the strongest correlation with comprehensive video effect, with a coefficient of 0.851, which is highly significant. Transportation and address-related scenarios also obtain high recognition, with a correlation coefficient of 0.746. The results prove that content practicality and scenario clarity are the most valued elements by elderly users. Cross-tabulation analysis presents significant gender differences in likes, scenarios, and comments. Female users present a higher like rate, while male users are more active in leaving comments and putting forward learning suggestions. No significant differences are found in collection behavior and overall satisfaction scores, which proves the universal acceptance of the age-friendly design.

The empirical results confirm that the proposed age-friendly strategies effectively improve video completion rate, interaction rate, and user acceptance. Practical scenario content, appropriate speaking speed, clear subtitles, and easy operation are the core factors that enhance the learning experience. The design system effectively solves the major defects of existing videos and can better meet the English learning needs of elderly learners on the Douyin platform.

Table 2. Correlation analysis of user data from 23 videos

High-frequency words categories	User	Scenario	Video	Like	Collection
passport/boarding pass/luggage, etc.	-0.063	0.162**	-0.381**	-0.031	-0.043
visa/itinerary/declaration, etc.	-0.063	0.162**	-0.381**	-0.031	-0.043
address/platform/ticket price/route, etc.	-0.096**	0.746**	-0.400**	-0.067	-0.075*
reservation/room type/deposit, etc.	-0.052	-0.285**	-0.359**	-0.016	-0.075*
taste/allergies/checkout, etc.	-0.052	0.527**	-0.418**	0.002	-0.088*
symptoms/address/credentials/help, etc.	0.143**	-0.713**	0.851**	0.060	0.155**
* $P < 0.05$, ** $P < 0.01$					

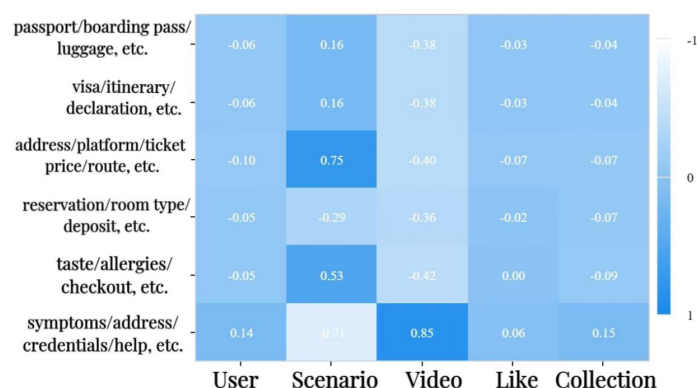


Figure 1. Heat map of correlation analysis for user data from 23 videos

6. Conclusion

This study focuses on the design of age-friendly English instructional videos on the Douyin platform under the background of active aging. It aims to solve the digital divide and learning barriers faced by elderly English learners, explore age-friendly design defects of existing short videos, extract core design elements, and construct a complete and operable design framework. Through questionnaire surveys, content analysis, and empirical verification, this study systematically tests the effectiveness of age-friendly design strategies and provides practical guidance for short-video platforms and content creators. The main findings, innovations, limitations, and future prospects are concluded as follows.

6.1. Main findings

Results indicate that current English instructional videos on Douyin present prominent age-friendly defects, as most content fails to match elderly learners' high-frequency outbound travel scenarios and lacks practical guidance, while unreasonable visual design, speech speed, and operation barriers, together with insufficient emotional motivation, cause a structural mismatch with the physical and cognitive conditions as well as actual learning needs of elderly users. This study summarizes four core design elements for age-friendly English videos, namely scenario-based practical content, adaptive presentation, simplified fault-tolerant operation, and enhanced motivational interaction, which together constitute the three-dimensional system of age-friendly experience, learning support, and motivational interaction. Empirical verification further confirms that the proposed age-friendly strategies effectively improve video completion rate, interaction rate, and user acceptance, and the design system shows satisfactory stability and generalizability.

6.2. Research innovations and contributions

Theoretically, this study constructs a three-dimensional framework integrating age-friendly design, adult learning, educational technology, and multimedia learning cognition theory, extends the age-friendly concept to short-video English teaching, and provides a new theoretical perspective for educational technology and pedagogy. Practically, it offers practical design indicators for platforms and creators, reduces learning barriers for the elderly, helps them master practical travel English, and supports the active aging strategy and lifelong learning society.

6.3. Research limitations

Several limitations exist in this study. The sample is geographically concentrated and lacks representation from grassroots and rural elderly groups with varying digital literacy, which may reduce the universality of the conclusions. Since empirical verification is conducted only on Douyin without cross-platform comparison, the impacts of platform mechanisms and user differences cannot be fully examined. The study focuses on video content, form, and interaction but insufficiently explores elderly users' emotional experience and social needs, and external factors such as intergenerational communication and community support are not systematically analyzed. Moreover, the empirical cycle is relatively short without long-term learning effect tracking, and the evaluation mainly relies on platform data and immediate feedback, lacking quantitative measurement of knowledge mastery and practical application ability.

6.4. Future prospects

Future research may expand the sample coverage and research scenarios, carry out cross-platform comparisons, and extend research to daily life scenarios to enhance the universality of conclusions. Further studies can adopt more quantitative methods and technical experiments to explore intelligent and personalized design supported by AI and VR. A collaborative age-friendly education ecosystem should be constructed to promote elderly education, digital inclusion, and the sustainable implementation of the active aging strategy.

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Disclosure statement

The authors declare no conflict of interest.

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