Exploring Inclusive Media: Frameworks for Barrier-Free Audio-Visual Communication in China

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Abstract: *Accessible audio-visual communication media can be categorized into two main types: dedicated accessible online audio-visual apps and modified accessible apps. Despite the presence of policies promoting the barrier-free transformation of apps, only a limited number of media platforms effectively meet the needs of people with disabilities. Furthermore, research on the effectiveness of accessible audio-visual communication is scarce, highlighting the need for a comprehensive evaluation system to assess its impact on disabled users. This paper proposes a practical pathway for enhancing accessible audio-visual communication, centered on four subsystems: users, services, products, and platforms.*

1. Introduction

In a broad sense, barrier-free audio-visual communication is to eliminate all obstacles caused by the lack of visual and auditory sensory functions in the process of audio-visual information dissemination for people with visual and hearing impairments, and ultimately achieve the process of non-discriminatory dissemination of audio-visual information. However, in the real environment, affected by differences in regions, populations, policies, technology, economy, culture, etc., it is irrational to achieve such a broad goal of non-discriminatory dissemination. Barrier-free audio-visual dissemination in a narrow sense can be interpreted from the process of linear dissemination, which refers to the barrier-free audio-visual content produced by barrier-free audio-visual communicators, which is effectively accepted by visually and hearing-impaired people after being disseminated through barrier-free audio-visual media, and achieves good barrier-free audio-visual dissemination effects.

2. Analysis of the Current Status of Barrier-free Audio-visual Dissemination in All Media

2.1 Barrier-free Audio-visual Communicators

Barrier-free audio-visual communicators are responsible for the task of collecting, sorting, processing and finally delivering barrier-free audio-visual. In the field of online audio-visual and radio and television, the crew responsible for producing barrier-free audio-visual programs, or the technical team and organization responsible for barrier-free audio-visual transformation, undertake the mission of disseminators.

2.2 Barrier-free Audio-visual Content Supply

Barrier-free audio-visual content mainly includes three categories: subtitle display, sign language interpretation and oral description.

Subtitle display can help hearing-impaired people and visually impaired people receive audio-visual information content at the same time. Due to the difference in sensory functions of hearing-impaired people, subtitle display can be divided into live subtitle display and recorded subtitle display according to the production and broadcasting type of audio-visual programs, and can be divided into large and small subtitles and regular subtitles, regular color subtitles and visual color difference subtitles, audio and video matching subtitles and effect description subtitles according to the subtitle reception effect.

Sign language interpretation mainly provides services for hearing-impaired people to receive audio-visual information content. Usually, during the broadcast of audio-visual programs, sign language hosts will simultaneously interpret program information in sign language. According to the production and broadcasting type of the program, it can be divided into two types: live broadcast sign language simultaneous interpretation and program replay with sign language interpretation. According to the appearance of the sign language host, it can be divided into subordinate type, cooperative type and dominant type. The subordinate type means that the sign language host, as the sign language interpreter of the program host, is in a subordinate position on the program screen, generally in an independent picture frame of about one-ninth of the left/right bottom of the program frame, accompanying the host to provide barrier-free hand flip services. This type is a relatively common model in the field of audio-visual news programs. The news program "Common Concern" on CCTV News Channel is a typical representative. The cooperative type is that the sign language host and the program host sit together in front of the anchor desk, and the two complete the program broadcasting tasks from the perspective of their respective audiences. The dominant type is that the sign language host appears alone, in the anchor position of the live broadcast screen, and transmits information through sign language. In general, it is believed that the cooperative type and the dominant type are ideal ways to provide barrier-free audio-visual communication sign language translation content.

Oral description is to use spoken language to supplement the information in the image that is not easy for the visually impaired to understand. This method does not include the existing human voice (dialogue, monologue, narration), sound (natural sound, social sound), and music (soundtrack, interlude, theme song) in the image. It is mainly to make up for the lack of information elements such as the actions, expressions, and demeanor of the characters in the image, the composition, color, light and shadow, metaphor of the picture, the rhythm, montage, and motivation of the narrative, so as to add narration separately to supplement the information so that the visually impaired can accurately understand the content of the image.

From the perspective of "imagery," as the omnimedia communication project enters its "deep water zone," "online audiovisual content" has become a major symbol for individuals with disabilities to access information and exchange culture (*Zhao & Li, 2021*). According to the 51st Statistical Report on the Internet Development in China by the China Internet Network Information Center, as of December 2022, 99.8% of Chinese netizens access the internet via mobile phones, and the number of online video (including short video) users has reached 1.031 billion, accounting for 96.5% of the total netizen population (*CNNIC, 2023*). It is foreseeable that the demand for audio description at the level of online audio-visual content will continue to rise among the visually and hearing impaired, as they strive to obtain seamless audio-visual experiences that are easy to listen to, see, and enjoy.

Unfortunately, audio description is currently more prevalent in the realm of movies and has gradually garnered attention from both academia and industry in recent years. It is mostly studied academically under the professional term "accessible movies" (*Pan & Li, 2013*). The relevant businesses are also primarily supported by offline cinema chains through public welfare initiatives. In the strict sense, the supply of accessible online audio-visual content, such as accessible online movies, accessible online news, accessible sports events, accessible live streaming sales, accessible game streaming, accessible short videos, accessible online variety shows, and accessible online dramas, is still far from meeting the needs of people with auditory and visual impairments.

2.3 Accessible Audio-visual Communication Media

Accessible audio-visual communication media are the interface and carrier of accessible audio-visual content, and the main participants are people with hearing and visual impairments. Accessible audio-visual communication media need to have a large number of accessible audio-visual programs to achieve basic operations such as reading, watching and sharing of accessible film and television audio-visual products. At present, they are mainly divided into two categories: "Accessible Network Audio-visual APP" and "Renovated Accessible Network Audio-visual APP".

Accessible Network Audio-visual APP: refers to an online audio-visual entertainment platform created for the film and television cultural needs of people with disabilities across the country, allowing people with disabilities to listen to and watch their own audio-visual programs on this exclusive online platform without leaving home. At present, China does not have a fully accessible online audio-visual APP.

Accessibility-enhanced Online Audio-Visual APP after Modification: In 2020, China's Ministry of Industry and Information Technology issued the "Special Action Plan for the Elderly-Friendly and Accessibility Modification of Internet Applications," focusing specifically on the accessibility modification project for mobile internet applications (APPs) (*China Government Network, 2023*). Seven online audio-visual apps, including Douyin, Huoshan Video, iQIYI, and Youku, are involved in the field of accessible audio-visual content. Against this backdrop, online audio-visual apps are turning towards the development of accessible audio-visual technologies or the provision of accessible audio-visual services, in order to reduce the operational burden that existing online audio-visual media impose on individuals with disabilities. These online audio-visual apps are referred to as "upgraded accessible online audio-visual apps."

2.4 Accessible Audio-visual Recipient Groups

Table 1: Classification of Visual Impairment

Type of Visual Impairment	Grade	Vision and Visual Field
Blindness	Grade 1	No light perception to less than 0.02; or visual field radius less than 5°
Blindness	Grade 2	0.02 to less than 0.05; or visual field radius less than 10°
Low Vision	Grade 3	0.05 to less than 0.1
Low Vision	Grade 4	0.1 to less than 0.3

Accessible audio-visual recipient groups are mainly people with visual disabilities and hearing disabilities. Due to the significant social effects of the country's vigorous promotion of barrier-free access in recent years, the professional expression of the word "disability" has been decreasing. In news communication practice, the word "disability" is often replaced by the word "obstacle", which is also a reflection of the equality of barrier-free society. In this study, the word "obstacle" will also be used to refer to the semantics of "disability". The "visually impaired" and "hearing-impaired" in this study are the people defined for the visually impaired and hearing-impaired groups in the national standard "Disability Classification and Grading of People with Disabilities".

Table 2: Classification of Hearing Disabilities

Grade	Range of Levels
Grade 1 Hearing Disability	Extremely severe damage to the structure and function of the auditory system, with an average hearing loss of ≥ 91 dBHL in the better ear. Without hearing assistance devices, individuals cannot rely on hearing for verbal communication and are extremely limited in activities such as understanding and communicating, facing extremely severe obstacles in participating in social life.
Grade 2 Hearing Disability	Severe damage to the structure and function of the auditory system, with an average hearing loss of 81-90 dBHL in the better ear. Without hearing assistance devices, individuals are severely limited in activities such as understanding and communicating and face significant obstacles in participating in social life.
Grade 3 Hearing Disability	Moderate to severe impairment of the structure and function of the auditory system, with an average hearing loss of 61-80 dBHL in the better ear. Without hearing aids, there is moderate limitation in activities such as understanding and communication, and moderate obstacles in participating in social life.
Grade 4 Hearing Disability	Moderate impairment of the structure and function of the auditory system, with an average hearing loss of 41-60 dBHL in the better ear. Without hearing aids, there is mild limitation in activities such as understanding and communication, and mild obstacles in participating in social life.

Currently, the authoritative criteria for defining individuals with visual impairments and hearing impairments are primarily based on the "Practical Criteria for Assessing Disabilities in China," which is an annex to the Notice on the Unified Issuance of Certificates of Disabled Persons of the People's Republic of China (No. 61) issued by the China Disabled Persons' Federation in 1995 (*CDPF, 2023*). Based on the internationally recognized classification

and grading methods, the national standard "Classification and Grading of Disabilities for Disabled Persons" has been formulated (*China Government Network, 2023*). It was implemented from May 1, 2011.

The national standard "Classification and Grading of Disabilities for People with Disabilities" stipulates that visual impairment refers to low vision in both eyes due to various reasons and cannot be corrected or the visual field is reduced, which affects their daily life and social participation. According to the visual acuity and visual field status, blindness is the first and second levels of visual impairment, and low vision is the third and fourth levels of visual impairment. The classification and grading are as follows:

The national standard "Classification and Grading of Disabilities for People with Disabilities" stipulates that hearing disability refers to a person who has permanent hearing impairment of varying degrees in both ears due to various reasons, and cannot hear or cannot hear the surrounding sounds and speech clearly, thus affecting daily life and social participation. The classification is based on average hearing loss, and the structure, function, activities and participation, environment and support of the auditory system as follows:

2.5 Barrier-free Audio-visual Communication Effect

Currently, there is little research in academia on the effectiveness of accessible audio-visual communication. Most current studies on accessible audio-visual communication focus on the improvement and application of cutting-edge technologies such as artificial intelligence. According to the 51st "Statistical Report on Internet Development in China" published by the China Internet Network Information Center, as of December 2022, relevant departments have organized 648 websites and apps to complete aging-friendly and accessibility modifications for internet applications (*SCIO, 2023*). However, after technology becomes accessible, what is the actual situation for users with disabilities when they use the modified accessible audio-visual APPs? What factors influence the satisfaction and willingness to continue using these apps among users with disabilities? Empirical research on topics with strong timeliness and practical significance, such as these, can be included in the scope of evaluating the effectiveness of accessible audio-visual communication.

Based on the above background, this study believes that, on the one hand, it is necessary to start from the top-level design and explore what can be considered a qualified barrier-free audio-visual project around the fundamental issues of all-media communication, namely "full presence", "full experience", "full participation" and "full acquisition". This requires breaking through the constraints of the traditional online audio-visual communication effect evaluation system and building a new set of all-media barrier-free audio-visual communication effect evaluation index system. Through this index system, barrier-free audio-visual communication can evaluate and judge its own comprehensive strength, clarify the actual effect of barrier-free audio-visual communication activities on users with hearing and visual impairments, and then adjust the communication strategy and methods.

On the other hand, it is necessary to collect first-hand data through questionnaire surveys to explore the factors and mechanisms of the current barrier-free transformation of national online audio-visual APPs on the continued use willingness of users with hearing impairments, and propose an integrated model to explain and predict the continued use willingness of people with hearing and visual impairments for the special service of barrier-free transformation of Chinese online audio-visual APPs. This may require the inclusion of existing classic theoretical models, and at the same time comprehensively considering the system characteristics of the barrier-free online audio-visual APPs after the transformation, in order to revise and supplement the existing models in the academic community and make the research results more reliable.

2.6 Omnimedia Barrier-free Audio-visual Communication System

The omnimedia barrier-free audio-visual communication system is by no means a single content construction or linear communication system. It should resonate with China's current omnimedia communication system. It aims to meet the needs of people with disabilities for a better audio-visual life with a rich barrier-free audio-visual supply, and to fulfill the "improvement of the care and service system for the disabled" proposed at the 20th National Congress of the Communist Party of China. In line with the development trend of balance and accessibility of "strengthening the construction of an omnimedia communication system" proposed at the 20th National Congress of the Communist Party of China, it realizes the "full presence", "full experience", "full participation" and "full access" of barrier-free audio-visual.

3.   Exploration of All-media Barrier-free Audio-visual Communication Paths

3.1 Construction of All-media Barrier-free Audio-visual Communication System

Drawing on General Secretary Xi Jinping's important remarks on the construction of an all-media communication system, as well as the current research results on the all-media communication system in China, this study believes that the all-media barrier-free audiovisual communication system is a multi-dimensional and multi-level complex system that integrates four subsystems: users, services, products, and platforms.

At the user system level, it is necessary to distinguish the different audiovisual needs of current visually impaired users and hearing-impaired users based on the media usage and satisfaction questionnaire survey. Discuss the media behavior of users with hearing impairments from the perspectives of user activity, user stickiness, user attractiveness, user retention, and user expansion; discuss the media motivation of users with hearing impairments from the perspectives of identity recognition, group culture, technological empowerment, and the rights of people with disabilities.

At the service system level, it is necessary to explore the satisfaction of the barrier-free "viewing" needs of hearing-impaired people under different current audiovisual media from three levels: barrier-free service model based on population, barrier-free service model based on situation, and barrier-free service model based on content, based on the media usage and satisfaction questionnaire survey, on the basis of classical theories and models.

At the product system level, it is necessary to use the digital divide theory and the industry standards for online audio-visual engineering construction based on the questionnaire survey of barrier-free content supply of different audio-visual types, discuss barrier-free online short videos, barrier-free online movies, barrier-free online dramas, barrier-free online variety shows, barrier-free online live broadcasts one by one, and discuss the types, characteristics, development background, development status, production points, media attributes, mass production models, etc. presented at the level of subtitles, sign language interpretation and oral images.

At the platform system level, it is necessary to distinguish the different levels of attributes of online audio-visual media, and discuss the four-level all-media barrier-free audio-visual communication platform system, including central audio-visual platform, provincial audio-visual platform, Internet audio-visual platform, and short video audio-visual platform.

3.2 Exploration of Barrier-free Audio-visual Communication Paths for All Media

Faced with the continuous introduction of national policies and the industry's research and development initiatives for technology, the real situation of the hearing-impaired and visually impaired people has failed to resonate and fit with the macro social trend. The hearing-impaired can pay attention to the visual elements in the picture by watching. That is to say, in general, there is no significant difference between the hearing people and the hearing-impaired in the content information conveyed by the visual image. The reason why the hearing-impaired cannot get the same viewing experience as the hearing-impaired is because of their own hearing impairment. The information conveyed by the current programs at the auditory level, that is, human voice, music, and sound, cannot have an emotional impact on the hearing-impaired. The visually impaired can pay attention to the auditory elements in the program by listening. However, there are still many technical adaptation problems in the media applications that can truly meet the "hearing" needs of the visually impaired. This kind of audio "message" brings rigid perception. The information conveyed by the image at the visual level, namely character information, scene description, action presentation, character psychology and montage narrative, has not yet provided "auditory transcoding", and the visually impaired cannot obtain the same visual experience as the hearing-impaired.

In the context of the omnimedia era, short videos, e-sports live broadcasts, live broadcasts with goods and other audio-visual types continue to emerge. Unfortunately, the current barrier-free audio-visual supply has not yet covered all media audio-visual types. Accurately use the three barrier-free audio-visual supply means of subtitle display, sign language translation and oral image to bridge the hearing barriers of the hearing-impaired in the aspects of voice, music, sound, etc., and the visual barriers of the visually impaired in the aspects of character performance, scene transition, drama plot, etc. The industry has been slow to act, and academic discussions have rarely focused on it, and the barrier-free audio-visual gap still exists. Meeting the needs of the disabled for a better audio-visual life with rich barrier-free audio-visual supply is not only an important mission to fulfill the task of "improving the care service system for the disabled" proposed by the 20th National Congress of the Communist

Party of China, but also an inevitable trend to achieve the balance and accessibility of "strengthening the construction of an all-media communication system" proposed by the 20th National Congress of the Communist Party of China.

The construction of an all-media barrier-free audio-visual communication system is a systematic project. It is necessary to explore clear ecological standards for barrier-free audio-visual products, improve the open sharing mechanism of barrier-free technologies for various audio-visual applications, and deepen the barrier-free audio-visual experience in segmented scenarios. The academic community should pay more attention to the actual situation in the field of barrier-free audio-visual in all media, build an all-media barrier-free audio-visual communication system, and explore and design the content, framework and model of the practical path. The industry needs relevant national ministries and commissions to organize information and communications, Internet associations and other units to guide relevant media and enterprises in a classified manner, implement various barrier-free audio-visual requirements in terms of service system, relevant standards, product optimization, daily maintenance, etc., transform special actions into long-term mechanisms, and continuously promote the healthy development of the all-media barrier-free audio-visual industry.

Allowing people with hearing and visual impairments to access and use online audio-visual media without barriers is a new stage of the national online audio-visual project entering the "people-centered" Chinese-style modernization construction. Therefore, while building an all-media barrier-free audio-visual communication system, it is also necessary to propose a practical path for the all-media barrier-free audio-visual communication system. This study believes that the practical path of the barrier-free audiovisual communication system of all media needs to consider the overall structure at the macro level, the special construction at the meso level, and the process model at the micro level.

In terms of the overall macro structure, it needs to be built from two dimensions: horizontal and vertical. Horizontal dimension: discuss the specialized strategies for system construction from multiple dimensions such as communication process, platform construction, communication resources, information content, technology application, and management methods; vertical dimension: explain the hierarchical, targeted and typological construction paths of multiple subjects such as central-level audiovisual platforms, provincial-level audiovisual platforms, Internet audiovisual platforms, and short video audiovisual platforms in the barrier-free audiovisual communication system of all media. In order to form a horizontal and vertical force, the macro path of the barrier-free audiovisual communication system is explained on the premise of grasping the general trend of all media.

In terms of the meso-level special construction, it is necessary to connect with the macro society through various special constructions. Special discussions are conducted on different audiovisual formats of all media, such as barrier-free online movies, barrier-free online news, barrier-free sports events, barrier-free live broadcasts, barrier-free game live broadcasts, barrier-free short videos, barrier-free online variety shows, and barrier-free online dramas. In order to achieve the expansion and extension of the barrier-free functions of the current mainstream audio-visual media in society.

As for the micro-process model, it is necessary to analyze from three aspects: the construction of all-media barrier-free production and distribution model, the construction of all-media barrier-free business and service model, and the construction of all-media barrier-free laws and regulations and talent training model. In order to propose a targeted, specific, detailed and operational practical path based on the current all-media process model, communication mechanism, capital operation, institutional guarantee, and human resource guarantee.

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