6 Can *Danmu* Enhance the Watching Experience for Chinese Viewers?

An Audience Reception Study on *Danmu* Preference and Processing

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6.1 Introduction

Subtitling, as 'one of the most thriving areas within the wider discipline of Translation Studies' (Díaz-Cintas & Remael, 2007, p. 8), has gradually been recognised as playing 'an increasingly important and prominent role' (Díaz-Cintas, 2004, p. 50) in our society. Among the various subtitling practices, fansubbing, defined as 'fan-produced, translated, subtitled media' (Díaz-Cintas and Muñoz Sánchez, 2006, p. 37), has emerged as a predominant form of fan translation, evolving into a widespread online social phenomenon. Such interactions occur among media consumers, between media consumers and media texts, and between media consumers and producers, which fall into what Jenkins (2006, p. 135) coined a 'participatory culture'. This culture is driven by new technologies that enable audiences with greater control of media, subcultures promoting DIY media production and shaping technology use, and media economics pushing content across channels, demanding more active spectatorship (Jenkins, 2006). The amateur knowledge-sharing process has broadened the scope of communication, subsequently catalysing innovations aimed at captivating audience attention and enhancing the viewer experience. *Danmu*,[2] for instance, represents one such recent innovation under this surge.

The term *danmu* (弹幕) derives from the Japanese term '*danmaku*', meaning 'barrage', which gained popularity on the Japanese video-sharing platform Nico Nico (Johnson, 2013; Yan et al., 2023). This format was subsequently adapted for Chinese video sites as *danmu*. Contrary to conventional static subtitles, *danmu* comprises user-generated scrolling commentary of a 'dynamic, contextualised, and continuously streaming nature across the video screen' (Díaz-Cintas and Remael, 2021, p. 18). They are synchronised into 'a specific playback time at a specific position in the video' (Hamasaki et al., 2009, p. 222), allowing audiences to add their own comments to form a dynamic subtitle track. In China, these overlaid subtitles first emerged on fandom platforms in 2007, subsequently

gaining tremendous popularity in not only online streaming but also e-commerce and product recommendation community such as Xiaohongshu and Taobao (Lu and Chen, 2024). According to Bilibili's 2023 financial report, the average daily active users totalled 96.5 million by the end of the second quarter of 2023, accounting for 6% of China's total population (Bilibili, n.d.). The advent of technological capabilities enabled their production on most media-streaming platforms, including the dominant OTT platforms[3] such as iQiyi, Youku and Tencent Video.

Compared to traditional subtitling studies, research on *danmu* – a phenomenon particularly prevalent in China – is significantly less developed. Much of the existing research has centred on descriptive and conceptual analysis of the final product of *danmu* (Li, 2017; Zhu, 2017; Nakajima, 2019; Zhang and Cassany, 2019, 2020; Cao, 2021; Yang, 2021). There is a dearth of empirical research in traditional subtitling studies in the Chinese context (Jia, 2023; Jia et al., forthcoming; Jia et al., forthcoming), and even less on *danmu*. We still lack a comprehensive understanding of how audiences perceive *danmu* and the extent to which they influence viewing comprehension. Therefore, this study aims to explore and investigate this emerging area. This article is part of an empirical study of the reception of *danmu*'s display speed among Chinese viewers. It focuses on three main research questions:

1. In what ways do Chinese viewers engage with *danmu*?
2. How do Chinese viewers perceive *danmu* in terms of its impact on viewing comprehension?
3. What are Chinese viewers' future prospects and strategic recommendations for the *danmu* mechanism?

In order to respond to these questions, the present study used semi-structured interviews with 30 Chinese participants to collect data on their *danmu* usage preferences, perceptions of *danmu*'s impact during viewing and suggestions for improvement. Thematic analysis was conducted to explore the qualitative data obtained from these interviews.

6.2 *Danmu*: Definition, Settings and Characteristics

6.2.1 *Conceptualising* Danmu *Commentary and* Danmu *Subtitling*

As noted above, the term *danmu* is translated from the Japanese word '*danmaku*' (barrage), which gained popularity on the Japanese video-sharing website Nico Nico (Yan et al., 2023). Japanese researchers have defined *danmaku* as 'comments directly overlaid on video' (Hamasaki et al., 2009, p. 222). The *danmu* interface 'allows online video viewers to

input "live" comments in a way that is directly overlaid onto the video' (Yang, 2020, p. 255). When the total number of comments 'reaches [a] certain point, the visual impact of *danmaku*, literally meaning "barrage" or "bullet curtain" in Japanese, is achieved' (Yang, 2020, p. 255). This style of live commenting generates a 'sense of time', where comments are organised according to the moment they were posted by users, rather than the sequence in which they were submitted (Johnson, 2013; Ouyang and Zhao, 2016). Enabled by pseudo-synchronicity and congruency technologies (Johnson, 2013; Yang et al., 2021), *danmu*-subtitled videos have evolved from a niche form of entertainment into a mainstream feature on most video streaming platforms in China. In light of the increasing prevalence of *danmu* within online streaming services, scholars have also observed a novel approach to subtitling through *danmu* in foreign language videos, referred to as '*danmu* subtitling'. Yang (2021a, p. 2), writing about *danmu* subtitling, refers to 'scenarios where online video viewers contribute amateur translations to untranslated video files in the form of live comments overlaid on the screen'. Such non-professional and grassroot-made translational phenomenon has been regarded as an ad hoc solution to foreign language videos, and unlike the quasi-professional workflows and organised communities in fansubbing, *danmu* subtitling features 'an accumulation of individual viewer's random contribution(s) on the video frame' (Yang, 2023, p. 851).

Based on the definitions provided, we propose that *danmu* can be categorised based on the presence or absence of translation functionality. Specifically, we identify two main categories: *danmu* commentary and *danmu* subtitling. *Danmu* commentary consists of user-generated live overlaid texts that comment on and react to specific video scenes without any translation behaviour. This category focuses on enhancing viewer interaction and engagement through personal insights or emotional reactions. In contrast, *danmu* subtitling involves real-time overlaid texts that translate the video content actively for the audience. This functionality is essential for making content accessible to viewers who do not understand the original language of the video, thereby broadening the audience's reach and inclusivity. *Danmu* subtitling plays a crucial role in bridging language barriers and facilitating a more comprehensive understanding of the foreign content. By distinguishing between these two categories, we can better understand the varied functions and impacts of *danmu* on the viewing experience. *Danmu* commentary enriches the interactive and emotional aspects of viewing, while *danmu* subtitling addresses language accessibility and comprehension. In this study, our primary focus was on investigating how *danmu*, including both two categories, affect viewers' comprehension, examining how these distinct functionalities influence their understanding and engagement with the video content.

6.2.2 *User Control and Customisation of* **Danmu** *Settings on Bilibili*

Bilibili, a leading OTT and video-sharing platform in China that incorporates *danmu* functionality, offers users extensive control over the *danmu* settings. The basic *danmu* interface on Bilibili consists of seven components, numbered from 1 to 7 for illustration purposes in this article, as shown in Figure 6.1.

Component 1 is a dynamic display frame that provides real-time information on a video's viewership and *danmu* status. It presents live statistics on the number of concurrent viewers and the cumulative count of *danmu* posted for the ongoing video. For example, the number 4 in Component 1 indicates that four people are currently watching, whereas the number 5,609 represents the total number of *danmu*.

By default, the *danmu* display is automatically enabled when a viewer clicks on a video on Bilibili. Users can disable the onscreen *danmu* display by clicking the button marked Component 2 in Figure 6.1. Once disabled, *danmu*, including *danmu* commentary and *danmu* subtitling, will be erased from the display. Users can restore the onscreen *danmu* display by clicking the same button (Component 2) again.

Components 3 and 4 provide access to interfaces for customising existing *danmu* settings. By selecting the button marked Component 3,

Figure 6.1 Basic *danmu* interface components on Bilibili.

Figure 6.2 Basic *danmu* configuration interface on Bilibili (English translations in yellow).

users will be directed to the basic *danmu* configuration interface, as shown in Figure 6.2.

This basic *danmu* configuration interface allows users to adjust various parameters affecting the existing overlaid *danmu* on screen sent by other users, including the transparency, screen position, font size and display speed.

Moreover, users can click the 'Advanced Settings' button at the bottom of the basic *danmu* configuration interface to enter the advanced *danmu* configuration interface in order to customise *danmu* further. In this interface, fonts can be modified to alter the typeface, weight (boldness) and visual effects such as shading. Figure 6.3 illustrates the 'Advanced Settings' interface.

Furthermore, the *danmu* display speed can be synchronised precisely with the video playback speed by enabling the 'Synchronise with video playback speed' button in the advanced *danmu* configuration interface. More specifically, assume that users set the video playback speed to twice the standard speed, which is the fastest option available on Bilibili. In that case, the *danmu* display speed will automatically adjust to 'very fast', the quickest setting for the *danmu* display.

In addition to modifying the existing *danmu* displayed on the screen, Bilibili users can customise their own *danmu* before sending it. The interface for customising new *danmu*, accessed via the button labelled Component 4, provides options to customise the font size, colour and
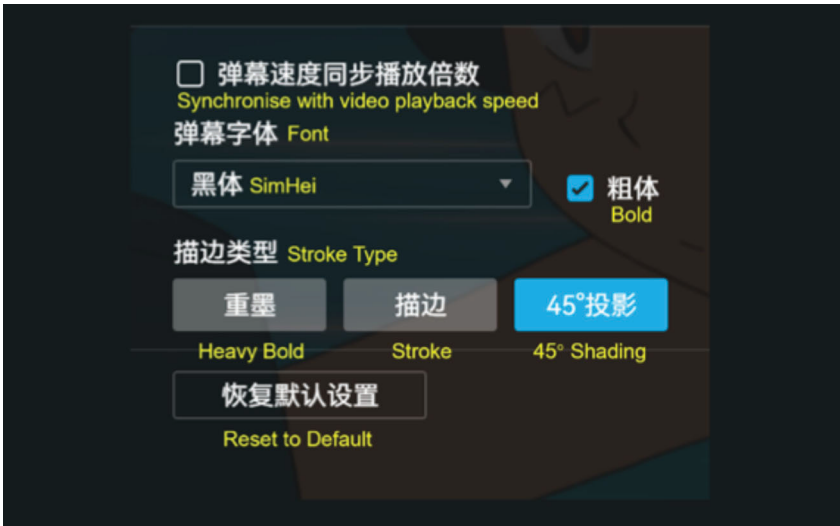
Figure 6.3 Advanced *danmu* configuration interface on Bilibili (English translations in yellow).

display mode, with comments able to scroll across the screen or pop up from the top or bottom, as shown in Figure 6.4.

Interestingly, apart from the eight basic components of the *danmu* system, Bilibili offers an interactive feature for users to express their appreciation of *danmu* by clicking *danmu* to 'like' them. Once a certain number of likes is reached, a yellow thumbs-up logo will be displayed on the left of the highly liked *danmu*. The specific number of likes can be accessed by hovering the mouse cursor over any liked *danmu*, as shown in Figure 6.5.

6.2.3 *Real-time Synchronisation and Multimodality in* Danmu *Viewing*

Whereas *danmu* facilitates personalised stylistic modifications for its users, its participatory characteristic lies in the precise overlay of user-generated comments onto a video in real-time. In particular, a 'built-in timer aligns comments with video scenes' (Yang, 2020, p. 265). This function enables individual viewers to contribute commentary and subtitles without their needing separate timers to ensure synchronisation. When the number of *danmu* reaches a certain threshold, the overlaying of *danmu* creates a distinctive 'bullet curtain' visual effect (Yang, 2020).
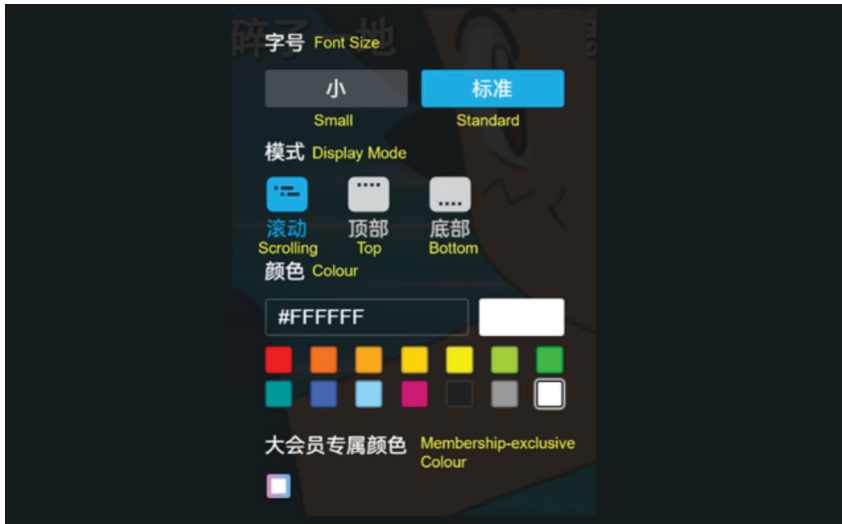
Figure 6.4 Danmu setting interface for customisation on Bilibili (English translations in yellow).

Figure 6.5 90 highly liked *danmu* indicated, with a yellow thumbs-up icon.

This unique spatial–temporal characteristic has attracted academic interest in investigating the 'co-viewing experience' (Yang, 2021a, p. 3). Hamasaki et al. (2009) argue that the precision overlay creates a sense of 'shared virtual viewing' as commenters react to the same moments. Unlike other video commentary formats, this synchronisation and super-imposition fosters an immersive interactive viewership. According to He and Muroi (2020), *danmu*'s real-time synchronisation has been found to have positive emotional effects on online video watchers. They used the PANAS (positive and negative affect scale) both before and after viewing videos with or without *danmu* and revealed that videos featuring *danmu* led to an increase in positive emotions and a decrease in negative emotions.

The high level of engagement also helps to facilitate an instantiation of 'new writing' – 'writing that relies on visual as well as, and even more than, verbal resources' (Djonov and Leeuwen, 2013, p. 2). The customisability and timed overlay enable *danmu* to leverage both visual and verbal modalities. Actual practices of new writing in *danmu*, which are dependent on the video content and the multimodal context of particular scenes, result in diverse instantiations that serve various communicative purposes (Yang, 2021b). Conceptualising colour as a semiotic mode, Teng and Chan (2022) found that the active use of colour in *danmu* functions as way to either enact fan relations or express judgments and emotions triggered by video content. *Danmu* creators utilise colours to establish cohesion among their comments and to integrate their contributions into a unified collective colouring effect. This use of colour not only enhances the visual appeal of the commentary but also deepens the interpretive layers of interaction, contributing to a richer, more multimodal and immersive viewing experience. Similarly, focusing on new form of visual writings or drawings in *danmu*, four key semiotic resources have been identified by Zhang and Cassany (2023) in creating visual comments: arrows, kaomoji, context-specific special characters and symbols, and ASCII art. These studies not only explore the evolving role of visual expression in textual communication on social media, focusing on *danmu* and its emerging visual grammar and interaction with screens, but also inevitably highlight concerns such as authorship and the reshaping of power dynamics (Kress 2010) in visual media.

In order to investigate the impact these settings and characteristics have on the *danmu* viewing experience among Chinese audiences, we conducted an empirical study using semi-structured interviews. This study aimed to reveal the participants' preferences for *danmu* settings, their perceived effects on comprehension, and their prospects and recommendations for the future mechanism of *danmu*.

6.3 Methodology

6.3.1 Participants

The study received ethical approval from the University College London Research Ethics Committee (Project ID: 25415.001). Thirty Chinese native speakers were recruited, with an average age of 23.20 (SD = 1.69). The majority of the participants (66.7%) were male, whereas 26.7% were female. None of the participants identified as non-binary and two individuals (6.7%) did not provide gender information. All of the participants reported no diagnosis of dyslexia. Concerning the length of their engagement with *danmu*, all of the participants reported having had previous frequent viewing of *danmu*. Among them, 50% indicated that they viewed *danmu*-subtitled videos more than five times per week. A smaller segment, 23.3% (7 out of 30), engaged with *danmu* subtitles between one to five times weekly, whereas 26.7% (8 out of 30) reported a monthly engagement of fewer than three times. Regarding familiarity with the film *Pokémon the Movie: I Choose You!,* 86.7% (26 out of 30) of the participants had not previously watched the film, whereas only 13.3% (4 out of 30) of the participants had watched it before participating in the study.

6.3.2 Stimuli

The study used three excerpts from the Japanese animated film *Pokémon the Movie: I Choose You!* (dir. Kunihiko Yuyama, 2017). Each excerpt was similar in length and came from the English-dubbed version, which is popular on Bilibili, having garnered 230,000 views and 13,000 *danmu* by

Table 6.1 Demographic information about the participants

		N	%
Gender	Male	20	66.7
	Female	8	26.7
	Non-binary	0	0.0
	Prefer not to tell	2	6.7
Dyslexia	Yes	0	0.0
	No	30	100.0
Danmu viewing frequency	Never	0	0.0
	< 3 a month	8	26.7
	1–5 a week	7	23.3
	> 5 a week	15	50.0
Prior exposure to the stimuli	Yes	4	13.3
	No	26	86.7

the time of the research. The excerpts were recorded using APower Player, saved as MP4 files and uploaded to Qualtrics for display on the researcher's laptop during the experiment. The clips were shown at varying speeds: one at 3 minutes and 45 seconds with slow-speed *danmu*, another at 3 minutes and 48 seconds at medium speed, and a third at 3 minutes and 43 seconds at fast speed.

6.3.3 Procedure

This study was conducted in July 2023 within the TransCluster at University College London's Centre for Translation Studies (CenTraS), located at Forster Court 216. The participants were tested individually using questionnaires and interviews. Upon arrival, they were provided with information sheets and required to sign consent forms. Before participating, each participant was assigned a number between 1 and 30 to maintain anonymity throughout the experiment. The participants completed an online assessment from Cambridge English to assess their English proficiency level. Following this, questionnaires[4] about the viewing experience,[5] written in Chinese, were administered. At the start of each questionnaire, the participants entered their assigned number, which allowed the Qualtrics system to direct them randomly to one of three counter-balanced video excerpts embedded in the questionnaires. After viewing the excerpts, the participants responded to the questions related to each clip. Upon completing the questionnaires, the participants conducted individual semi-structured interviews in Chinese aimed at exploring their views and preferences regarding *danmu*. Each interview lasted about 30 minutes, with the responses recorded and subsequently transcribed into written text using IflyREC. The interview responses collected were then subjected to thematic analysis to identify the participants' preferences, perceptions and suggestions when engaging with *danmu*.

6.4 Results and Discussion

In this section, we present an analysis of the participants' usage preferences, perceptions and suggestions regarding the use of *danmu*, as well as the impact of *danmu* on viewing comprehension. We conclude with a discussion of future prospects for *danmu* in application, along with recommendations for its improvement.

6.4.1 User Preferences in Danmu

The interviews investigated the *danmu* usage habits of the 30 participants. All of the participants reported having engaged in previous acts of posting

danmu commentary. Only 37% (11 participants) had had experience of posting *danmu* subtitling. A minority (two participants) mentioned their inclination to use *danmu* commentary to correct existing *danmu* subtitles, although they were less likely to post *danmu* subtitles directly.

Most of the participants (67%, 20 out of 30) reported the habit of customising *danmu*'s transparency. Specifically, they set the transparency level to between 30% and 50% to avoid *danmu* commentary's obstruction of the video content. In contrast, a smaller portion of the participants (33%, 10 out of 30) chose to retain the default transparency settings provided by the platform, indicating a positive attitude towards the standard settings and possibly less interest in customising *danmu*.

Of 30 participants, 17 expressed their inclination to block *danmu* being displayed in specific areas to mitigate the visual disruptions caused by the *danmu* commentary. Among them, ten participants reported blocking *danmu* commentary displayed at the bottom of the image when watching traditionally subtitled[6] videos so as to prevent *danmu* commentary overlapping or obscuring the subtitles. Seven participants among these 30 reported blocking *danmu* commentary displayed at the top of the image in order to give themselves a clearer view of the video. However, 13 out of the 30 participants did not report any previous behaviour involving blocking *danmu* displayed in certain areas.

Most of the participants (17 out of 30) tend to confine the display area to a quarter of the screen to mitigate potential video-image obstruction caused by the *danmu* commentary. In contrast, passive consumption behaviour towards this functionality was observed in the minority of the participants (seven out of 30), who preferred to maintain the default *danmu* display area. Interestingly, six participants mentioned their lack of awareness of this feature.

When asked about their preferences for enabling *danmu*, 60% of the participants indicated that the nature of the video plays a decisive role in determining whether they activate it. For instance, Participant 7 (P7) expressed the view that the video's length influences their choices. When consuming more extended materials, P7 preferred to enable the *danmu* display in order to have the 'accompanying experience' provided by the *danmu* commentary. In contrast, they tended to turn off the *danmu* display in shorter clips to enhance their concentration on the content. Less than one-third (nine out of 30) of those interviewed considered the genre of a video to be a factor that influenced their decision to enable *danmu* viewing. Of these nine participants, two stressed the disruptive nature of *danmu* commentary during video viewing. However, four participants tended to enable *danmu* for the commentary while watching generally light-hearted content such as comedies, variety shows and streaming programmes. Interestingly, three others mentioned that their choice to

enable *danmu* to activate the commentary is not fixed but evolves with the progression of a video. They selectively activate *danmu* based on whether a particular scene lends itself to interactive *danmu* commentary. For instance, P20 remarked: 'When the plot reaches an exciting point, I will turn on the *danmu* to find interesting comments or interpretations.' Similarly, P10 stated that they may enable *danmu* commentary so as to seek plot hints or spoilers when watching suspense films.

A small percentage of the participants (13%) reported that their decision to enable *danmu* is influenced by their familiarity with the video's topic: when they lack sufficient knowledge about the content or theme, they are inclined to activate *danmu* to access related information posted in *danmu* commentary. P6 added to this point, emphasising their preference for seeking 'experts' in *danmu* commentary to obtain explanations of the different terminology used when watching obscure science videos.

The audio language of the video is another factor that influences the decision whether or not to activate *danmu* for its subtitling. One-fifth (six out of 30) of those interviewed indicated that they resort to *danmu* subtitling when watching videos in languages that are beyond their linguistic proficiency. For instance, P20 stated: 'For languages I am unfamiliar with, such as French, Spanish or Japanese, I typically rely on *danmu* subtitling for translation references.'

In addition to the video content itself, the quality of *danmu* subtitling also plays a role in whether viewers choose to turn on the *danmu* display. A few participants (five out of 30) mentioned that they sometimes turn off the *danmu* because they find the comments to be of poor quality. For example, P6 noted that 'low-quality *danmu* subtitling can make the video less enjoyable to watch'.

When questioned about their possible inclination to adjust the display speed of *danmu*, a substantial majority of 83% (25 participants) stated that they did not exhibit such behaviour. Specifically, among these 25 participants, 15 claimed that the default display speed of *danmu* meets their needs, thus modifying the *danmu* speed appears unnecessary to them. Interestingly, the remaining ten participants emphasised their lack of awareness of this customisation feature as the reason for refraining from adjusting it. In contrast to the majority, a minority of 17% (five participants) reported having previously adjusted the display speed of *danmu*. However, there were divergent opinions among these limited responses: three of these participants indicated their preference for setting the display speed of *danmu* slower than the default to allow for longer information-processing time to read the *danmu* commentary; the remaining two participants reported that they increased the speed of *danmu* to attain a better alignment with their faster reading speed. For instance, P22 stated: 'I read more quickly than the default *danmu* display

speed. If it's too slow, it doesn't provide the information density I need.' These results highlight the diverse user interactions with *danmu* display speed features based on individual viewing habits and awareness of customisable options, which underscores the need for accessible and adjustable settings to accommodate diverse preferences.

Regarding the colouring feature of *danmu*, just more than half of the participants (16 out of 30) reported using this function for different purposes. Among these 16 participants, three reported that altering the *danmu* commentary colour expresses their affiliation with a specific fanbase. A distinct colour is frequently associated with a particular character and fans customarily employ this colour to signify their allegiance as dedicated supporters. For instance, P18 made this point using an example:

> Certain colours in some formations or scenes may represent special meanings, like using teal *danmu* commentary to say '*ohimesama*', a Japanese expression for 'distinguished princess', in videos related to Hatsune Miku.[7]

Six of the participants in this same group indicated that the choice of colours in *danmu* commentary goes beyond fan identity, serving as a cultural signifier. P23 explicitly expressed their intention to use the colour yellow – a colour that represents eroticism in China – when 'commenting on dirty jokes'. In addition, P7 mentioned another scenario in which they tend to employ the orange colour while posting *danmu* commentary in lesbian anime:

> This practice stems from a well-known ACG meme from *Citrus* (2012), a renowned Japanese lesbian comic. Over time, the colour orange has evolved into an implied symbol of lesbian love within internet communities.

The remaining seven of these 16 participants reported using distinctive colours to differentiate their *danmu* commentary from those of others. For instance, P6, P10 and P15 specifically pointed out their use of exclusive colours available only to Bilibili VIP members so as to underline their status and enhance the visual appeal of their comments. One of them explained it as follows:

> I intentionally use member-exclusive colours to showcase my VIP privileges whenever I post *danmu* commentary. This not only adds aesthetic value but also sets them apart from the standard white-coloured *danmu*.

However, fewer than half of the participants (14 out of 30) who opt not to change the colour of their *danmu* commentary offered a consistent reason: they find it unnecessary. P3, for example, stated that they 'saw no need to alter the colour', indicating a preference for simplicity in their engagement.

When asked about their tendency to express appreciation for *danmu* by 'liking' them, 53% (16 out of 30) of the participants admitted to doing so. Among these participants, 11 indicated that they 'like' *danmu* commentary which aligns with their thoughts. For example, P7 described a scenario where '*danmu* commentary expressing the ideas I was just going to say at a certain point of the story' would appear on screen and they would 'like' them to indicate their agreement. From another perspective, the participants tend to 'like' *danmu* commentary that offers a humorous interpretation of the content. For instance, P28 stated, 'There are always humorous *danmu* commentary commenting on the plot, and I tend to 'like' some of them when I see hilarious ones.' Another five participants reported that they particularly appreciate *danmu* subtitling when it features excellent translation quality. For instance, P17 noted their appreciation for *danmu* subtitling which adeptly translates the rhythmic spells into Chinese with a poetic flair. Those 14 participants who do not typically 'like' *danmu* did not provide reasons for not doing so.

6.4.2 *Impact of* Danmu *on Viewing Comprehension*

The responses from the participants on the ways in which *danmu* affects their comprehension were categorised into three tendencies: positive, negative and neutral. Most of the participants (93%; 28 out of 30) felt that the supplementary information in the *danmu* commentary helped them to understand the video content better. For example, one participant mentioned how *danmu* commentary serves as a helpful tool to explain unclear parts of dialogue, especially when characters do not provide enough context. 'For instance, while watching foreign sitcoms on Bilibili, you might find explanations in *danmu* commentary for jokes that do not translate well into Chinese culture,' one participant explained. However, two participants shared some negative thoughts about the *danmu* commentary. One of them noted that too many off-topic discussions in the comments can make it more difficult to focus on and understand a video: 'I often find myself reading lots of *danmu* comments that have nothing to do with what is happening in the video. This kind of chatter can really distract me from following the plot,' this participant added.

When the participants were asked about the impact of the *danmu* subtitling on their understanding of English-language videos, only one participant had a neutral response, explaining that due to their high

proficiency in English, they could understand the video content without the need for *danmu* subtitling. However, the remaining 29 participants reported positive experiences, emphasising that *danmu* subtitling greatly enhanced both their viewing experience and their comprehension of the content. Of these 29 participants, 41% (12 out of 29) appreciated the translation function of *danmu* subtitling, especially when official subtitles were unavailable. For instance, P9 stated: 'If the video is in a language I do not know, using *danmu* subtitling could really help me understand it, since I do not speak those languages.' Nearly half of the participants (14 out of 29) noted that *danmu* subtitling offers more than just translation – it provides additional context and personal insights – which significantly enhances their understanding. P5 highlighted this by noting that *danmu* subtitling helps them to 'gain additional information and explanations regarding the content'. Others, such as P7, P21 and P22, emphasised that *danmu* subtitling is particularly useful in interpreting jargon and specialised terms when they are watching content that they are less familiar with. These findings align with previous research showing that the real-time nature of *danmu* provides additional cognitive support for viewers, particularly in helping viewers efficiently seek information that include hidden meanings or symbolic implications of content (Chen et al., 2017). A smaller group (3 out of 29) pointed out that the translation choices made by *danmu* subtitling, which often reflect popular or community-preferred expressions or translations, had a positive impact on their comprehension. Unlike official subtitles, which might use formal or less common language, *danmu* subtitling usually uses phrases that resonate better with the audience. For example, P24 explained that in anime, the term 'Gundam' is commonly translated as '高达' (Gaoda), a well-known term among anime fans, whereas official subtitles sometimes use the less familiar and unusual '钢弹' (Steel Egg). They found that 'it is reassuring that *danmu* subtitling sticks to expressions that the target audience is familiar with, avoiding potential misunderstandings'. Such resonance with fans highlights how user-generated subtitles can better reflect the cultural and linguistic nuances of specific communities (Wang, 2017; Lu and Lu, 2021), thereby enhancing the viewing comprehension.

6.4.3 *Future Prospects of and Recommendations Regarding* Danmu

The interviews also inquired about the participants' general views on *danmu*'s prospects and suggestions for its improvement. One commonly noted advantage of *danmu* subtitling is the ease and speed of production. This benefit stems from both the diversity of the source materials available and the quickness of the *danmu* subtitling process. P5 highlighted the wide selection of raw materials, noting:

> A vast array of untranslated foreign videos draws interest. However, a shortage of subtitlers and censorship issues make professional translations scarce, prompting viewers like me to use *danmu* subtitling to expand our access to foreign content.

This accessibility is crucial in *danmu* subtitling's role, as it reduces the production barriers and enables participation from all users. P6 echoed this sentiment, stating that the ease of creating *danmu* subtitles has played a significant role in the success of Bilibili as an innovative streaming platform: 'With *danmu* systems, I can easily post translations, helping to elucidate videos for others and promote a diverse array of content.' This approach embodies the idea of 'empowering through passion (为爱发电)'. P18 stated that *danmu*'s prompt availability reduces the wait time significantly compared to traditional subtitling, saying, 'I would not be willing to wait two days for a five-minute clip when I could watch it with *danmu* subtitles just half a day after its release.' In fact, *danmu* subtitling speeds up the availability of video content.

In addition, a few participants discussed the fact that *danmu* subtitling supports continuous improvement and collaboration. They mentioned that the system encourages viewers to correct and improve translations, in this way enhancing the overall quality. P12 pointed out the potential for *danmu* subtitling to 'evolve' through viewer contributions and P22 described it as a 'collective endeavour'. This interactive aspect allows for ongoing refinement and better translation accuracy over time.

Regarding the possible enhancements to *danmu* subtitling, ten participants advocated overhauling the display logic of *danmu* to improve its comprehensibility. Of the participants, 20% emphasised the necessity for a separate display area for *danmu* subtitling to ensure a more straightforward interface during viewing. P15, for example, argued for a dedicated space to 'emphasise translations' and give them precedence over the *danmu* commentary. Similarly, P19 was forthright in their desire for *danmu* subtitles to be 'anchored at the bottom of the screen'.

Four other participants recommended the addition of a filtering mechanism which allows viewers to choose a specific translator whose work aligns most closely with their preferences. P18 supported this idea, stating:

> It would be preferable to have the option to select one to two specific subtitlers, facilitating a more seamless viewing experience with consistent language style and expressions in the *danmu* subtitles.

In addition to improvements in the display settings, several participants expressed an interest in having features that allow for creative translation, enhancing enjoyment and interactivity. P14 envisaged an innovative

approach to *danmu* subtitling, suggesting that subtitles could be placed 'anywhere on the screen', especially 'next to the speaking characters' in scenes with multiple speakers. This, they noted, would indicate more effectively which translation corresponds to which character. Echoing this idea, P27 advocated more flexible positioning of *danmu* subtitles, stating:

> If there were a map written in English on the screen, *danmu* subtitles could be placed directly on the map itself rather than at the bottom of the screen, creating a more immersive visual effect.

When questioned about the necessity of standardising *danmu* subtitling to align with traditional subtitling guidelines, only three participants affirmed the need, primarily citing dissatisfaction with *danmu*'s translation quality and erratic positioning. In contrast, most of the participants (90%; 27 out of 30) opposed such standardisation in favour of preserving the voluntary essence of *danmu* subtitling. P18 emphasised that standardisation would strip *danmu* subtitling of its freedom to manipulate language creatively, which is considered to be its most salient feature, potentially diminishing viewer willingness to post *danmu* subtitling. Similarly, P25 contemplated the adverse effects of standardisation on user motivation:

> Overly strict rules may lead to a decline in the enthusiasm for posting *danmu* subtitles. As every *danmu* subtitle is posted out of personal interest, further restrictions could harm users' motivation.

Regarding the integration of *danmu* commentary into Western OTT platforms such as Netflix, 23% (7 out of 30) of the participants were against its integration, citing concerns about disrupting the immersive viewing experience. An interesting aspect of this discussion emerged when P14 explained the linguistic challenges associated with such integration:

> Languages such as English, which has a lower information density and more relaxed syntactic structure than logographic languages like Chinese, could present challenges. In Chinese, *danmu* commentary can be concise and fully expressive, easily fitting into the fast-scrolling format. However, the commentary might become excessively lengthy in English, making it too long for effective display and challenging for viewers to quickly process as it scrolls across the screen.

This highlights a fundamental issue with posting *danmu* in English, affecting the practicality and viewer experience of *danmu* commentary on platforms such as Netflix.

6.5 Conclusion

This study explored Chinese viewers' perceptions of interfacing with *danmu*, focusing on usage preferences, comprehension impact and future prospects. Regarding the setting of preferences, all participants reported previous experience with posting *danmu* commentary, while 37% had experience with posting *danmu* subtitles. There was a lower tendency to post *danmu* subtitles, probably due to the level of language proficiency required. Most of the participants customised *danmu* transparency to between 30% and 50% to minimise the obstruction of video content. In order to reduce visual disruption further, most of the participants favoured confining *danmu* to a smaller display area (25% of the screen). Interestingly, 83% of participants were satisfied with the default *danmu* display speed, although some were unaware of the ability to adjust it, possibly due to the complex interface settings. Several factors influence the decision to enable *danmu* during video playback. These include the length of a video, with longer content more likely to have *danmu* enabled, and the genre, where lighter genres typically see more *danmu* use. Viewer familiarity with a video's topic also plays a role; those less familiar with the content tend to enable *danmu* more often. In addition, viewers with a lower level of language proficiency are more likely to turn on *danmu*, whereas poor-quality *danmu* subtitling often leads to it being turned off. Regarding the colouring feature of *danmu*, 53% of the participants reported using this function for various purposes. Furthermore, an equal percentage of the participants expressed their appreciation of *danmu* by 'liking' them.

Regarding comprehension, 98% of the participants found that *danmu* enhanced their understanding of videos. This is primarily due to the real-time interactive nature of *danmu* commentary, which offers additional context beyond traditional subtitles. In addition, using popular or fan-preferred expressions in *danmu* subtitling increases the support viewers gain in understanding the video content. The better resonance with cultural and linguistic nuances of specific communities proves to be an essential factor in fostering deeper engagement and more effective comprehension for *danmu* viewers. This underscores the potential of *danmu* as a dynamic tool that not only aids understanding but also personalises the viewing experience by aligning with the audience's cultural expectations and preferences.

As for strategic recommendations, the viewers particularly appreciated the quick availability of *danmu*, which reduces waiting times for content compared to traditional subtitling. They also highlighted the potential for *danmu* to evolve through user contributions, emphasising its role in fostering a collaborative and interactive viewing experience. Several suggestions for improving *danmu* were also raised. For instance, the

participants proposed enhancements such as overhauling the display logic to improve comprehension, creating dedicated spaces to emphasise translations and introducing filtering mechanisms to select specific subtitlers for a more consistent viewing experience. In addition, some expressed interest in allowing more creative translation placements, such as positioning subtitles next to characters or on relevant onscreen objects for a more immersive effect. Moreover, most of the participants were opposed to standardising *danmu* to preserve its creative, entertaining and voluntary nature, fearing that strict guidelines could diminish user engagement and motivation. Furthermore, the respondents were sceptical about integrating *danmu* into Western OTT platforms such as Netflix because of possible linguistic challenges and concerns about disrupting the immersive viewing experience as a result.

This research sets the stage for further studies on *danmu*'s reception. Given the limited awareness of *danmu* configuration settings among viewers, further research is necessary to gain a greater understanding of their impact on the viewing experience. For example, future reception studies could incorporate eye-tracking technologies to enable a thorough investigation into the ways in which various settings – such as *danmu* display speed, density and transparency – affect the viewing experience, along with other relevant settings and characteristics. Moreover, the diverse attitudes towards *danmu* commentary and *danmu* subtitling underscore the importance of clearly differentiating these two forms in future research in order to explore their respective impacts. In the light of the scepticism expressed about global implementation, further empirical studies are essential to evaluate the feasibility and reception of expanding *danmu* on Western OTT platforms such as Netflix and YouTube among (Western) audiences.

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Notes

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2   For research purposes, we have categorised *danmu* into *danmu* subtitling and *danmu* commentary as two different types based on whether or not translation behaviour is observed in *danmu*. However, the design of the *danmu* system on Bilibili (see section 6.2.2 below) is not based on whether or not translation behaviour is involved. Therefore, neither *danmu* commentary nor *danmu* subtitling has a separate display setting interface on Bilibili. This article adopts a broader term "*danmu*" to encompass all forms of *danmu* practices when there is no need to differentiate whether translation behaviour is involved or not. The terms "*danmu* commentary" and "*danmu* subtitling" are used only in discussions related to the functionality of *danmu* during their interaction with the viewers, reflecting the different purposes for which viewers engage with *danmu*.

3   OTT (over-the-top) is a means of providing television and film content over the internet at the request of and to suit the requirements of individual consumers. The term implies that a content provider is going over the top of existing internet services to satisfy consumer needs.

4   The interview questions can be accessed here: https://doi.org/10.17605/OSF.IO/DSPJ7.

5   The quantitative results derived from the questionnaires about the impact of *danmu* on the viewing experience will be reported on in a separate publication.

6   In the current study, the videos we used feature audio in English and did not include standard or traditional subtitles.

7   Hatsune Miku, officially code-named CV01, is a Vocaloid software voicebank developed by Crypton Future Media and is represented as a 16-year-old girl with long turquoise twintails and marketed as a virtual idol performing at live concerts as an animated projection.

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