

A STUDY ON THE KEY FACTORS FOR CONTINUED USE OF THE LANGUAGE TRAINING APPLICATION “VIOBOK” BY HEARING-IMPAIRED PEOPLE IN THE DIGITAL ERA

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Abstract

In today's highly competitive business environment, customer experience is considered one of the key factors for the success of corporate products. Many companies have begun introducing the NPS (User Net Promoter Score) tracking system to create an enterprise operation system with user experience as the core. For competitive language training app platforms, enhancing user stickiness and increasing the willingness for continuous use is key to future development. This study starts from the perspective of user experience to investigate the key factors influencing the willingness of individuals with hearing impairments in Shanghai, China, to continue using the language training application "Viobook". By integrating the Technology Acceptance Model (TAM), Means-End Theory, Social Learning Theory, and theories related to user experience, a model of the factors influencing the continued usage intention of users on language training app platforms has been constructed.

Keywords: Language Training Application; Continuous Usage Intention; User Experience; Technology Acceptance Model.

1. INTRODUCTION

Dr. Tedros Adhanom Ghebreyesus, Director-General of the World Health Organization, mentioned on " World Hearing Day " that Hearing loss has often been referred to as an “invisible disability”, not just because of the lack of visible symptoms, but because it has long been stigmatized in communities and ignored by policy-makers (World Health Organization, 2024b). Unaddressed hearing loss ranks third among the causes of global disability-adjusted life years, affecting individuals of all ages, families, and economic levels. Due to the increasing prevalence of hearing impairment and its negative impact on quality of life, hearing loss has become a significant global health issue. According to research by the World Health Organization (WHO), Nearly 80% of people with disabling hearing loss live in low- and middle-income countries (World Health Organization, 2024a), where they face barriers to acquiring language and communication skills. Traditional educational methods often fail to fully meet their special needs, particularly in language rehabilitation learning. Cochlear implants and hearing aids can only address basic hearing problems, and subsequent language rehabilitation therapies are lengthy and costly.

With the rapid development of technology such as the Internet and artificial intelligence, new forms of digital and mobile education based on the Internet continue to emerge. Mobile learning provides a new way of language rehabilitation training for the hearing-impaired community, offering them a broader space for survival in this technological revolution. As the use of mobile applications by the hearing impaired grows widespread, mobile apps have become accessible "tools" for them. Consequently, apps related to audiology, fitting, and rehabilitation services have seen significant development. Thus, products combining technology with the hearing industry have begun to flourish, giving rise to hearing and language service apps aimed at providing more convenient services to the hearing-impaired community. These apps assist them in practicing listening and pronunciation, enabling them to improve themselves and integrate better into mainstream society.

As an emerging industry in recent years, the market for hearing and language service apps is diverse, with rapid product updates and iterations, leading to intense market competition. Faced with this fierce competition, how to make products stand out and enhance consumer loyalty is a question that enterprises have been pondering.

B. Joseph Pine II and James H. Gilmore proposed in their 1998 best-selling management book, that as services increasingly become commoditized, experiences have emerged as the next step in what we call the progression of economic value. From now on, leading-edge companies—whether they sell to consumers or businesses—will find that the next competitive battleground lies in staging experiences (Joseph & Gilmore, 1998). In the past, people mostly focused on the luxurious appearance, powerful features, and affordable prices of products, with cost reduction being the primary objective. However, with the advent of the "experience economy," merely offering products or services is no longer sufficient to satisfy consumers. Consumers now pay attention to the interaction process with company products and the feelings and value gained during the process, seeking a complete "experience." B. Joseph Pine explored the digital future of the experience economy, stating in his research objectives that respecting customers' time and innovating ways to add value to their consumption are now key indicators for assessing whether a company's provided experience meets its goals (B. Joseph Pine II, 2023). This indicates that "experience" has become an additional value of products and is gradually becoming mainstream in the economic system.

In the current field of research, studies on the user experience of deaf users with specific software applications are relatively limited, especially those designed for specific needs like language training apps. These applications aim to help deaf individuals improve their language skills but often overlook the user experience and factors influencing their continued use of these tools. Therefore, this study selected the Viobook product as a case study, aiming to explore and analyze the key factors affecting the continued use of language training apps by deaf users.

The study results suggest that optimizing these factors can not only enhance the user experience but also significantly improve deaf users' language abilities and social interaction. This helps to improve the design and functionality of such language rehabilitation training applications, better meeting the needs of deaf users, and enhancing product experience, user stickiness, and

loyalty. Therefore, to design more effective language training tools, developers need a deeper understanding of these specific needs and translate them into concrete product features. Ultimately, the outcomes of this study are expected to advance assistive technology for the deaf, improve the quality of life for this group, and fill the current gaps in research on the user experience of the deaf community and their continuous use behavior with apps, guiding more inclusive and user-friendly technological solutions.

2. BACKGROUND OF INDUSTRY

2.1 The Language Training Needs of the Hearing-Impaired Community

Hearing impairment refers to abnormal sound transmission and sensorineural functions in the auditory system, resulting in hearing loss or varying degrees of deterioration. The person cannot hear or cannot hear the sounds in the surrounding environment clearly, and can only rely on other senses such as vision, touch, and smell. To receive external information, affecting daily communication and life activities to varying degrees (Huang Ting; Peng Jiayi, 2023). According to the World Hearing Report released by the World Health Organization in 2021, about 20% of the world's population, or 1.5 billion people, has hearing loss (World Health Organization, 2021). In 2024, WHO estimated that by 2050, nearly 2.5 billion people will suffer from some degree of hearing loss, of which at least 700 million will require rehabilitation services (World Health Organization, 2024a). Failure to act will take a huge toll on the health and well-being of those affected, as well as economic losses as they are excluded from communication, education, and employment. Globally, over 80% of ear and hearing care needs remain unmet. Unaddressed hearing loss poses an annual cost of nearly US\$1 trillion globally. Deeply ingrained societal misperceptions and stigmatizing mindsets are key factors that limit efforts for preventing and addressing hearing loss. Changing mindsets related to ear and hearing care is crucial to improving access and mitigating the cost of unaddressed hearing loss (World Health Organization, 2024b).

In China, the growth of the population with hearing impairment is a serious social and economic issue. According to the results of the second national sampling survey of persons with disabilities, there are as many as 27.8 million hearing-impaired people in our country, ranking first among the five disabled people.

Among them, people with simple hearing disabilities accounted for 24.2% of the total number of disabled people, accounting for 20.04 million; among those with multiple disabilities, those with hearing disabilities accounted for 57.4% or 7.76 million people with multiple disabilities had hearing disabilities. Among the 27.8 million people, 15.57% are hearing disabled people at level 1 and 11.01% are hearing disabled at level 2, making the combined total 26.58%. There are approximately 7.39 million people with complete hearing loss in our country, making it the country with the largest number of hearing-impaired people in the world (Xingying Zhang, 2023). With such a large population experiencing hearing loss, the market lacks service software that relies on information technology to improve the living standards of people with hearing impairments, as well as professionals who can provide high-quality hearing services. Dr. Tedros Adhanom Ghebreyesus stated that hearing is incredibly valuable. Untreated hearing

loss can severely affect people's communication, learning, and earning abilities. It also impacts individuals' mental health and their ability to maintain relationships.

In the current process of speech rehabilitation training, cochlear implants, and hearing aids are the primary means of assisting the hearing-impaired community in restoring speech function. They help the hearing-impaired community restore auditory sensation, thereby addressing issues with pronunciation (YANG Ye, 2023). In terms of hardware equipment, the coverage rate of hearing aids in China remains very low. The first World Report on Hearing published by the World Health Organization in 2021 pointed out that the proportion of people globally with hearing impairment who wear hearing aids is less than 17%. Because hearing aids are not covered by medical insurance in China, adults with hearing impairment cannot receive government subsidies during medical treatment, and less than 28.1% of hearing-impaired children in China have received hearing aid services. Less than 5% of adult hearing-impaired individuals wear hearing aids (World Health Organization, 2021).

Speech rehabilitation is a necessary step to achieve improved language expression ability for individuals with hearing impairment (Tang et al., 2018). For those wearing hearing aids or cochlear implants, extensive speech rehabilitation training is still required to regain auditory and speaking abilities. In China, the development of speech rehabilitation professionals is relatively short, leading to limited intervention time for individuals with hearing impairment, high costs associated with rehabilitation, a shortage of rehabilitation trainers, and a lack of knowledge about speech rehabilitation among the families of hearing-impaired individuals, resulting in difficulties in achieving normalized speech rehabilitation. Whether individuals are prelingually deaf or postlingually deaf, and regardless of whether they wear hearing aids, speech rehabilitation training is an important means to help them gradually restore speech function. However, in China, the proportion of hearing-impaired individuals wearing hearing aids is small, particularly among adults. Additionally, the predominant use of one-on-one training in current speech rehabilitation methods results in high costs and severe shortages of speech rehabilitation resources, making it difficult for many hearing-impaired individuals to undergo effective training during the speech rehabilitation stage. Because of the various problems caused by the functional loss of hearing senses, assistive products for hearing-impaired patients need to be designed around the actual needs of the patients themselves (Xu & Li, 2023).

2.2 The Rapid Development of Mobile Learning Technology and New Opportunities for Hearing Impairment Rehabilitation

With the advent of the Information 4.0 era and the rise of the "Internet Plus" concept, along with the development of artificial intelligence technology, modern information technology based on network communication and computer technology has not only promoted the socio-economic development but also changed and expanded the temporal and spatial boundaries of social education. It has enhanced people's interest, efficiency, and initiative in learning. Utilizing Internet technology, as well as various terminal devices such as computers, mobile phones, and tablets, anyone can search, process, and learn knowledge according to their needs at any time and place, without being limited by age, gender, region, or race. Whether you are

in rural or urban areas, regardless of your location in the world, you can benefit from information technology and enjoy the right to learn through the internet.

Meanwhile, the mobile learning approach, which offers advantages such as visualized information content and customized learning, is particularly suitable for the language rehabilitation training needs of the hearing-impaired population in this context of development.

Mobile learning is a new form of digital learning that has emerged from the combination of mobile technology and digitized learning, enabling learning anytime and anywhere using mobile devices. The widespread application of information technology has promoted the development of mobile learning, and its definition is also constantly changing, from technology-centered to learner-centered (Wu Mengya, 2023). Currently, countries around the world have varying degrees of research and application in mobile learning. With the development of information technology and the widespread use of online education applications, more and more researchers are paying attention to the emerging field of mobile education. Mobile learning has largely emerged with the development of the mobile internet wave, mainly due to the creation of cross-temporal and spatial ways of life, work, and learning by the mobile internet, and the popularity of mobile terminals has fundamentally changed the way knowledge is acquired (Tian Degang; Zhang Li; Qiu Yujie, 2023). In recent years, China's digital learning market has experienced significant growth, especially driven by the popularity of mobile internet and smartphones, government emphasis on educational technology, and attention to inclusive education, providing development space for digital learning tools in the field of special education.

The development of the Internet has promoted the improvement of service APPs and also prompted people to pay attention to the hearing-impaired people who have been forgotten by the rapidly developing society (Qi Hongmin, 2023). The development of mobile learning technology has facilitated the rapid growth of medical service platforms and formats. Mobile apps have become readily accessible tools for individuals, with significant advancements in services such as auditory testing, learning, and rehabilitation. As a result, products combining technology with the hearing industry have started to emerge, giving rise to language rehabilitation service apps (He Kezhen; Zhang Xuefei; Li Zhimin, 2020). The emergence of educational technology applications like language training apps provides a flexible and interactive learning approach for individuals with hearing impairments. These applications offer a richer and more diverse learning experience than traditional teaching methods through visual, textual, and tactile feedback. For instance, they can utilize multimedia elements such as animations, videos, and images to assist in language learning, which is particularly crucial for hearing-impaired individuals who rely on visual information. Mobile language training APP is a specific application of telemedicine mobile terminal services. It has transformed from a desktop computer into a special software (APP) for smartphones. It is mainly used in subdivided fields such as hearing testing, rehabilitation, and education. Research shows that 60 % of respondents with hearing loss report using the Internet (Saunders & Chisolm, 2015). Furthermore, the integration of artificial intelligence and machine learning technologies enables these apps to provide personalized learning experiences tailored to the specific needs

and learning pace of each hearing-impaired individual. This not only enhances the effectiveness of learning but also greatly increases its attractiveness and motivation.

Hearing-impaired individuals can see their progress through instant feedback and reward mechanisms, thereby gaining confidence to continue their learning journey.

Language rehabilitation training apps have become innovative tools to address the language rehabilitation needs of the hearing-impaired population due to their flexibility and convenience. The speech rehabilitation market has great commercial potential. Promoting the development of the speech rehabilitation industry and meeting the rehabilitation needs of speech-impaired people will not only help protect the basic rights and interests of speech-impaired people but also provide a broad space for economic development and employment opportunities (Guanzhong, 2023). An increasing number of companies are entering this field, launching various app products, and striving to provide a better language rehabilitation experience for the hearing-impaired community. Intense competition characterizes the current market for language rehabilitation training apps, with companies engaging in fierce competition in technology, content, user experience, and other aspects, aiming to offer more innovative and effective language rehabilitation learning solutions. With the continuous promotion of mobile learning, discussions and research surrounding mobile learning are also increasing. For developers of these products, the real concern is whether the products can be accepted by consumers and continuously used, thereby increasing user stickiness and achieving sustainable development for the company.

3. STATEMENT OF PROBLEM

In the field of language rehabilitation education technology for the hearing-impaired community, the most significant challenge is the lack of research on how user experience affects the continued usage behavior of language training applications. Particularly within the context of the hearing-impaired community in Shanghai, China, how language rehabilitation training products can retain their existing large user base, attract new users while keeping old customers, and enhance users' willingness to continue using are key to the industry's development. This gap in understanding is crucial for applications like "VioBook," which aim to meet the unique learning needs of the hearing-impaired population. Although such technologies have emerged, their adoption and continued use remain limited due to a lack of in-depth understanding of the factors driving user satisfaction and long-term engagement.

From the research background, it is evident that the continuous and steady development of the Internet has laid a solid foundation for the rise of language training platforms, and at this stage, language training apps have become a popular platform in the Internet's niche markets. In terms of research on the continued usage behavior of language training apps, a review of the literature database reveals that there is almost no research on the usage behavior of products by individuals with hearing impairments. Searches on platforms such as CNKI and Google Scholar with keywords like "continued usage behavior research," "language training app," and "language training for people with hearing impairments" yield few academic studies on users of language training application platforms, especially concerning users' continued usage

intentions. As of January 2024, there is a considerable amount of research on product continued usage in general, but none on the usage behavior of hearing-impaired users of language training products specifically, indicating that research on user behavior for such products is still non-existent both domestically and internationally.

Building on the above, this study takes the language training app "Viobook," used by the hearing-impaired community, as the subject of research. Adopting user experience as the research perspective and integrating the Technology Acceptance Model (TAM), Social Learning Theory, Means-End Theory, and theories related to user experience, it investigates the factors influencing the continued usage intention of users on language training app platforms. This aims to make beneficial additions to existing theories and fill the current research gap on the user experience of the hearing-impaired community. It provides reference suggestions for product developers and operators to optimize platform construction and operation, enhance the level of user experience, and strengthen users' willingness to continue using, thereby promoting the sustained and healthy development of the language training app platform and enhancing user loyalty and continued usage intention towards language rehabilitation training products.

4. RESEARCH CONTENTS

4.1 Research on the Relationship between the Technology Acceptance Model and User Experience

User experience is the subjective experience of customers before, during, and after using a product or system, encompassing all aspects including physiological and psychological responses of customers, customer behavior during use, and interaction with the environment during use, and satisfaction after use. The definition provided by the Usability Professionals' Association (UPA) expands the traditional human-computer interaction and usability, not only including task-related requirements but also customers' emotional and value requirements (*Usability Body of Knowledge*, n.d.). According to Alben (Alben, n.d.), user experience should encompass all aspects of the interaction between customers and products or services, including emotions, understanding of the product, and achievement of set goals, while Makela & Suri believe that user experience is considered to be the customer's experience of a product or service. James Garrett argues that the value of using a product is just one aspect of user experience; a more critical aspect is how the product connects with customers and produces actual effects, i.e., how customers access and use the product. Hekkert (2006) defines user experience as the result of interaction between customers and products, including sensory satisfaction (aesthetic experience), a sense of trust (value experience), and experiences and attitudes (emotional experience), while Roto (2006) defines user experience as the entire process of interaction and feedback between customers and products. Shedroff (2006) views user experience as various feelings and cognitions at both external and internal levels that are displayed after users interact with a product or service.

It is evident from the above that user experience focuses on the entire accumulated experience of customers while using a product or service, including cognitive abilities, emotional

inclinations, and mindset aspects. The object is the product or service, i.e., the quality of service (Moore et al., 2010), and the subject is the user in a certain environment.

Scholars have researched the definition and components of user experience from different perspectives, showing that user experience is complex, dynamic, and subjective, making it difficult to precisely define and categorize. Many studies tend to limit user experience to the quality and characteristics of the product or service itself, but they should also include the psychological experiences of product users and the interaction environment. Therefore, evaluating user experience is difficult to define and standardize to some extent and is becoming increasingly complex.

The Technology Acceptance Model suggests that the use of a system can be reasonably predicted based on the intention to use, which is determined by both attitude towards use and perceived usefulness. In turn, the attitude towards using is determined by perceived usefulness and perceived ease of use, while perceived usefulness is determined by external variables and perceived ease of use, with perceived ease of use being determined by external variables, including system design characteristics, user characteristics, etc.

Davis (1989) defined Perceived Usefulness (PU) as "the degree to which a person believes that using a particular system would enhance his or her job performance"; Perceived Ease of Use (PEU) refers to "the degree to which a person believes that using a particular system would be free of effort." Usage attitude refers to the subjective feelings produced by users after using information technology, including emotional, affective, and psychological aspects. Users decide whether to continue using the information technology based on these subjective feelings, so it can be considered that usage attitude is a part of user experience. The factors affecting usage attitude—perceived usefulness and perceived ease of use—can also be regarded as factors that affect user experience and thereby influence continued usage intention.

The Technology Acceptance Model (TAM) and user experience theory provide us with a framework for deeply understanding and evaluating user interaction with technological products. TAM emphasizes two core concepts—perceived ease of use and perceived usefulness—and their impact on technology acceptance. Perceived ease of use reflects the degree to which a user believes that using a particular technological product requires minimal effort, while perceived usefulness pertains to the extent to which a user believes that the technological product will enhance their work efficiency or quality of life. These factors not only play a decisive role in the acceptance and decision-making process of technology but are also directly linked to the quality of the user experience.

User experience theory further broadens our understanding of the consequences of technology use, expanding the focus from merely functional use to the overall interactive experience, including emotional responses, aesthetic evaluations, and the realization of user value. A good user experience demands that technological products are easy to use and functionally powerful, but also emotionally satisfying, making users feel pleased, valued, and content.

Perceived usefulness refers to the belief of users that using a specific technology will increase their job performance or bring other forms of benefits. In the context of continued usage

intention, if users' initial expectations of technology use are validated by their experience and they perceive noticeable benefits, their intention to continue using the technology will be strengthened. These benefits may be reflected in time savings, efficiency improvements, or the achievement of other personal goals. Therefore, reinforcing the perception of technology's usefulness, such as adding features, improving performance, or enhancing user experience, can enhance user experience and promote continued use. Perceived ease of use involves users' belief that using a certain technology will be effortless to learn. This construct directly affects users' usage experience and technology acceptance. Technologies with higher ease of use can reduce the time and effort users spend learning new systems, and lower frustration during use, thereby increasing user satisfaction and the likelihood of continued use.

4.2 Means-End Theory

Scholar Bagozzi (2007) believes that although the TAM model is very influential, it is overly simplistic and overlooks other important factors that could influence usage attitude or intention to use. Therefore, this study combines the Technology Acceptance Model with the Means-End Theory for research. The Means-End Theory is a theory of cognitive psychology that explains how individuals achieve their desired goals or ultimate values by selecting appropriate means. Within this theoretical framework, "means" are viewed as actions or things that can help individuals achieve their goals, while "ends" are the states, objectives, or outcomes that individuals pursue. The core of the theory is that individuals' decision-making processes revolve around how effectively to align means with desired ends.

The Means-End Theory is often applied to consumer behavior research, especially in understanding how consumers satisfy their deep-seated values and life goals through purchasing products or services. For example, a consumer buying a car (means) may do so to achieve convenience (end), and this convenience may be related to deeper values, such as freedom or time savings. Perceived value plays a key role in users' decision-making processes, influencing their choices and behaviors. For users with hearing impairments, applications that can meet their specific needs and values are more likely to be continuously used. By analyzing perceived value, research can reveal the psychological mechanisms behind decision-making, guiding for designing products that better meet user needs. From the perspective of value needs, the expansiveness of the Means-End Theory is significant. Studying user experience provides a framework for explaining how individuals integrate technology use with personal goals. This mode of explanation can be applied across different technological platforms and user groups, whether in the fields of education, health, entertainment, or work.

4.3 Social Learning Theory

The core idea of Social Learning Theory is that people observe and learn or imitate others' behaviors and will strengthen or weaken such behaviors according to self-established standards. Individuals learn not only through their trials and feedback but also by observing and imitating the behaviors of others. This process may be particularly important for people with hearing impairments, as their learning and communication methods may rely more on visual and social interactions. In this context, "innovation" is seen as a key driver for

encouraging hearing-impaired users to accept and use new technologies. Language training apps can provide innovative features, such as specially designed interactive teaching tools or personalized learning plans, to meet the specific needs of people with hearing impairments. Content innovation involves customizing teaching content, for example, using visual teaching materials that align with the learning habits of people with hearing impairments. Interaction innovation, on the other hand, is about promoting the participation and social interaction of hearing-impaired users through the app's interactive design, which may include communication methods that support sign language or visual signals.

SLT explains the process and influencing factors of learning behavior formation, aiming to illustrate the behaviors undertaken by subjects in response to different cognitions within an environment, emphasizing the influence of the environment while overlooking the motivation of the subject in specific situations. To refine this theory, Bandura proposed that subject behavior is not only influenced by the outcomes of actions but also by the subject's expectations of their ability to perform certain behaviors and the expected outcomes of these behaviors. Distinguishing between efficacy expectations and outcome expectations, Bandura introduced the concept of "self-efficacy" in 1977, defining it as the belief of subjects regarding their capability to control events that affect their lives. Efficacy expectation is the subject's subjective judgment of their capability to perform a certain behavior, while outcome expectation is the subject's speculation about the consequences of their actions. The higher the efficacy expectation of the subject, the greater their tendency to exert effort.

Innovative features not only directly impact the "Perceived Usefulness" and "Perceived Ease of Use" of an app but also enhance its "Perceived Value," which is a key factor in driving users to adopt and continue using technology according to the Means-End Theory. Innovation is also a core concept in Social Learning Theory, as it involves the role of observation and imitation in the adoption of new technology. Among the deaf and hard-of-hearing community, social learning is particularly crucial because they may be more inclined to imitate peers who have successfully adopted new technologies, especially when these technologies significantly improve their communication and learning abilities. Since individuals with hearing impairments may place more emphasis on how technology products adapt to their unique needs when choosing to use them, innovation in functionality, content, and interaction is extremely important from the user experience perspective. These innovations not only meet the practical needs of users with hearing impairments but also fulfill their psychological and emotional needs for social inclusivity and self-efficacy.

In the context of social learning, innovation (whether in product features, user interface design, or methods of interaction) can act as a medium for learning, helping users to learn and adapt to new technologies through observation and imitation. Innovation itself promotes the perception of ease of use and usefulness of technology, as users understand and adopt new technological features through social interaction. Therefore, in this study, considering "innovation" as a mediating variable helps to reveal and quantify how these innovative features enhance the acceptance and willingness to use language training apps like "vibook" by individuals with hearing impairments through improving user experience. Moreover, understanding this is

crucial for designers, as it can help them create more inclusive and effective technological solutions to better serve the deaf and hard-of-hearing community. The Technology Acceptance Model (TAM) emphasizes the impact of "perceived usefulness" and "perceived ease of use" on users' acceptance behavior. This is foundational in understanding user acceptance of new technologies, focusing on the degree to which users believe technology can enhance work efficiency and the convenience of its use. If users perceive a technology product or service as useful and easy to use, they are more likely to accept and use it. This provides a psychological and functional basis for researching technology acceptance. The inclusion of the Means-End Theory (MET), through the concept of "perceived value," extends TAM. It considers not only the direct utility of the product but also users' perceptions of the values and goals behind the product. For users with hearing impairments, this may include perceived social inclusiveness, autonomy, and the potential value in enhancing the quality of life.

5. RESEARCH METHODS

This study focuses on the community of people with hearing impairments in the Shanghai area of China, taking into consideration the cultural and technological background of this region. The study employs an empirical quantitative research method to obtain comprehensive data. Through this approach, the research can not only reveal statistically significant trends but also gain a deep understanding of individual experiences and preferences. The specific research methods used in this study include:

1) Literature Research

A literature review is an indispensable and crucial step in the research process, requiring researchers to read extensively within the selected topic area, summarize previous research findings, and have a comprehensive grasp of research progress. It focuses on identifying the limitations and shortcomings of existing studies, thereby providing theoretical support for the formulation of this study's research questions. Specifically, this study will utilize multiple domestic and international mainstream databases, such as CNKI (China National Knowledge Infrastructure), Elsevier, Google Scholar, and Web of Science, to analyze and organize relevant literature studies from both China and abroad. It aims to comprehensively understand the research progress in related fields such as continuous use theory of information systems, user experience research, the development status of the Viobook language training app platform, continuous usage behavior on language training app platforms, and the development and application of motivation theories. Tracking the latest research trends, excavating related theoretical literature, collecting relevant theoretical models, and exploring the current state and prospects of related topics, will lay the foundation for subsequent research.

2) Questionnaire Survey

The questionnaire survey method is the most commonly used research method in social surveys, allowing respondents to provide more detailed and complete related data through a relatively convenient questionnaire form. This study targets users with hearing impairments who use hearing and speech training apps. Through the questionnaire survey, the difficulties

and needs faced by people with hearing impairments when using hearing and speech training apps are understood, as well as consumers' recognition and acceptance of the products they use. Based on the literature review, combined with the characteristics of the hearing-impaired community and the features of hearing and speech training apps, and referring to the user experience theoretical model of previous research scholars, a model of factors affecting the continued use of language training apps by users is constructed, incorporating user experience. Research hypotheses were formulated based on the associations between the factors in the model, and a user experience survey questionnaire was developed concerning appropriate scales. The questionnaire survey was distributed online, with a small number of questionnaires initially distributed as a pre-test. After data collection, the questionnaire data's reliability, validity, correlation, and regression were verified. According to the pre-test results, the questionnaire survey was adjusted to be more reasonable, and finally, a questionnaire survey on the factors affecting the continued use of hearing and language training apps by users with hearing impairments was compiled, initiating research and data collection. This study designed an online questionnaire through the Questionnaire Star platform (<https://www.wjx.cn/>) and published the link on different social media platforms such as WeChat, Weibo, and Tieba at various times, encouraging completion of the questionnaire with red packets. To ensure the validity of the sample, corresponding screening questions were set at the beginning of the questionnaire to ultimately obtain quantitative research data.

3) Quantitative Analysis

After the questionnaire survey was collected, valid questionnaires were entered into a table and statistical analysis was conducted using SPSS. This includes descriptive statistical analysis, reliability and validity testing, correlation analysis, and regression analysis to examine the relationship between independent and dependent variables and to verify the rationality of the hypotheses. The purpose of this study is to test the rationality of the model hypotheses, analyze the key factors affecting the continued use of language training apps by users with hearing impairments, and how to adopt user-centered design methods in the product development process to create more attractive and competitive product experiences.

6. SIGNIFICANCE OF STUDY

This study holds significant practical and theoretical value for developers in the field of educational technology, scholars in special education, and policymakers in education. For app developers, this research provides crucial insights that guide key considerations when designing and optimizing digital learning tools for users with hearing impairments. This includes principles of accessible design, optimization of user interface and interaction experience, and customization of content. For experts and decision-makers in special education, this study offers in-depth analysis, helping them to more comprehensively understand the specific educational needs of the hearing-impaired community. This is particularly important for formulating inclusive education policies and planning the future allocation of educational resources. The findings will promote the effective allocation of special education resources, ensuring that the development of educational technology can

better meet the needs of learners with hearing impairments, thereby enhancing their learning outcomes and overall educational experience. Based on the above, this study mainly summarizes the following two aspects of research significance:

6.1 Theoretical Significance

The model used in this study breaks through the limitations of a single theoretical framework, creating a multidimensional composite model for understanding user experience. By integrating perceived usefulness and perceived ease of use from the Technology Acceptance Model, the perceived value from Means-End Theory, and the concept of innovation from Social Learning Theory, this model offers a new perspective on how different factors interact, adding depth and breadth to the study of user experience. The research explores the impact of perceived usefulness, perceived ease of use, and perceived value through the connecting role of innovation and the moderating role of technological features on user experience, providing a new perspective for understanding the complex relationship between technology acceptance and user experience. This not only enriches the theoretical foundation in the field of technology acceptance, especially in assistive technology and special education applications but also expands the role of mediating and moderating variables in explaining the technology acceptance model. Furthermore, by incorporating Social Learning Theory and defining innovation as a key mediating variable, the study highlights the connecting role of innovation in influencing user experience and technology acceptance processes. This challenges the traditional view that user acceptance behavior is mainly driven by direct influencing factors and provides new insights into how technological innovation can promote technology acceptance by improving user experience. By examining how specific technological features (such as accessibility, personalization, interactivity, etc.) modulate the relationship between perceived usefulness, perceived ease of use, perceived value, and user experience, this study reveals the importance of technological design details in facilitating or hindering the technology acceptance process. This shift in focus, from single performance and effort expectations to the specific implementation details of technology, provides a theoretical basis for designing more user-friendly and need-satisfying technology products.

The theoretical contribution of this study also lies in promoting interdisciplinary dialogue and collaboration, including psychology, design, engineering, marketing, and sociology. Such collaboration can bring a comprehensive perspective, helping to better meet the diverse needs of users. By integrating theories and methods from these fields, this study provides new pathways for exploring how to design and evaluate user-centered technology solutions. The mixed-methods research design adopted by the study, combining quantitative structural equation modeling and qualitative case studies, offers a new methodological paradigm for future research in technology acceptance and user experience fields. This approach can more comprehensively capture users' perceptions and experiences of technology, providing richer insights for both theory and practice. By revealing the role of innovation in promoting technology acceptance and optimizing user experience, this study opens new research topics, such as how specific dimensions of innovation influence users' technology acceptance behaviors and how different user groups (such as people with disabilities) respond to and accept

technological innovations. In summary, the theoretical contribution of this study is mainly reflected in the expansion and deepening of existing theories of technology acceptance and user experience, providing a new perspective and framework for understanding how technological innovation can promote technology acceptance through improving user experience. By thoroughly analyzing the connecting role of innovation and the moderating role of technological features, this study provides a theoretical basis for designing technology solutions that better meet user needs and expectations, while also opening new paths and possibilities for future research.

6.2 Practical Significance

From a practical point of view, language rehabilitation online education is an emerging industry. Because it is very different from traditional education, it has received great attention from capital and even the entire society. Enterprises have also focused on how to attract users and improve user stickiness. Improve user satisfaction, thereby achieving user monetization and realizing corporate value. Many online education products have very different characteristics, ranging from paid to fully open courses. Operators attract users from the perspective of user needs, usage scenarios, and operation methods to stand out among many platforms, improve the quality of online rehabilitation education platforms, and enhance competitiveness (Tian Degang; Zhang Li; Qiu Yujie, 2023).

In the field of education, especially for language training applications targeted at special needs groups such as users with hearing impairments, this study highlights the role of innovation in enhancing learning and user experience. This provides educators with strategies to use technological innovations to enhance the learning experience, for example, by facilitating communication and collaboration among learners through social learning platforms, thereby improving motivation and learning outcomes. By improving the understanding of users with special needs, this study helps to create more inclusive technological solutions that can meet the needs of a broader user base. This is particularly important for policymakers, who need to ensure that technological advancements benefit all users, including those who might be overlooked in traditional market designs. The findings of this study can assist educators and policymakers to more effectively utilize digital tools, especially language training apps, to support the learning of individuals with hearing impairments. This will contribute to improving the quality and outcomes of special education. Understanding the experiences of users with hearing impairments in using language training apps provides important information for educational policymakers, helping them to make more informed decisions in the planning and allocation of special education resources.

By optimizing the app to meet the needs of users with hearing impairments, user experience can be significantly enhanced, thereby increasing user loyalty and willingness to recommend, which is crucial for the long-term success of the app. Providing high-quality language training apps that cater to special needs can help the product stand out in a competitive market, attracting a broader user base, including users with hearing impairments and non-hearing-impaired users interested in high-quality educational applications.

In summary, the practical significance of this study is broad and profound. It provides practical guidance on how to improve user experience through technological innovation and offers a theoretical basis for designing more attractive and user-centric products and services, while also promoting social inclusivity and equality. Through this comprehensive and integrated research perspective, we can enhance the quality of life for special user groups and drive the entire society toward a more human-centric and intelligent direction. With the development of the Internet industry and the artificial intelligence industry, hearing service APPs have also been continuously improved. While providing complete services for the hearing-impaired, they can also help the hearing-impaired group integrate into society. The future development prospects of the industry are considerable, and it also has profound humanistic and social significance (Qi Hongmin, 2023).

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