

“I feel it is my responsibility to stream”

Streaming and Engaging with Intangible Cultural Heritage through Livestreaming

Zhicong Lu

University of Toronto
Toronto, Ontario, Canada
luzhc@dgp.toronto.edu

Michelle Annett

MishMashMakers
Toronto, Ontario, Canada
mkannett@gmail.com

Mingming Fan

University of Toronto
Toronto, Ontario, Canada
mfan@dgp.toronto.edu

Daniel Wigdor

University of Toronto
Toronto, Ontario, Canada
daniel@dgp.toronto.edu



Figure 1: ICH(Intangible Cultural Heritage)-related livestreams on Kuaishou, a livestreaming and video sharing mobile application, where streamers livestream videos of themselves engaging in cultural practices such as (a) traditional Chinese painting, (b) Guqin (Chinese Zither), (c) sculpting Dough Figurines, (d) Pit Carving, (e) Chinese calligraphy, and (f) Shadow play.

ABSTRACT

Globalization has led to the destruction of many cultural practices, expressions, and knowledge found within local communities. These practices, defined by UNESCO as Intangible Cultural Heritage (ICH), have been identified, promoted, and safeguarded by nations, academia, organizations and local communities to varying degrees. Despite such efforts, many practices are still in danger of being lost or forgotten forever. With the increased popularity of livestreaming in China, some streamers have begun to use livestreaming to showcase and promote ICH activities. To better understand the practices, opportunities, and challenges inherent in

sharing and safeguarding ICH through livestreaming, we interviewed 10 streamers and 8 viewers from China. Through our qualitative investigation, we found that ICH streamers had altruistic motivations and engaged with viewers using multiple modalities beyond livestreams. We also found that livestreaming encouraged real-time interaction and sociality, while non-live curated videos attracted attention from a broader audience and assisted in the archiving of knowledge.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**; *Empirical studies in HCI*;

KEYWORDS

Livestreaming, intangible cultural heritage, user engagement, social media, cultural preservation

ACM Reference Format:

Zhicong Lu, Michelle Annett, Mingming Fan, and Daniel Wigdor. 2019. “I feel it is my responsibility to stream”: Streaming and Engaging with Intangible Cultural Heritage through Livestreaming. In *CHI Conference on Human Factors in Computing Systems Proceedings (CHI 2019)*, May 4–9, 2019, Glasgow, Scotland UK. ACM, New York, NY, USA, 14 pages. <https://doi.org/10.1145/3290605.3300459>

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org. *CHI'19*, May 4–9, 2019, Glasgow, Scotland UK

© 2019 Copyright held by the owner/author(s). Publication rights licensed to ACM.

ACM ISBN 978-1-4503-5970-2/19/05...\$15.00

<https://doi.org/10.1145/3290605.3300459>

1 INTRODUCTION

As noted by UNESCO (United Nations Educational, Scientific, and Cultural Organization), “*Cultural diversity is as necessary for humankind as biodiversity is for nature*” [23]. Over the last few decades, globalization has led to an increased sense of urgency to maintain cultural diversity through the protection and promotion of cultural heritage [22]. Most often, preservation activities focus on entities of tangible cultural heritage, e.g., monuments and historical sites, however, there has been a growing interest in *intangible cultural heritage* (ICH). Intangible cultural heritage refers to social practices and traditions rooted in local cultures, such as oral traditions, customs, language, music, and craftsmanship (Figure 1), which are often passed down by personal exchanges and oral mentoring [48]. These practices are not only a manifestation of human intelligence and creativity, but also a medium through which to transmit the wealth of human knowledge from generation to generation [11]. However, they are continually being threatened by globalization, which has caused new generations to lose interest in them.

In recent years, the proliferation of high-speed internet and high resolution cameras on mobile devices has led to a surge in livestreaming [12, 18, 19, 24, 46]. This “third-wave” of mobile livestreaming has enabled the average person to use their mobile devices to stream their life and socialize with their audience, in real time [26]. Recently, Lu et al. reported on the emergence of livestreamers in China, some of whom livestream traditional cultural practices [28]. Livestreams about ICH enable viewers to become aware of, appreciate, and gain knowledge about cultural practices using real-time media. With its growing popularity, livestreaming has the potential to enable ICH to reach a broader, more global audience, raise public awareness and interest in ICH practices, and further assist in the safeguarding of such practices.

To better understand the practices, opportunities, and challenges of using livestreaming platforms for the dissemination of ICH, we conducted an interview-based study with 10 streamers who livestream ICH-related content, and 8 viewers of these streamers. We found that ICH streamers were less motivated by financial benefits but were motivated by self-perceived responsibilities to safeguard the cultural practices of their expertise. Streamers also curated their livestream content to meet different viewer goals, e.g., appreciating the art or craftsmanship, socializing with others, collecting artifacts, or acquiring knowledge. Streamers also leveraged live and non-live media (e.g., curated videos or posts) for different purposes. Live media was used to interact with viewers in real time, answer questions, and provide knowledge in context, whereas non-live media was used to post curated content, gain attention from a broader audience, and archive knowledge for post-hoc learning.

Because livestreaming in China differs from that in North America in terms of content and platform design [28], and few ICH-related livestream readily occur outside of China, the aim of our work is to understand ICH livestreaming within the unique social and cultural context in China, but not to explicitly generalize all aspects of Chinese ICH livestreaming to other contexts, especially in light of the many cultural-specific ICH sensibilities found in other cultures [15].

The contributions of this work are thus, an interview-based study that identified i) the practices and motivations of streamers who livestream ICH-related content, and how this differs from other categories such as video gaming, ii) how streamers engage viewers with ICH-related content through different media, and iii) design implications to improve the software and tools available to ICH streamers and viewers. We also provide insights into what other practitioners safeguarding ICH in China or in other countries can learn from Chinese ICH livestreaming practices.

2 BACKGROUND AND RELATED WORK

Research into ICH, engaging local communities to protect ICH, the technology available to safeguard ICH, and current livestreaming and ICH practices in China all helped inform the direction of this work.

Intangible Cultural Heritage

Every community has its cultural heritage. Heritage is most recognizable within tangible heritage such as monuments and historical sites, however, equally important are the intangible facets of heritage, e.g., music and craftsmanship. Globalization and modernization have led to the large scale destruction of traditional ways of living, and modern urban lifestyles have discouraged ICH practices [22]. The safeguarding of cultural heritage has always been a goal of institutions such as UNESCO [22]. However, only in recent years has the focus shifted towards intangible heritage, people, and their culture [25]. In 2003, UNESCO introduced the *Convention for the Safeguarding of the Intangible Cultural Heritage* [48], which defined intangible cultural heritage as “*practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups, and individuals recognize as part of their cultural heritage*” [48]. The Convention inscribed a broad range of practices and expressions, including languages, oral traditions, performing arts, rituals, festivities, and traditional craftsmanship. These practices and knowledge are essential to sense of social and cultural identity and cultural continuity of local communities [25]. UNESCO has created a list of ICH practices in need of urgent safeguarding and, when possible, has made photographs and audio-visual recordings of these practices accessible online [50]. Although

this list helps raise awareness about ICH, it provides limited guidance on how to engage local communities [17].

Community Participation to Protect ICH

Intergenerational transmission within local communities is essential to safeguarding ICH [15]. Because of this, much research has taken a bottom-up perspective to investigate how to encourage local communities to safeguard ICH [39]. For example, mainstream public archives of ICH in the UK have developed flexible practices to work with local communities, allowing them to regain control over their material while still getting support from public archives for long-term safeguarding [43]. Some participatory ICH protection projects in China have shown that even though the government and experts provide guidance and policy support to local communities, success is not warranted if local communities, which can be composed of minor ethnicities from rural areas that hold primitive life-styles or are illiterate [22], do not play a role in the decision making processes [32]. Research has shown that many community-based safeguarding projects suffered from an insufficient understanding of users' needs [1, 35], digital illiteracy [44], partial engagement by the community [10], and often resulted in new divisions within a community [13]. Based on these findings, we aim to explore how livestreaming, a new form of media which facilitates the forming of online communities and improves user engagement [19, 28], could encourage community participation and engagement in the safeguarding of ICH.

Safeguarding ICH through Technology

Although technology is often considered a threat to many cultural practices, many innovations in Information and Communication Technology (ICT) have contributed to the identification, documentation, dissemination, education, and safeguarding of ICH. For example, the i-Treasures project developed an open and extendable platform to identify features or patterns of ICH for research or education [11] using technologies such as facial expression analysis, vocal tract modelling, body motion analysis, 3D visualization, and text-to-song synthesis [2]. The use of serious games [16, 29], tangible interaction [38], crowdsourcing [34], wikis [14, 36], and augmented and virtual reality [3] have been explored for cultural heritage education, in cases such as indigenous customs [20], festivals [8], sports and games [47], and dance [21]. Most of these projects did not involve ICH practitioners when end users were interacting with the systems. Little research has explored how ICH practitioners themselves use technology, how to leverage the bonds and interactions that often grow between ICH practitioners and users, and how new forms of social media (i.e., livestreaming), can engage users and facilitate the dissemination and learning of ICH.

ICH and Livestreaming in China

China has many cultural heritage practices, among which 39 have been identified by UNESCO as representative of ICH [49]. The Chinese government has also implemented a policy of “*central initiative and local participation*” and developed its own framework to identify, classify, and safeguard ICH practices at national, regional, and local levels [22]. There are critiques of this framework because government-led approaches may not fully engage local communities and may even exploit or misuse cultural heritage [7, 32]. Further, although Chinese citizens have an increased awareness of ICH in recent years, most “common” people are reported to be indifferent to ICH and few desire to be successors of ICH [7].

Livestreaming in China attracted over 324 million users in 2017, with the top 9 popular platforms having over 2 million daily active users [28]. Since 2017, most popular livestreaming platforms in China have begun to officially host special live ICH events and promote ICH streamers [28, 31]. Although previous research on livestreaming has explored the different types of content that engages viewers, e.g., video gaming [19, 37], live events [18], experience sharing [46], live performance [28], civic engagement [12], and shopping [5], little has focused on understanding ICH-related livestreams, streamers, and viewers. We thus aim to explore the motivations, practices, and challenges of sharing and watching ICH-related livestreams to gain insights into how to better design interfaces to support engagement and improve the transmission of ICH through livestreaming.

3 METHODS

Inspired by the prevalence of ICH-related livestreams in China, we sought to explore these research questions:

RQ1: What are the practices and motivations for sharing and watching ICH-related livestreams in China?

RQ2: How do ICH streamers interact with, and engage, viewers?

RQ3: What are the perceived benefits, drawbacks, and positive and negative experiences by both the ICH streamers and viewers?

Interviews

Semi-structured interviews were conducted with 10 ICH livestreamers (Table 1) and 8 viewers of these streamers to understand their practices (Table 2). The interviews were conducted remotely using video or audio calls in July and August 2018. Each interview lasted approximately 50 minutes, and participants were provided with a 50 CNY honorarium for their time. Interviews with streamers included questions about how they started livestreaming, their motivations to stream ICH-related content, their stream structures, how they interacted and engaged with viewers, their positive and negative experiences with livestreaming, and the challenges they faced while livestreaming. Interviews with viewers included questions about their motivations to watch

Table 1: Summary of streamers interviewed. Streaming Platforms: K–Kuaishou, H–Huoshan, D–Douyin; Location: cities listed according to the Chinese city tier system [52].

ID	Sex	Age	ICH Category	Years Streaming	Years w/ ICH	# of Followers	Platforms	Location
S1	F	28	Jade Carving	0.5	10+	30k	K	Tier 1
S2	M	47	Steamed Bun Figurine	1	20+	89k	K	Tier 3
S3	M	26	Peking Opera	<0.5	10+	11k	H	Tier 2
S4	F	45	Dough Figurines	0.5	30+	645k	K	Tier 1
S5	F	32	Chinese Paper-cutting	1.5	3	237k	D & H	Tier 1
S6	M	33	Chinese Calligraphy	2	10+	90k	K & H	Tier 2
S7	M	30	Pit Carving	1.5	8	8.4k	K & H	Tier 3
S8	F	27	Guqin (Chinese Zither)	1.5	3	3.4k	K & D	Tier 3
S9	M	27	Chinese Calligraphy	1+	10	18k	K	Tier 2
S10	F	31	Chinese Embroidery	2	4	50k	K & H	Rural

Table 2: Summary of viewers interviewed. Location: cities listed according to the Chinese city tier system [52].

ID	Sex	Age	Streamers Watched	Years Watching LS	Viewing Sessions Per Week	Type of Learner	Location
V1	F	41	S6, S8	<1	2	Casual	Tier 1
V2	F	50	S3	0.5	3	Casual	Tier 2
V3	M	52	S3	1.5	3	Casual	Tier 1
V4	F	42	S6	<1	5	Casual	Tier 1
V5	M	25	S6, S9	1	2	Casual	Rural
V6	M	38	S4	<1	5	Professional	Tier 3
V7	M	30	S1	2	3	Casual	Tier 2
V8	M	32	S1, S4	1.5	2	Professional	Tier 1

ICH-related content, what types of content they watched, how long they had been watching such content, what the advantages and drawbacks of ICH livestreams compared to ICH content in other media were, what they liked or disliked about ICH-related livestreams, and how they interacted with streamers and other viewers. Interviews were conducted in Mandarin, audio-taped, and later transcribed by the author (a native Mandarin speaker) who conducted the interviews.

Recruitment

Streamers were recruited by sending direct messages on streaming platforms or sending messages to the WeChat accounts disclosed on their public profile. We searched through the top 10 streaming platforms in China (e.g., Douyu.tv, Inke, Kuaishou, etc. [28]) and popular video sharing mobile applications with livestreaming functionality (i.e., Douyin, Huoshan) using ICH related keywords (e.g., Guqin, figurine, etc.), and sent direct messages to those streamers who had streamed in the past 2 weeks and had over 1,000 followers.

We contacted 87 streamers in total and 10 streamers were willing to be interviewed (denoted as S1 – S10). S1 was a craftsman who ran a jade carving studio. S2 was running

a home-based business selling steamed bun figurines who also sometimes taught apprentices from local areas about the practice. S3 was an office-worker but had practiced Peking Opera for more than 10 years. S4 was a renowned craftsman who made and sold intricate dough figurines for over 30 years. S5 was a housewife interested in paper-cutting and often practiced it during her spare time. S6 and S9 were both office-workers interested in Chinese Calligraphy and had practiced and casually wrote it for over 10 years. S7 was a full-time pit carver who sold their artifacts. S8 was a worker in a tech company but quit her job to work on safeguarding Guqin and now ran a school teaching Guqin. S10 was a housewife living in a rural area, who made and sold Chinese embroidery from her home.

Viewers were recruited by either sending direct messages to them on the livestreaming platforms (V1, V4, V5, V6), or by contacting them in the group chat of the streamers (V2, V3, V7, V8). Sending direct messages on streaming platforms to viewers resulted in a very low response rate. We had contacted 73 viewers in total, but only 8 viewers were willing to participate. Many viewers were skeptical about our intentions and many worried that they would not be able to provide constructive answers to our questions, so they did not agree to be interviewed. This challenge made us unable to recruit more viewers for interviews.

To build rapport with the streamers and viewers who agreed to be interviewed, we identified ourselves to them while we started to watch their streams and join fan chat groups on WeChat or QQ [28] 2 weeks prior to the interviews. This allowed us to become part of their viewership and ask focused, informed questions about their community and streaming and viewing practices during the interviews.

Data Analysis

The interview transcripts were analyzed using an open coding method [9]. Two native Mandarin-speaking authors coded the transcripts individually and met to gain consensus on their codes. All the codes were then translated into English and were discussed by the research team using affinity diagramming [4] as a modified version of grounded theory analysis [9]. All codes were transcribed on sticky notes which were arranged in a random order. We then iteratively arranged the notes into a hierarchy of themes and reached a consensus about the general patterns of ICH streaming.

4 FINDINGS

The affinity diagramming activity revealed 5 main themes about ICH livestreaming in China: *the activities and practices of streamers, motivations to watch and stream ICH, promotional strategies used by streamers, the use of technology beyond livestreaming to promote ICH*, and the growing importance of *e-commerce within ICH livestreams*.

Activities and Practices of ICH Streamers

Although the workload required to prepare and conduct ICH streams is significant, all the interviewed streamers *voluntarily* stream about ICH practices on public streaming platforms which are accessible to anyone.

ICH Streamer Practices. As shown in [28], there is a fragmentation of users among the popular streaming platforms that coexist in China. Unlike many popular streamers who are contracted to one platform exclusively [28], many ICH streamers streamed on multiple platforms. For some, this took the form of posting pre-recorded, curated videos about ICH practices on multiple platforms to test if viewers on those platforms like their content. S7 and S10 reported that they use two mobile phones to livestream on two platforms simultaneously to maximize their visibility. For others, they choose platforms that are mostly used by local people because they want to engage local people for potential offline interactions, e.g., “*I want more local people to watch my streams so that I can attract them to come to my school*” (S8).

When deciding which platforms to stream on, the demographics of viewers was one factor, as different platforms have clusters of different viewers, i.e., “*Douyin is more used by Millennials in Tier 1 and Tier 2 cities, while Kuaishou is more used by people from Tier 3 and Tier 4 cities or rural areas, who may be more interested in ICH*” (S7). The “realness” of the audience was another factor. To increase viewership and encourage more streaming content, many services use bots to stimulate streams, however, they were not favored by streamers, “*I prefer to use Kuaishou because viewers on it are real people. They ask questions and contact me on WeChat. I don’t need any bots. I want real interactions*” (S1).

In terms of when streamers decided to stream, a variety of schedules emerged. Streamers who had more flexible schedules streamed daily, and had a fixed schedule to reach the most viewers. For those with full-time professions, if videos they posted went viral on one platform, i.e., it received many likes, comments or shares, they would stream that day on that platform to gain more visibility and attention from new followers. For others, the decision to stream was dictated by convenience, “*When there are some common questions that the fans keep asking [in group chat], I will stream to answer them instead of replying one by one*” (S6). For them, the ease with which they could start a livestream to answer questions, as opposed to answering the same question multiple times, encouraged them to use livestreaming to save time.

Streaming Structures. Streamers used diverse streaming structures to showcase ICH practices. Across all streamers, however, each used a basic model wherein they used live video to showcase themselves performing the ICH practice (with video frames including their upper body and face) and

simultaneously narrated while they were performing the practice. Streamers interact with viewers in real time using chat functions. Such streams lasted from one to two hours. A number of other streaming structures were also used.

Question and Answer Sessions. Most of the streamers mentioned that they sometimes hosted special Q&A sessions focused on answering frequently asked questions from viewers about cultural backgrounds or common misunderstandings. Such sessions were mostly on demand and viewers were informed about the schedule in group chat.

Live Talks by Other Experts. S8 and S6 sometimes invited artists or other cultural practitioners to give talks about arts and life in their streams. This enabled viewers to reflect on arts, culture, and life, “*Playing Guqin is not just about skills. Learners must have a deep understanding about life and nature to understand the background and the true meaning behind the music scores*” (S8). Viewers found such talks inspiring and beneficial, as V1 noted, “*By watching these talks of whom I might not have access to before, I am inspired to think deeper about arts and self. These deeper thoughts are very important for playing Guqin, as for me, playing Guqin is like having conversations with myself*”.

Live Performances by Learners. S3, S4 and S8 reported that they invited several learners to give live performances as part of their livestreams so that the streamer could comment on the performance during their stream. Such invitational shows happened physically or virtually online. S4 and S8 liked to invite local learners to come to their studios and streamed them playing Guqin or making dough figurines. S3 leveraged online media, since most of his viewers were not local. He used WeSing, a mobile app for singing and sharing Karaoke, to host live sessions of performances by learners. He remarked that he usually created a live “Karaoke room” on WeSing to allow all of his viewers to join and take turns to sing their favorite songs of Peking Opera. He chose to use WeSing to host such sessions, which was not affiliated with his streaming platform of choice, Huoshan, because “*other streaming apps do not have instrumental music and lyrics for Peking Opera*”, and WeSing allows users to upload customized music clips. Viewers who are cautious about their privacy can also participate because WeSing allows for the recording of audio without video. As the room is open to the public, it also helped the streamer attract more fans because anyone can join the room.

Live Tutorials about Fundamental Knowledge. To attract a broader audience and benefit more viewers, S1, a jade carver, reported that she also collaborates with other streamers to give live tutorials about design sketching, so that even viewers who do not carve jade can learn fundamental design skills. The invited collaborators each streamed about their own expertise, e.g., sketching the human body or flowers, and often shared common groups of viewers. “*Since most of*

my viewers are craftsmen and many of them have not finished college or even high school, they had limited training in a lot of skills, including arts and design. We would like to help all of them improve by streaming basic sketching skills. It can potentially benefit our craftsmen” (S1).

The diversity of the streaming structures and additional technology used for these endeavors, suggest that a one-size-fits-all app would unlikely be beneficial for ICH streamers.

Motivations of Streamers

We identified four motivations of ICH streamers in China: *transmission and enhanced visibility of ICH, sociality, positive impact, and self-improvement.*

Transmission and Enhanced Visibility of ICH. A perceived responsibility to enable more people to be aware of, and engage with, ICH motivated all the interviewed streamers, e.g., *“young adults should not just play games using mobile phones. I feel it is my responsibility to stream. With more livestreams like mine, they could also use mobiles to learn about ICH practices. ICH is the roots of our Chinese culture inherited from our ancestors”* (S4). Unlike popular video gaming streamers or performers [24], ICH streamers were less interested in receiving virtual gifts in streams. They did not want to create the impression that only those who were able to buy many virtual gifts could engage with ICH, but rather that everyone could have equal access. Because of this, few streamers induce viewers to buy virtual gifts during their streams, e.g., *“I understand that many viewers of mine are students who are learning crafting. They don’t have much money, so I never encourage them to buy virtual gifts for me”* (S1).

Sociality. All streamers also commented that livestreaming provides them more chances to communicate with people they may not otherwise had chances to speak to before. As S2 noted, *“traditional craftsmen in China were often isolated from the society, because they worked very hard mastering the techniques and seldom went out of their studios”*. With livestreaming, such craftsmen have a direct communication channel to the outside world, even when they are crafting. This direct access gives cultural practitioners the ability to quickly clear up misunderstandings about ICH practices, e.g., *“Some streamers who are not real experts are misleading the viewers about some calligraphy skills. Sometimes in my streams, I try to correct my viewers about this”* (S9). Being social through livestreaming can also reduce loneliness for some streamers, e.g., *“Writing calligraphy alone often makes me feel lonely, but when I livestream while writing and chatting casually with fans, it makes me feel much better”* (S6).

Positive Impact. Nine interviewed streamers also reported that livestreaming enables them to have power to positively impact ICH practitioners and fans. Streamers can promote ICH on a large scale without geographical constraints, e.g., *“Before I started livestreaming, I could only teach*

tens of local people calligraphy. Now I have learners from across China” (S6). Further, through exposure to ICH, live lectures, and live tutorials, viewers can develop an appreciation for these traditional art forms and the efforts and labor behind the practices, e.g., *“if people are always exposed to artifacts that are mass-produced by machines, they are not able to develop aesthetic senses, and few will appreciate handcrafts. Through our efforts streaming practices and teaching sketching skills, we hope that people can gradually have a better taste of crafts, which is beneficial to the whole craft industry”* (S1).

Self-improvement. Nine streamers noted that livestreaming had made a positive impact on their lives. Encountering people from diverse backgrounds allowed them to see how different people react to their performance or artifacts and, sometimes, enabled them to draw inspiration from their conversations, e.g., *“Once there were some viewers who are experts in mechanical engineering. They pointed me to some tools I could leverage to boost my efficiency”* (S7). As some viewers are also experts, especially for calligraphy and Peking Opera, such viewers often help the streamers improve their own skills as well. As S6 noted, *“sometimes viewers give me advice when watching me writing calligraphy. Some advice is helpful. I cannot easily recognize it by myself”*. Further, to engage and impress viewers during the stream, some streamers make great efforts to practice and improve both their speaking and ICH-related skills, which in turn makes them feel a sense of self-fulfillment, e.g., *“I don’t want to err in my streams, and only show viewers when I think it is close to perfect. So, I practice many times before going to stream”* (S9).

Motivations of Viewers

We identified four motivations for watching ICH livestreams: *learning, engaging with arts, interest in the artifacts, and connecting with others.* Since connecting with others is also a tenant of other types of livestreams [19, 28, 46], we focus on the other three here.

Learning. All the interviewed viewers reported their main motivation for watching ICH livestreams was learning. They liked the detailed demonstrations performed by the streamers, the direct interaction that they could have with the streamers, the possibility of learning skills by practicing alongside the streamers, the ability to ask questions in-situ, and the closeness that they feel to the streamers, who seem akin to role models but are more approachable than well-known ICH masters. As V3 mentioned, *“by listening to the streamer [S3] singing opera, I learned a lot of subtle tricks which I cannot learn from other well-known masters. I think it is because he has more experience on what problems average people may have and he highlights the details in his streams”*.

Engaging with the Arts. Most viewers shared that they also watch ICH livestreams for an edification of the arts and reflections on life. Listening to Guqin music, watching Peking

Opera, and appreciating calligraphy are all traditionally seen as activities part of an elegant life style in China. Livestreams make these activities more accessible and affordable to most viewers. Viewers also found it beneficial to listen to streamers about their own thoughts on culture and life, e.g., *"I was greatly inspired by her [S8] deep thoughts on life style and Guqin culture. I began to realize that learning to play Guqin is also about the cultivation of mind"* (V1).

Interest in the Artifacts. For viewers who watch crafting or calligraphy, they often expressed an interest in purchasing the artifacts that the streamers were making during the stream. Some saw the artifacts as having a collectible value, whereas others enjoyed watching the production process of an artifact and wanted to have the artifact since watching how it was made *"embedded more meaning"* (V6). They were also motivated to learn more about how to identify high-quality from poor-quality or fake artifacts, e.g., *"the streamer [S9] told us a lot about inside stories of calligraphy market, and I learned some tricks to be a wiser buyer"* (V5).

Strategies to Promote ICH

To better engage viewers and promote ICH, streamers used a number of techniques, including using *curated content that was always available, giving away gifts or free artifacts, and offering apprenticeship opportunities.*

Always Available, Curated Content. Because some streamers cannot livestream regularly due to their full-time jobs, they constantly post curated short videos on the streaming platforms to maintain their fan base and increase their visibility. As S9 noted, *"it is much more flexible to post curated video than to livestream, because I don't need to commit a period over one hour to streaming. I can capture a short video even when I am very busy"*. The length of the short videos often ranges from several seconds to one minute, and due to their format, they can be widely shared on social media. The content of such curated videos is often creative and focused, highlighting unique features of ICH, e.g., a video demonstrating how to make a rose from dough (S2). Viewer comments on these curated videos and the number of likes can provide useful feedback for the streamers to improve their content. S8 and S9 noted that they sometimes tested how viewers might react to different livestreaming content by observing the comments and number of likes to the curated videos.

The streamers engaged viewers with live and curated videos in complementary ways. If viewers raise questions during livestreams, the streamer can then call out the curated videos to attract more people to watch the videos which contain answers, hints, or other useful information (S1, S8). The more views a streamer has of their curated videos, the more likely they are to be featured on the platform, and thus visible to new viewers. On the other hand, because curated videos

are always visible to all users on a platform, and the more creative the content, the more likely it will stimulate users' curiosity, which could lead to increased followership and viewers' interest in watching streams when they are live.

The interviewed viewers also mentioned that they engage with the live and curated videos in an interleaved manner. They enjoy the liveness and realness of livestreams, but also like the creativity and convenience of the curated videos, e.g., *"I enjoy chatting with other viewers during livestreams. When I am too busy to watch livestreams, I can watch the short videos to relax"* (V2). While watching livestreams, sometimes they start watching the curated videos out of curiosity or the need to recall some important information, and then they jump back to the livestream. By doing this, however, they may have missed important information in the livestream. Because there are no summarization features within a livestream, viewers often get lost when they come back to the livestream. Viewers also noted that when they watched the curated videos and had questions, instead of asking the streamers via commenting or direct messaging, they prefer to go to livestreams to ask the streamers. As V8 noted, *"it feels more direct and intuitive to get answers during the stream, because she [S1] can provide more details and even demonstrate a relevant technique or process"*. Some viewers go to curated videos after watching the streams because the curated videos help them recall key points in livestreams.

The always available nature of curated videos also enables streamers to improve upon their own streams by watching other streamers' curated videos to get inspiration, e.g., *"I watch other popular streamers who stream about calligraphy to see how they control the camera, and what music they play during the stream, and then adapt some good practices to mine"* (S6). Many streamers also work hard to modernize the content or topics of their curated videos or streams. For example, because Guqin only has limited traditional music scores, to avoid potential boredom, S8 sometimes played modern popular music using Guqin to attract more viewers.

Rewarding Viewers. Similar to many popular streamers in China [28], streamers can also reward viewers by giving them free gifts or hosting auctions for their artifacts. The difference between this and typical livestreaming content is that the free gifts or artifacts for bidding are crafted by the streamers during the livestream and can be customized to the specifications or desires of viewers in real time. This helps viewers form a bond with the artifacts they are watching being created. Viewers also reported viewing the invitation to perform in a live sharing session as a reward, e.g., *"Being invited by him [S3] to perform and share with peer viewers seems to be an approval for me. I think I also benefit from it because it urges me practice more to improve my skills and makes me feel more comfortable with speaking publicly"* (V2).

Apprenticeship. Many ICH practices in China are traditionally transmitted from masters to apprentices [22]. Although livestreaming brings more learners and awareness to ICH practitioners, some still maintain apprenticeship traditions. For such streamers, livestreaming is a recruitment tool and can enable apprentices to showcase their talents. These apprentices, however, often have more privileges compared to average learners, for example, S4 only teaches his apprentices about ingredients of the dough he uses. S4 is also the main streamer in his stream, but occasionally lets some of his apprentices stream during less popular time periods. He reported that he is very strict when selecting apprentices, e.g., "I only choose those who have good character and moral principles" (S4). This practice was rooted in a stigma about apprenticeship in traditional craftsmanship, wherein if the master teaches everything he knows to an apprentice who lacks integrity, the apprentice would eventually dominate the business and thus starve the master.

Social Interactions Beyond Livestreams

In addition to using streaming platforms, several additional tools were used by almost all streamers to encourage social interactions between themselves and their viewers.

Private Fan Groups. Most interviewed streamers disclose their personal WeChat or QQ IDs while streaming or on their public profiles on streaming platforms. Unlike many popular streamers in China who have fan groups that are open to all [28], these streamers maintain closed and private fan groups. Viewers who want to join the streamer's group must first befriend the streamer on WeChat or QQ, and then get invited by the streamer to join their fan group. This ensures that all the members in the group chat are really interested in the ICH practices and helps reduce scams, e.g., "there are many people scamming in group chats on WeChat, especially those of strangers. His [S3] fan group is much better, since members are selected" (V3). As the members of the private group are curated, there are few instances of off-topic conversation because the livestreams provide more of a common grounding for the group and thus members are more focused on discussions about the skills or knowledge related to the ICH practice. As S8 noted, "the learners often post some videos of them practicing Guqin, and I often provide feedback to help them improve in the group chat".

Peer Learning Sessions in Group Chat. Fan groups also serve an additional function for streamers, i.e., as a classroom to deliver more customized guidance. For example, S1, S5, S8, and S9 often invite a subset of fans to a provisional group chat for a peer learning session. Peer learning sessions typically last about 90 minutes, during which members try to learn and help each other learn by posting videos and pictures of themselves performing the ICH practices and then comment

on the posted videos and pictures. Viewers like the positive and supportive atmosphere of these sessions, the constructive criticism they receive from peers, and the collaborative rather than competitive norms of these sessions, e.g., "our relationship grows as we learn from each other, and the group feels like a family. We care about, and encourage each other, so that we all make progress" (V1). Similar to knowledge sharing livestreams [27], some viewers voluntarily serve as teaching assistants in the group, helping the streamer prepare materials that will be used in the stream, and helping others learn, e.g., "I voluntarily help him [S3] make instrumental music, and persuade peers to practice singing regularly. I feel happy when the peers can benefit from my efforts" (V3).

Other Interactions on WeChat. In addition to private chat groups, streamers often communicate with fans on WeChat. They often use WeChat to send pre-recorded videos to viewers about specific skills through direct messaging (S2 and S10). If the video is insufficient, streamers will often use video calling to have a one-on-one conversation or demo session with the viewer. As S2 noted, "I feel that I am responsible to help learners improve. When they are stuck on some problems, video calling is the most efficient way to help them".

Streamers also make use of WeChat Moments, a social feed feature similar to feeds of friends on Facebook. Streamers regularly post photos or videos about ICH or their new pieces of work in WeChat Moment, post screenshots of their conversations with other viewers about ICH, or post screenshots about their transactions of artifacts (Figure 2). This allows the streamer to be more transparent to viewers and continually provide them with new, interesting content.

Viewers are also actively using WeChat Moments. For example, V1, V2, V4, and V5 all reported posting photos or videos of themselves crafting or learning skills. Streamers sometimes comment on these posts to provide the poster,



Figure 2: Left: A WeChat Moment where S6 shares photos and videos of calligraphy; Right: A screenshot of the conversation about a transaction for calligraphy, showing the money transfer, which is shared in a WeChat Moment.

and rest of the community with feedback and opportunities to improve, e.g., *"If I comment on a learner's WeChat Moment, others can also see my feedback and also learn from it"* (S8).

E-commerce

A surprising theme that emerged was the e-commerce side of ICH. All interviewed streamers run some sort of business related to their ICH practice, either providing professional online or offline mentoring of the practice or by selling artifacts (e.g., calligraphy or figurines). Although there was not an expectation that such activities would result in a large income, e-commerce is important aspect of the livestreaming process because it does motivate some streamers and the increased visibility that livestreaming affords may help streamers sell more artifacts thereby ensuring the sustainability of their ICH practices, e.g., *"I sell some pieces of calligraphy just to cover the expense of tools and materials I need for calligraphy"* (S9), *"I stream mainly for promoting my offline studio to attract more potential learners to come"* (S8). E-commerce often took the form of *direct selling via WeChat, enabled for iterative production processes, and supported Jieyuan.*

Direct Selling on WeChat. Surprisingly, most streamers do not use Taobao, the largest Chinese e-commerce website, or other e-marketplaces to sell their artifacts. These e-marketplaces are not suitable for selling ICH related artifacts, because the items sold on these platforms are mostly manufactured by machines and are cheap, two principles that do not align with ICH practices (S1, S9). Some streamers reported that they do not use these platforms because they do not have the time or energy to manage online shops (S2, S5, S6), e.g., *"dealing with customer services on Taobao can be really troublesome"* (S5). In other cases, such as with S10, a lack of technological literacy prevents them from using e-commerce platforms, e.g., *"I don't know anyone around me who knows how to set up a shop in Taobao in our village. I also seldom use desktop computers, which is necessary for managing an online shop"* (S10). Thus, many streamers leverage WeChat to sell artifacts. They post images and videos of their artifacts on streaming platforms or in WeChat Moments, and those who wish to purchase them can directly contact the streamer on WeChat. The mobile payment feature of WeChat allows the viewing buyer to transfer money to the streamer directly and instantly. Although such direct money transfers with strangers can be risky, many viewing buyers have already formed a bond and degree of trust with the streamer so they do not feel that such transactions are risky e.g., *"since I often watch his [S6] streams and we have already chatted for many times, I don't think he will cheat on me"* (V5), *"I trust those who practice ICH. If one is good at, for example, calligraphy or Guqin, it is unlikely that he will cheat"* (V4). The direct access that the viewers have with the streamer has enabled a strong

bond to grow between viewers and streamers and thus a new mechanism through which e-commerce can occur.

Iterative, Personalized Production Processes. The real-time interactivity of livestreams and direct communication channels also make it possible for viewers to have the artifact they wish to own personalized by the streamer. For example, during S9's streams, viewing buyers can watch S9's writing process and give him feedback in real time. This feedback can then be used to modify the calligraphy that he is creating to satisfy the desires of his viewers. For artifacts that require more time to produce, e.g., embroidery, S10 leverages both livestreams and WeChat. Her viewers can either watch her livestreams or ask her to send photos or videos of the progress she is making on a piece through direct messaging. For S10, although this degree of interactivity and access can be very demanding, she is still willing to do so for the sake of craftsmanship, e.g., *"as long as the request is reasonable and good for the product, I will try to fulfill it no matter how hard it is. After all, it is hard work to make embroidery, I want my product to be as perfect as possible"* (S10).

"Jieyuan": Bonding with the Artifacts and Craftsman. In Chinese folk religion, *Jieyuan*, or the building of "yuan", traditionally refers to *"building a natural affinity with someone"* [53]. We found that several interviewed streamers advertise and treat the selling of artifacts to viewers as *Jieyuan*. To these streamers, the selling of artifacts is not just a transaction or a question of money, but also enables buyers to build a relationship or bond with the artifact they are acquiring, and ultimately, with the streamers themselves, e.g., *"every craft is unique and is resulted from my hard work, so I treat it as my child. It is priceless. It is waiting for someone who can truly appreciate it and love it"* (S4), *"as a craftsman, I expect to encounter those who understand and appreciate my craftsmanship. If I meet someone like this, I may send my artifacts as gifts to him rather than selling them"* (S7).

ICH Streaming Challenges

In addition to uncovering a number of benefits of livestreaming to ICH streamers and viewers, our interviews revealed a number of challenges associated with livestreaming today.

Fragmented Technology Eco-System. Our interviews revealed that the technology landscape surrounding livestreaming ICH activities is fragmented and complex. ICH streamers use various mobile applications, including different streaming platforms, short video sharing, instant messaging apps (e.g., WeChat and QQ), and even WeSing, to help them better engage viewers, promote ICH, and conduct e-commerce transactions. These app appropriations [6] and practices have resulted in a fragmented and complex ICH livestreaming ecosystem (Figure 3). Our results highlighted the complementary

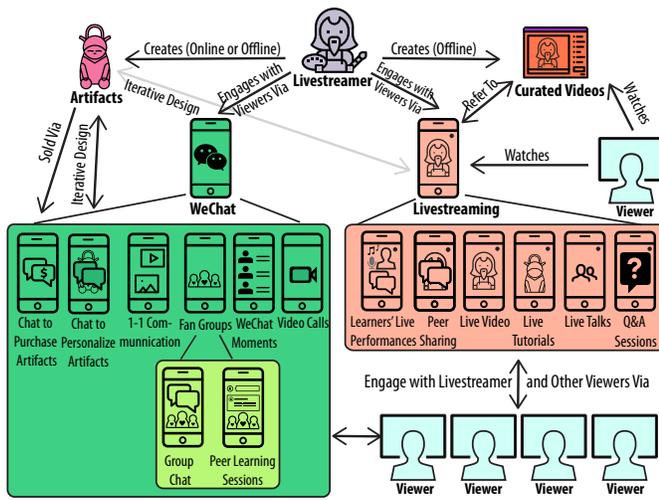


Figure 3: The current eco-system of engaging with ICH livestreamers and viewers, which is dominated by livestreaming software and WeChat usage.

effects of live and curated video, however, most streamers separated the two procedures and thought of them as distinct sets of streaming actions. As a result, the two forms of media competed for time and attention. Tools should thus be designed to help the streamers easily make curated short video summaries from the archive of their livestreams and should leverage concurrent viewer’s input to achieve this.

Further to this, ICH practices often involve showcasing a variety of content including live video, pre-recorded video, photographs, chat groups, e-commerce, and so on. As this list only will continue to grow, livestreaming software needs to support the use of more rich media and content. For example, the design of multi-camera or VR systems would enable viewers and streamers to showcase different angles of the same process or enable viewers to engage with ICH skills or artifacts via tangible interfaces or haptic feedback. Such systems should also support real-time co-design practices between the streamers and viewers, to enable viewers to have more hands-on experiences which can improve learning and their *Jieyuan* with the artifact and streamer. Some design opportunities regarding e-commerce are unique within ICH livestreaming, e.g., designing tools to help streamers manage ad hoc transactions in-stream and beyond.

Physical and Cognitive Demands of Streaming. Because most ICH practices require a lot of physical and cognitive skills, many streamers find it hard to keep interacting with viewers while streaming ICH, e.g. "if I talk too much, it could influence the quality of my craft; however, if I don't response to viewers' comments, some of them may be annoyed" (S1). On the other hand, some viewers understand this challenge,

and quietly watch the livestream to avoid interrupting the streamer. This often results in a less "active" stream, e.g., "quiet streams can also be engaging. I feel peaceful in mind watching such streams, which I seldom feel watching other types of streams" (V5). However, as current streaming platforms encourage active streaming, and promote such streams with increased visibility, quiet ICH streams with fewer active viewers often become neglected by streaming platforms. To better support increasing visibility, platforms should consider other metrics to define engagement with livestreams, for example, user’s attention levels or arousal. Viewers engagement with the streamers via liking curated videos or chatting on WeChat, should also be considered, though such engagement is not easily trackable and will require partnerships between different social media platforms.

Misunderstandings and Unintentional Trolling. Streamers’ skills and talent are often respected by viewers, but some reported negative experiences due to misunderstandings. Because many viewers initially have limited knowledge about ICH practices, some challenge the talent of the streamer or the value and legitimacy of their degree of craftsmanship during the stream, e.g., "once there was a viewer commenting in my stream that 'this is just made of dough, why are you selling it at such a high price?' I was pissed off by him" (S4). Though such comments may not always be intentional, they discourage streamers as the comments relate to the ICH that they love. In some cases, streamers have treated such comments positively, for example, to impress other, non-trolling, viewers, e.g., "when a troll was challenging me in my stream that I was showing very easy paper-cutting skills, I presented my portfolio containing all my best pieces to viewers and introduced more background knowledge, which impressed the viewers and I got more followers" (S5).

Misunderstandings may also be a natural part of the ICH domain. For ICH practices such as Guqin and Peking Opera, there are many different ideological schools that disagree on the appropriate ways to perform skills or the origins or definitions of certain concepts. This often "results in some conflicts in streams" (S8), which can detract from the learning and knowledge acquisition within a stream or fan group chat. To improve the mutual understandings, tools should be designed to support in-stream discussion sessions and facilitate viewer participation and understanding.

Need for External Validation and Support. Many streamers noted that since they spent many years learning the ICH practices, they were discouraged by some other streamers who are not real experts in ICH practices but pretend to be experts and livestream to make money. They noted that this is not good for the ICH practitioner community because average people may be misled by these "fake experts", leaving them with bad impressions of ICH. To mitigate the negative

impact these fake experts might have, streamers expressed a desire for a verification or authenticity process. Such a process could allow them to have a verified check mark on their profiles, similar to Twitter, Facebook, or Instagram, and perhaps be endorsed and awarded by streaming platforms, viewers, professional organizations, or even the government.

In addition to verification support, some streamers noted that streamers in underdeveloped areas need extra external support, e.g., "*they may not have stable Internet connections and affordable logistics to handle delivery*" (S10). Without such support, the practices that streamers are versed in may be lost because they cannot reach a population outside their immediate surroundings.

5 DISCUSSION

The interviews uncovered many novel aspects of livestreaming that are unique to the domain of ICH. In what follows, we first situate our findings within previous livestreaming research and then raise three overarching concerns that researchers and practitioners of ICH should be mindful of when designing technologies for ICH promotion and preservation.

Situating within Existing Livestreaming Research

Our findings complement prior livestreaming research. We found that not only do livestreams [19] and fan group chats [28] serve as third places for streamer communities, but also demonstrated that curated videos, WeChat Moments, and other ad-hoc groups are used as satellite spaces by ICH streamers. We echo findings from Pellicone et al. [37], wherein streamers were found to negotiate tensions among social, performative, and economic motivations, but we discovered that ICH streamers are also motivated by feelings of a social responsibility for cultural transmission and positive social impact. We found that both livestreams and curated videos by ICH streamers engage viewers; livestreams provide interactivity and chances for sociality, while curated videos offer an easy way to browse rich content, echoing Haimson et al.'s findings on live events [18].

Further, some of many unique characteristics of gaming community found in prior work [37] were not shared by our interviewees (i.e., our participants self-reported that they were not video gamers nor did they often watch such streams). Our research demonstrated, for example, that ICH streamers have a more difficult time with fatigue and maintaining focus because ICH streamers often have to attend to their craft or performance and also try to interact with their streaming interface at the same time. Video gamers, in contrast, can make use of extensions that overlay chat text on their screen within their game so that they can continue to play their game and respond to viewers simultaneously. Due to these and other differences between the two streaming domains, future research should continue to understand

and explore the differences between video gamer and non-game streamers/viewers so as to ensure that the design of the streaming interfaces they utilize best matches their environmental contexts and activity demands.

Lastly, in our study, the demographics of streamers and viewers was varied to that in prior work. Past work has identified that involving viewers is difficult, even if streamers are engaged [27], and paid viewers tend to behave differently than volunteers watching live events[45]. We focused on viewers who were intrinsically motivated and interested in ICH, thus we invited those who regularly watched the streamers we interviewed. Although the audiences of many live streams are young viewers (e.g., teenagers or adolescents), few young people watched the ICH streamers we interviewed, e.g., S3 reported that most viewers in his chat group were over 30. Because ICH streamer viewership ages are skewed higher than most non-ICH livestreams, this likely has an impact on the style, tone, and amount of educational content contained within the streams (i.e., more focus was placed on explaining the historical contexts for a technique, there were less topical changes or off topic chatting, less upbeat music and flashy graphics were used, etc.). Although our interviewees skewed older, it would be fruitful to understand the influence that these facets of the livestreams themselves have on the recruitment and engagement of younger ICH viewers and also determine how to best support streamers in reaching and engaging audiences that are more diverse.

Trust in the Streaming Community

Trust has been identified as a necessary mechanism in e-commerce that is essential for transactions between strangers online [30]. The use of WeChat for ICH e-commerce echoed that exclusive membership to a closed group and a perceived similarity between members, i.e., ICH lovers, fostered trust [30]. Further, based on warranting theory [41, 51], streamers have higher trust with viewers because the livestreams of their production processes, which are difficult to manipulate or fake, are watched by viewers in real time. As viewers keep watching livestreams, join fan groups, interact with the streamer and other fans, and browse the social feeds of the streamers on WeChat Moments, these activities all contribute to viewers' social bonds, and higher trust, with streamers. Cultural elements such as *Jieyuan* [53] may also play a role in fostering trust, as advertising the selling of artifacts as *Jieyuan* indicates that the streamers hold their skills and craftsmanship in high regard, and are less likely to risk their reputations to cheat viewers.

Mechanized vs. Handmade Artifacts

There has been a long debate on the role of machines and mechanization for craftsmanship [42]. As more and more commodities are manufactured by machines, some consider

craftsmanship to be anachronistic, whereas others regard it as "a spiritual and aesthetic boon" [40]. Because machines have high precision and accuracy, which enables for the mass production of artifacts, some view machine-made artifacts as standardized and impersonal [40]. The interviewed craftsmen struggled with the continued intrusion of mechanized approaches into their practices. Although machinery may reduce the time needed to produce an artifact or increase the accuracy and repeatability of certain techniques, the process of handcrafting is still valuable, as it is engaging to watch, allows for iterative and personalized production processes, and facilitates the developing of social bonds between the craftsman and their viewers. The relationship between the craftsmen and the machines should thus be viewed as complementary rather than conflicting so we should design tools to empower rather than replace craftsmen.

Improving ICH Livestreaming Diversity

Diverse ICH practices are currently being livestreamed in China, however, some practices, which are only practiced by certain ethnic groups, e.g., Uyghur Muqam of Xinjiang and Manas, both listed by UNESCO as representative ICH practices [50], are underrepresented [33]. This may be due to cultural differences between different ethnic groups, however, understanding the barriers that prevent these underrepresented cultural practitioners and their local communities from using livestreaming, is important to further improve the diversity and safeguarding of ICH livestreaming practices. Governments and other non-profit organizations should also be encouraged to provide more support and incentives for these ICH practitioners, as it is these localized practices that are most in danger of being lost.

As livestreaming is becoming increasingly popular worldwide [26, 46], we envision a future where all the ICH practitioners around the world can freely conduct livestreams showcasing their ICH practices online, and everyone has access to engage with any ICH livestream, not only the people within the home country. To achieve this, we must design tools to help viewers overcome language barriers, understand contextual knowledge and subtle cultural differences, and participate in the community of the streamer in ways that will be rewarding for both the viewer and streamer.

6 CONCLUSION

By examining ICH livestreamers' practices in China, a better understanding of how livestreaming can help promote and safeguard ICH practices was obtained. Understanding the motivations, practices, current strategies used to promote ICH, the social interactions between streamers and viewers that take place beyond livestreams, and the e-commerce side

of ICH, the unique challenges and social behaviors encountered with ICH livestreams in China can be used to inspire ICH promotion and safeguarding in other countries.

This work examined underrepresented groups of livestreaming users, which are a special case of ICH practitioners, and outlined the importance of understanding the complementary effects of livestreams and other media, the unique challenges and opportunities ICH streamers are faced with when dealing with misunderstandings, and the need to reconsider the role of engagement and media used for livestreaming.

REFERENCES

- [1] Syed Mustafa Ali. 2016. A Brief Introduction to Decolonial Computing. *XRDS* 22, 4 (jun 2016), 16–21. <https://doi.org/10.1145/2930886>
- [2] Marilena Alivizatou-Barakou, Alexandros Kitsikidis, Filareti Tsalakanidou, Kosmas Dimitropoulos, Chantas Giannis, Spiros Nikolopoulos, Samer Al Kork, Bruce Denby, Lise Buchman, Martine Adda-Decker, Claire Pillot-Loiseau, Joëlle Tillmanne, S Dupont, Benjamin Picart, Francesca Pozzi, Michela Ott, Yilmaz Erdal, Vasileios Charisis, Stelios Hadjidimitriou, Leontios Hadjileontiadis, Marius Cotescu, Christina Volioti, Athanasios Manitsaris, Sotiris Manitsaris, and Nikos Grammalidis. 2017. Intangible Cultural Heritage and New Technologies: Challenges and Opportunities for Cultural Preservation and Development. In *Mixed Reality and Gamification for Cultural Heritage*, Marinou Ioannides, Nadia Magnenat-Thalmann, and George Papagiannakis (Eds.). Springer International Publishing, Cham, 129–158. https://doi.org/10.1007/978-3-319-49607-8_5
- [3] Mafkereseb Kassahun Bekele, Roberto Pierdicca, Emanuele Frontoni, Eva Savina Malinverni, and James Gain. 2018. A Survey of Augmented, Virtual, and Mixed Reality for Cultural Heritage. *J. Comput. Cult. Herit.* 11, 2 (mar 2018), 7:1–7:36. <https://doi.org/10.1145/3145534>
- [4] Hugh Beyer and Karen Holtzblatt. 1998. *Contextual Design: Defining Customer-Centred Systems*. Morgan Kaufmann Publishers Inc.
- [5] Jie Cai, Donghee Yvette Wohn, Ankit Mittal, and Dhanush Sureshbabu. 2018. Utilitarian and Hedonic Motivations for Live Streaming Shopping. In *Proceedings of the 2018 ACM International Conference on Interactive Experiences for TV and Online Video (TVX '18)*. ACM, New York, NY, USA, 81–88. <https://doi.org/10.1145/3210825.3210837>
- [6] Jennie Carroll. 2004. Completing design in use: closing the appropriation cycle. In *ECIS 2014 Proceedings*. 44.
- [7] Jung-a Chang. 2016. From "folk culture" to "great cultural heritage of China": the aporia of the quest for the essence of Chinese culture. In *Intangible Cultural Heritage in Contemporary China*, Khun Eng Kuah and Zhaohui Liu (Eds.). Routledge, 124–148.
- [8] Yi-Hsing Chang, Yu-Kai Lin, Rong-Jyue Fang, and You-Te Lu. 2017. A Situated Cultural Festival Learning System Based on Motion Sensing. *Eurasia Journal of Mathematics, Science & Technology Education* 13, 3 (2017), 571–588.
- [9] Juliet Corbin and Anselm Strauss. 1998. *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA, US: Sage Publications, Inc.
- [10] Elizabeth Crooke. 2007. Museums and Community. In *A Companion to Museum Studies*. Wiley-Blackwell, Chapter 11, 170–185. <https://doi.org/10.1002/9780470996836.ch11>
- [11] K Dimitropoulos, S Manitsaris, F Tsalakanidou, S Nikolopoulos, B Denby, S A Kork, L Crevier-Buchman, C Pillot-Loiseau, M Adda-Decker, S Dupont, J Tillmanne, M Ott, M Alivizatou, E Yilmaz, L Hadjileontiadis, V Charisis, O Deroo, A Manitsaris, I Kompatsiaris, and N Grammalidis. 2014. Capturing the intangible an introduction to the i-Treasures project. In *2014 International Conference on Computer*

- Vision Theory and Applications (VISAPP)*, Vol. 2. 773–781.
- [12] Audubon Dougherty. 2011. Live-streaming mobile video : production as civic engagement. In *Proceedings of the 13th International Conference on Human Computer Interaction with Mobile Devices and Services (MobileHCI '11)*. ACM Press, New York, New York, USA, 425. <https://doi.org/10.1145/2037373.2037437>
- [13] Danilo Giglito. 2017. Community Empowerment Through the Management of Intangible Cultural Heritage in the Isle of Jura, Scotland. *Imperial Journal of Interdisciplinary Research* 3, 5 (2017), 567–578. <https://ssrn.com/abstract=3000953>
- [14] Danilo Giglito. 2017. *Using wikis for intangible cultural heritage in Scotland: suitability and empowerment*. Ph.D. Dissertation. University of Aberdeen.
- [15] Danilo Giglito, Shaimaa Lazem, and Anne Preston. 2018. In the Eye of the Student: An Intangible Cultural Heritage Experience, with a Human-Computer Interaction Twist. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. ACM, New York, NY, USA, 290:1—290:12. <https://doi.org/10.1145/3173574.3173864>
- [16] A Grammatikopoulou, S Laraba, O Sahbenderoglu, K Dimitropoulos, S Douka, and N Grammalidis. 2018. An adaptive framework for the creation of exergames for intangible cultural heritage (ICH) education. *Journal of Computers in Education* (2018), 1–34.
- [17] Valdimar Tr Hafstein. 2008. Intangible heritage as a list: from masterpieces to representation. In *Intangible heritage*, Laurajane Smith and Natsuko Akagawa (Eds.). Routledge, 107–125.
- [18] Oliver L. Haimson and John C. Tang. 2017. What Makes Live Events Engaging on Facebook Live, Periscope, and Snapchat. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. ACM Press, New York, New York, USA, 48–60. <https://doi.org/10.1145/3025453.3025642>
- [19] William A. Hamilton, Oliver Garretson, and Andruid Kerne. 2014. Streaming on twitch: fostering participatory communities of play within live mixed media. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems (CHI '14)*. ACM Press, New York, New York, USA, 1315–1324. <https://doi.org/10.1145/2556288.2557048>
- [20] Chih-Hong Huang and Yi-Ting Huang. 2013. An Annales School-based Serious Game Creation Framework for Taiwanese Indigenous Cultural Heritage. *J. Comput. Cult. Herit.* 6, 2 (may 2013), 9:1—9:31. <https://doi.org/10.1145/2460376.2460380>
- [21] Alexandros Kitsikidis, Kosmas Dimitropoulos, Deniz Ugurca, Can Bayçay, Erdal Yilmaz, Filareti Tsalakanidou, Stella Douka, and Nikos Grammalidis. 2015. A game-like application for dance learning using a natural human computer interface. In *International Conference on Universal Access in Human-Computer Interaction*. Springer, 472–482.
- [22] Khun Eng Kuah and Zhaohui Liu. 2016. Intangible cultural heritage in contemporary China and Hong Kong: an introductory overview. In *Intangible Cultural Heritage in Contemporary China*. Routledge, 13–22.
- [23] K Russell Lamotte. 2002. United Nations Educational, Scientific and Cultural Organization (UNESCO): Universal Declaration on Cultural Diversity. *International Legal Materials* 41, 1 (2002), 57–62.
- [24] Jinglan Lin and Zhicong Lu. 2017. The Rise and Proliferation of Live-Streaming in China: Insights and Lessons. In *International Conference on Human-Computer Interaction*. Springer, 632–637.
- [25] William S Logan. 2007. Closing Pandora’s box: human rights conundrums in cultural heritage protection. In *Cultural heritage and human rights*. Springer, 33–52.
- [26] Danielle Lottridge, Frank Bentley, Matt Wheeler, Jason Lee, Janet Cheung, Katherine Ong, and Cristy Rowley. 2017. Third-wave livestreaming: teens’ long form selfie. In *Proceedings of the 19th International Conference on Human-Computer Interaction with Mobile Devices and Services*. ACM, 20.
- [27] Zhicong Lu, Seongkook Heo, and Daniel Wigdor. 2018. StreamWiki: Enabling Viewers of Knowledge Sharing Live Streams to Collaboratively Generate Archival Documentation for Effective In-Stream and Post-Hoc Learning. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW (2018), Article 112. <https://doi.org/10.1145/3274381>
- [28] Zhicong Lu, Haijun Xia, Seongkook Heo, and Daniel Wigdor. 2018. You Watch, You Give, and You Engage: A Study of Live Streaming Practices in China. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*. Paper 466, 13 pages. <https://doi.org/10.1145/3173574.3174040>
- [29] Michela Mortara, Chiara Eva Catalano, Francesco Bellotti, Giusy Ficucci, Minica Houry-Panchetti, and Panagiotis Petridis. 2014. Learning cultural heritage by serious games. *Journal of Cultural Heritage* 15, 3 (2014), 318–325. <https://doi.org/10.1016/j.culher.2013.04.004>
- [30] Carol Moser, Paul Resnick, and Sarita Schoenebeck. 2017. Community Commerce: Facilitating Trust in Mom-to-Mom Sale Groups on Facebook. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. ACM, New York, NY, USA, 4344–4357. <https://doi.org/10.1145/3025453.3025550>
- [31] China Economic Net. 2017. 陌陌平台非物质文化遗产专场开播直播圈来了个“文化担当” [Intangible Cultural Heritage Livestreams Started on Momo Platform. Livestreaming has Taken on “cultural responsibility”]. http://www.ce.cn/culture/gd/201708/30/t20170830_25505969.shtml
- [32] William Nitzky. 2013. Community Empowerment at the Periphery? Participatory Approaches to Heritage Protection in Guizhou, China. In *Cultural Heritage Politics in China*, Tami Blumenfeld and Helaine Silverman (Eds.). Springer New York, New York, NY, 205–232. https://doi.org/10.1007/978-1-4614-6874-5_11
- [33] Guangming Online. 2017. 非遗传承与网络直播座谈会 [ICH and livestreaming Seminar]. http://topics.gmw.cn/node_113857.htm
- [34] Johan Oomen and Lora Aroyo. 2011. Crowdsourcing in the Cultural Heritage Domain: Opportunities and Challenges. In *Proceedings of the 5th International Conference on Communities and Technologies (C&T '11)*. ACM, New York, NY, USA, 138–149. <https://doi.org/10.1145/2103354.2103373>
- [35] Michela Ott, Francesca Maria Dagnino, Francesca Pozzi, and Mauro Tavella. 2014. Widening Access to Intangible Cultural Heritage: towards the Development of an Innovative Platform. In *Universal Access in Human-Computer Interaction. Universal Access to Information and Knowledge*, Constantine Stephanidis and Margherita Antona (Eds.). Springer International Publishing, Cham, 705–713.
- [36] Soon Cheol Park. 2014. ICHPEDIA, a case study in community engagement in the safeguarding of ICH online. *International Journal of Intangible Heritage* 9 (2014), 69–82.
- [37] Anthony J Pellicone and June Ahn. 2017. The Game of Performing Play: Understanding Streaming As Cultural Production. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. ACM, New York, 4863–4874. <https://doi.org/10.1145/3025453.3025854>
- [38] Beryl Plimmer, Liang He, Tariq Zaman, Kasun Karunanayaka, Alvin W Yeo, Garen Jengan, Rachel Blagojevic, and Ellen Yi-Luen Do. 2015. New Interaction Tools for Preserving an Old Language. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15)*. ACM, New York, NY, USA, 3493–3502. <https://doi.org/10.1145/2702123.2702339>
- [39] Iain J M Robertson. 2016. *Heritage from below*. Routledge.
- [40] Mark Roskill. 1977. The aesthetic concept of craftsmanship. *The British Journal of Aesthetics* 17, 2 (1977), 138–148.
- [41] W. Scott Sanders, Gopi Chand Nutakki, and Olfa Nasraoui. 2016. Testing the Application of Warranting Theory to Online Third Party Marketplaces: The Effects of Information Uniqueness and Product Type.

- In *Proceedings of the 7th 2016 International Conference on Social Media & Society (SMSociety '16)*. ACM, New York, NY, USA, 16:1–16:7. <https://doi.org/10.1145/2930971.2930988>
- [42] Richard Sennett. 2008. *The craftsman*. Yale University Press.
- [43] Mary Stevens, Andrew Flinn, and Elizabeth Shepherd. 2010. New frameworks for community engagement in the archive sector: from handing over to handing on. *International Journal of Heritage Studies* 16, 1-2 (2010), 59–76.
- [44] Elizabeth Tait, Marsaili MacLeod, David Beel, Claire Wallace, Chris Mellish, and Stuart Taylor. 2013. Linking to the past: an analysis of community digital heritage initiatives. *Aslib Proceedings* 65, 6 (2013), 564–580. <https://doi.org/10.1108/AP-05-2013-0039>
- [45] John Tang, Gina Venolia, Kori Inkpen, Charles Parker, Robert Gruen, and Alicia Pelton. 2017. Crowdcasting: Remotely Participating in Live Events Through Multiple Live Streams. *Proc. ACM Hum.-Comput. Interact.* 1, CSCW, Article 98 (Dec. 2017), 18 pages. <https://doi.org/10.1145/3134733>
- [46] John C. Tang, Gina Venolia, and Kori M. Inkpen. 2016. Meerkat and Periscope. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16)*. ACM Press, New York, New York, USA, 4770–4780. <https://doi.org/10.1145/2858036.2858374>
- [47] Yvain Tisserand, Nadia Magnenat-Thalmann, Luis Unzueta, Maria T Linaza, Amin Ahmadi, Noel E O'Connor, Nikolaos Zioulis, Dimitrios Zarpalas, and Petros Daras. 2017. Preservation and gamification of traditional sports. In *Mixed Reality and Gamification for Cultural Heritage*. Springer, 421–446.
- [48] UNESCO. 2003. Text of the Convention for the Safeguarding of the Intangible Cultural Heritage - intangible heritage - Culture Sector - UNESCO. <https://ich.unesco.org/en/convention>
- [49] UNESCO. 2018. Browse the Lists of Intangible Cultural Heritage and the Register of good safeguarding practices - intangible heritage - Culture Sector - UNESCO. <https://ich.unesco.org/en/lists>
- [50] UNESCO. 2018. China - intangible heritage - Culture Sector - UNESCO. <https://ich.unesco.org/en/state/china-CN?info=elements-on-the-lists>
- [51] Joseph B Walther. 1996. Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication research* 23, 1 (1996), 3–43.
- [52] Wikipedia. 2018. Chinese city tier system. https://en.wikipedia.org/wiki/Chinese_city_tier_system
- [53] Kuo-Shu Yang and David Y F Ho. 1988. The role of yuan in Chinese social life: A conceptual and empirical analysis. *Asian contributions to psychology* (1988), 263 – 281.