Gamification Elements on Social Live Streaming Service Mobile Applications

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Abstract. Social live streaming services (SLSSs), a kind of synchronous social networking service, are slowly but surely becoming a part of people's daily lives. To keep users interested, a wide range of gamification elements are implemented on these services, increasing the user engagement and changing their behavior. This study examined 20 different SLSS mobile applications and the applied gamification elements. A literature review as well as a content analysis were used to find appropriate SLSS apps and game elements. What kind of mechanics can be found on SLSS mobile apps and how many are implemented on each system? On three of the observed apps we could identify all game elements. Chinese SLSS apps are the most gamified ones. On Ustream, no game element is implemented. The game mechanics *following others* as well as *customization* are the most often applied; *capturing a moment* of a stream is the least often implemented.

Keywords: Social live streaming service · Gamification · Content analysis · Mobile application

1 Introduction

Gamification is a promising and tactical strategy often used in education or online applications [5]. One definition of gamification was coined by Deterding, Nacke and Dixon: "gamification [is] the use of game design elements in non-game contexts" [6, p. 1]. Generally speaking, gamification can be seen to be comprised of three main elements as proposed by Hamari, Koivisto, and Sarsa [14]: the elements or mechanics that are used within a system are aimed at making the user undergo a gameful experience. This in turn leads to psychological outcomes, which can be, for example, encountering a feeling of competence when solving a task or quest, but also enjoyment which is one of the main ambitions of gamification. Based on these positive experiences, it is estimated that the user will change their behavior. These behavioral outcomes can be seen in better results if learning and language apps are concerned, or health applications and physical fitness. Gamification is estimated to be implemented by many companies in the near future, proving it to be an important mechanic in business contexts [19].

The potentials of gamification are also seen for other areas, for example government services and public engagement, crowdsourcing, commerce, exercise [20], marketing and advertising, environmental behavior, and information systems [24].

Social networking services (SNSs), a special type of information system, are rather recommended by users if they are gamified, also, the intention to use the service increases [13]. Recently, SNSs such as Facebook and the video sharing platform YouTube implemented the live streaming feature, making them an embedded social live streaming service (SLSS), e.g. YouTube Live. There are two other types of SLSSs - general live streaming services where no specific focus or subject is prevalent (e.g. Periscope), and topic-specific live streaming services attracting one special interest group concerned with a certain kind of content, e.g. Twitch for eSports. This kind of SNS seems to be especially attractive in China, as there are already over 200 different SLSSs [27]. The implementation of gamification elements makes users of SLSSs feel rewarded and motivated through the interaction with the game mechanics [35].

SLSSs are mainly used out of boredom, for socializing, communication, and entertainment [3, 9, 10, 16]. In this context, the Uses and Gratifications Theory (UG&T) by Blumler and Katz [1] needs to be mentioned. If one applies media, it is usually goal-oriented and underlines a kind of expectation [22]. McQuail [30] states four main goals or motivations to use media: entertainment, information, personal identity and social interaction. In the context of SLSSs, the aspect of personal identity shall be redefined as self-presentation [45].

The Self-Determination Theory (SDT) proposed by Ryan and Deci [32] also concerns human needs and user motivation. They describe motivation as an action that drives people which is influenced by external and internal factors. Intrinsic motivation makes people engage in activities they find interesting but also challenging, making it an internal driving factor. Extrinsic motivation is an influence from outside, for example monetary rewards or fame. Hamari et al. [14] state that users of an information system are intrinsically motivated by game design elements.

All in all, gamification is applied to motivate the user and for repetitive information system usage [4].

2 Related Work

There are already studies on the impact of gamification in context with live streaming behavior. First of all, the game mechanics are seen as a motivating factor, making users want to keep using a service [12, 15, 23, 39].

A live streaming application was developed in three different versions to test the effect of gamification elements on the broadcasting behavior of SLSSs users [42]. The first version did not contain any game mechanics, the second version contained levels, and the third version added challenges and badges. The results indicate that the more gamification elements are implemented and used, the longer the streaming time.

The impact of gamification was investigated using YouNow as a case study [35]. Three different user groups (producers of streams or streamers, participants, and consumers) were analyzed, all seem to feel rewarded through different gamification elements. Most motivated by gamification mechanics are the producers of streams. Overall,

all elements are at least perceived as being neutral but most often as highly rewarding and motivating.

YouNow was also the focus of a study showcasing if a difference between giving and receiving gratifications in a gamified SLSS could be observed. All game mechanics are perceived as being fun, useful, rewarding, and motivating. In general, the users seem to rather want to receive gratifications from others than taking the action to give gratifications to the streamer [36].

Another service, Twitch, is an ideal platform to investigate as the activities of streaming and watching streams are highly gamified. For example, streams can be individualized through customization to keep the viewers entertained [38]. But, the study also points out that not all features will suit all streamers and their streams. A streamer who garners a lot of viewers is not able to read all commands and chat comments, therefore some actions are getting lost in the chat history.

Twitch was the case study of another study concerned with a web-based leaderboard tool developed to amplify the gamification effect of word-of-mouth referrals which is intended to help the streamer grow his audience [2]. Since word-of-mouth programs, which give the customers incentives to share with their friends and families, for example a referral code, are successfully employed by many companies on social media, the impact could likely be as effective for streamers. As the study points out, the tool increased the number of new viewers and is also appreciated by the Twitch community.

Lu, Xia, Heo, and Wigdor [27] mention the engaging role of the gifting function and fan groups in Chinese SLSSs. As gift-sending viewers are sometimes treated more special by the streamer, gifting seems to be a popular option in streamer and viewer interaction. Gifting serves as a more meaningful and expressive way of communication than texts. China is the country with the most SLSSs as of now, applying various game mechanics and elements to keep the streamers and viewers engaged [37]. The study also investigated the amount of game mechanics found on the most popular SLSSs websites in the world. The features that were implemented predominantly are following others, leaderboards, and, ranking third together with currency, badges, and gifts.

In summary, gamification is motivating for streamers and viewers of SLSSs, keeping them engaged and wanting them to keep on using a service. But, to our knowledge, a study on SLSS apps (Fig. 1) and the most applied game design elements on them has not been conducted yet. Therefore, we are going to close this research gap. Based on these aspects, we arrive at the following research question:

RQ1. Which gamification elements are implemented on social live streaming service mobile apps?

3   Method

For this study, the aim is to get an overview of the implemented game mechanics and game elements on different SLSS mobile applications. It is possible to add gamification elements to the layout of the stream via bots (e.g. a ranking that lists top gifting viewers). This kind of game mechanic was not considered in this study. The focus lies on the game mechanics prepared and applied by the system and the apps itself.
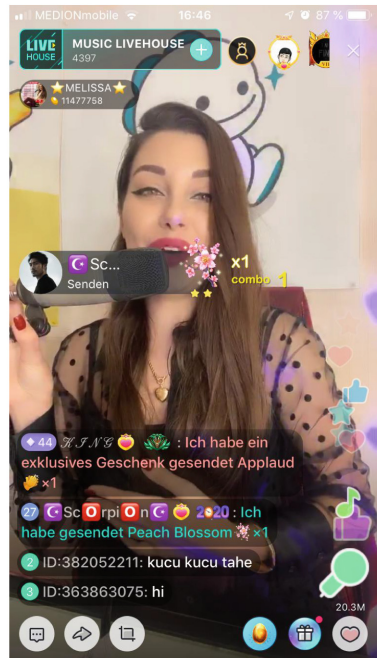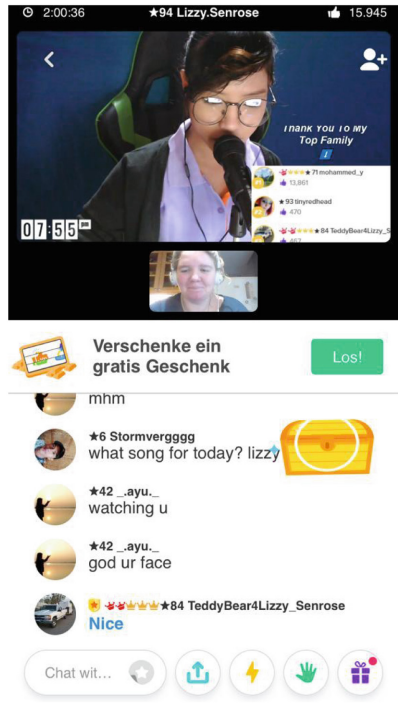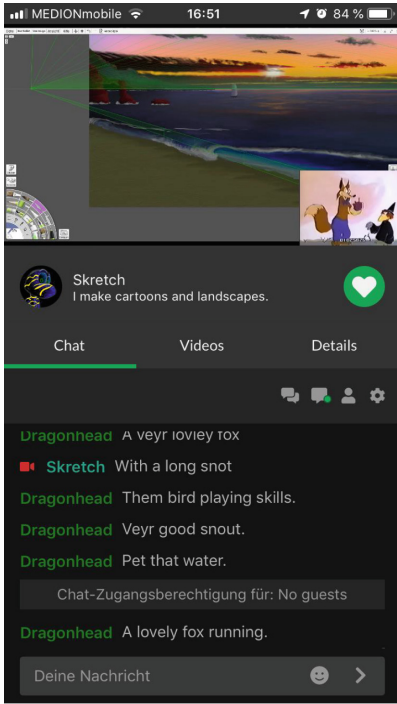
Fig. 1. Screenshots of (left to right) Picarto, YouNow, nicocnico, Bigo Live

Table 1. SLSS apps and their global and country-specific ranking

SLSS	Global rank	Rank in country
YouTube.com	2	USA: 2
Facebook.com	5	USA: 4
live.qq.com	6	China: 3
Twitch.tv	40	USA: 18
yy.com	96	China: 29
Nicovideo.jp (niconico)	222	Japan: 19
Mixer.com	1,370	USA: 639
Huya.com	1,750	China: 244
Pscp.tv	10,710	USA: 6,933
Kuaishou.com	11,518	China: 1,116
Bigo.tv	12,610	China: 6,777
Younow.com	14,061	USA: 18,991
Longzhu.com	17,145	China: 1,359
Chushou.tv	21,036	China: 1,365
Ustream.tv	23,025	USA: 34,269
Picarto.tv	29,482	USA: 11,095
Huajiao.com	32,190	China: 2,119
Laifeng.com	37,746	China: 4,669
Qiuxiu (x.pps.tv)	59,691	China: 7,013
Yizhibo.com	88,764	China: 6,523

Data source: Alexa (as of December 29th, 2019)

Furthermore, SLSS websites of the applications were not included in this study, as research on the same subject was already conducted [37]. Also, not every implemented game mechanic of a system may be used by each user group (producer, participant, or consumer). The systems were examined from each user group's perspective, but because of only a few differences we showed no differentiation in the results section. As our investigative method, a total of 20 SLSS mobile applications were examined and evaluated for a defined set of gamification elements. For this study, a content analysis was conducted with the conventional and deductive approach applying literature review [8, 18]. Via the directed approach [8], we examined SLSSs for different game mechanics and categorized them.

3.1 Appropriate SLSSs

A first analysis of SLSS websites and the applied game elements was conducted [37]. Based on this, as a comparative measure, our study focuses on the game mechanics of

the corresponding apps. Primarily, the SLSSs websites were selected through literature research [e.g. 21, 27, 31, 46] as well as online research. We consulted the homepage of the Nanjing Marketing Group, a website specialized on Chinese markets, as China has a big user group of SLSS websites [28]. The 11 highest ranking websites in China were selected from Alexa.com and the corresponding apps investigated. Furthermore, the phrase "live stream" or "#livestream" were searched for on various social media sites (e.g. Instagram, YouTube, Facebook, and Twitter) to gather the Western SLSS websites. After gathering the SLSSs, we checked their Alexa rankings compared to other websites of the world as well as their positions in the country with the most users. From this, the websites were chosen. The Table 1 displays all relevant SLSSs which were examined for the implemented game mechanics.

Table 2. Game mechanics found on SLSSs (modified from [37])

Game mechanics	Description	Literature
Badges	Visual elements that are awarded for fulfilling tasks	e.g., [11]
Capturing moments	Recording a short clip of a live stream	e.g., [35]
Collaboration and team	Broadcasting; via split screen of two or more users	e.g., [35]
Collecting	Collection of different things, e.g. awards or gifts	e.g., [26]
Currency	Bought with real money or earned through tasks to buy gifts	e.g., [7]
Points	Earned through different tasks or site activities	e.g., [33]
Customization	Changing features of the channel, profile website, or chat	e.g., [40]
Following others	Users stay up to date through following, becoming a fan, subscribing, or befriending function	e.g., [36]
Gifts	Viewers can show their appreciation with gifts	e.g., [27]
Challenges and goals	Users can achieve goals and solve tasks that are predefined by each platform	e.g., [41]
Leaderboards	Statistics of the best streamers or viewers according to different criteria	e.g., [33]
Progress bar	Overview of current status until reaching a next step (e.g. level)	e.g., [34]
Likes	A kind of social feedback from viewers towards streamers	e.g., [29]
Levels	Displaying the users' experience in a system	e.g., [44, 46]

3.2   Game Mechanics

The game mechanics were selected by applying different methods. Literature reviews on gamification (e.g. [14]) and research on different game mechanics (e.g. [29, 41, 43])

were especially considered. All in all, a list consisting of over 20 gamification elements was created. Following, the conventional approach via observing SLSS websites was applied to get an impression on what game mechanics are implemented on SLSSs. The game elements we could not identify on SLSSs websites were not included in the list. The 14 game design elements and a short definition of each one are listed in Table 2.

3.3 The Examination

Each SLSS mobile app was examined by a pair of two researchers [25]. Each game mechanic presented in the app was discussed. The coders always arrived at the same conclusion on which category was appropriate for the game mechanic that was observed. For example, if some form of money exchange could be recognized on the SLSS, it was classified as the 'currency' category. Since the three researchers did not have the appropriate language skills for Japanese, a fluent speaker was present for the investigation of the Japanese app. All in all, we identified fourteen different game mechanics that are applied by different SLSSs (Table 2).

4 Results

Taking a look at Table 3, the number of game mechanics identified on each service are listed. Most Chinese live streaming applications have nearly all game mechanics implemented. At least eight or more gamification mechanics were observed on each Chinese SLSS app. Two of the services from China, Huajiao and Yizhibo, have all 14 game elements, four services have 13 game elements, one service has 12, and three services have 11 game elements. From China, the least elements (eight) were found on Kuaishou.

For the US-American services, only YouNow's app has all game mechanics implemented. Facebook Live has a number of six, YouTube Live five and one service (Ustream) even has no game elements. For YouTube and Facebook, we have to take into consideration that the services are already established and important SNSs which embedded the function of streaming live broadcasts. The Japanese SLSS mobile application niconico has 11 and the German service Picarto has three game mechanics.

Following, some examples for the detected gamification elements will be mentioned, as the observation table only displays if a certain game mechanic was implemented or not and no details are included (Table 4). Every checked platform, except for Ustream, has the function *following others* and *customization*, as Ustream has no game element.

On Bigo Live, streamers can add stickers to their stream as a kind of *customization*. *Collecting* is implemented on, for instance, Quixiu. Viewers can open chests when watching the stream to earn random awards. Streamers collect gifts and exchange them for income.

With *leaderboards* users are able to compare their performance and accomplishment with other users, YouNow has leaderboards for top broadcasters, top fans, and top moment makers. On the SLSS mobile application of YY, Y coins and red diamonds are implemented as *currency* to be able to buy gifts. *Gifts* on SLSSs serve as a reward for

Table 3. Number of game mechanics per SLSS mobile application (N = 14).

SLSS mobile application (*country of origin*)	Number of game mechanics
China	
Huajiao	14
Yizhibo	14
Bigo Live	13
Laifeng	13
Long Zhu	13
Qiuxiu	13
YY	12
Chushou	11
Huya	11
QQ Live	11
Kuaishou	8
USA	
YouNow	14
Mixer	11
Twitch	9
Periscope	7
Facebook Live	6
YouTube Live	5
Ustream	0
Japan	
niconico	11
Germany	
Picarto	3

the streamer. They are implemented on 18 of the 20 observed services, whereby they are built-in on Picarto and Ustream.

Chushou has *challenges and goals* that are called "missions," thereby users are able to get badges and to earn "active coins." The Facebook Live function in the mobile application offers the opportunity to invite friends to the stream. If the friend accepts the invitation, they are able to *collaborate* and stream via split screen.

On Huajiao and Huya experience *points* can be earned by e.g. sending gifts or watching streams. Experience points are for leveling up. On most platforms, a *progress bar* displays the progress to a next level. Whereby Mixer has a progress bar for streamer progression which tracks a streamers growth. Levels display the experience of users, we could identify them on 12 apps, e.g. QQ Live, NicoVideo, Laifeng, and Long Zhu.

Table 4. Overview of the implemented game mechanics per SLSS mobile application.

SLSS mobile applications	Game mechanics													
	Currency	Points	Levels	Progress bar	Leaderboards	Badges	Gifts	Challenges & goals	Customization	Collecting	Following others	Likes	Collaboration & team	Capturing a moment
Huajiao	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Yizhibo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
YouNow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bigo Live	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Laifeng	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Long Zhu	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Quixiu	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
YY	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
Chushou	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Huya	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Mixer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
NicoVideo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
QQ Live	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Twitch	✓	✓			✓	✓	✓		✓	✓	✓		✓	✓
Kuaishou	✓	✓					✓		✓	✓	✓	✓	✓	
Periscope	✓	✓							✓	✓	✓	✓		
Facebook Live							✓		✓	✓	✓	✓	✓	
YouTube Live							✓		✓	✓	✓	✓		
Picarto									✓		✓		✓	
Ustream														

Badges on Twitch will be earned when fulfilling specific things, such as purchasing bits or giving gifts. Also, subscribers can get a so called "Subscriber Badge." Via *likes* users can show that they like a streamers live show. Periscope provides the opportunity to send likes with colorful hearts which are shown in the live stream. The least often applied function was *capturing a moment,* we could identify it on Yizhibo, Huajiao, YouNow, and Twitch. Thereby, a user is able to record a certain period of a stream.

Table 5. Number of SLSS mobile application having game mechanics (N = 20).

Game mechanic	Number of SLSS mobile apps
Customization	19
Following others	19
Gifts	18
Collecting	18
Currency	16
Points	16
Leaderboards	13
Badges	13
Challenges & goals	13
Levels	13
Progress bar	13
Likes	12
Collaboration & team	11
Capturing a moment	4

The most often detected game mechanics on the observed SLSS mobile applications were customization and *following others.* 19 of the 20 platforms had these functions implemented (Table 5). As customization allows users to be individual, it is a very popular function. With following others, users stay up-to-date about the users' activities. The functions *gifts* and *collecting*, with 18 each, as well as *currency and points*, with 16 each, were also found often on SLSS mobile apps.

A number of 13 of the 20 observed apps had *leaderboards, badges, challenges and goals, levels, and a progress bar*. *Likes* were observed on 12 SLSS mobile applications and *collaboration and team* on eleven apps. The least often implemented game mechanic is *capturing a moment*. It was only found on four observed systems. As some services (e.g. YouTube Live) offer the opportunity to watch the completely recorded former live streams again, it is not necessarily used on each system.

5 Discussion

In this study, a content analysis on 20 different SLSS mobile applications was conducted to discover which game mechanics are applied on each service. Thereby, the applications were checked for a number of 14 game elements. Eleven mobile apps were from

China, six from the United States of America, one from Japan, and one from Germany. The results show that Chinese SLSSs mobile applications apply on average the most game elements. Two of the Chinese services have all 14 and four services have 13 game elements implemented. From the United States of America, only one service (YouNow) has all game mechanics implemented and the following one with the second most has 11 game mechanics. The Japanese one has 11 as well and the German has 3 gamification elements. The tendency shows that Chinese SLSSs have more game mechanics implemented than the ones from the USA. A comparison with German or Japanese services is not applicable as only one service of each country was considered.

Why is there such a tendency for gamification on Chinese SLSS? An explanation could be that there is a more intense competition between the various live streaming services (a number of 200) in China. Following Hamari and Koivisto [13], the intention to use a service increases, if gamification is applied. Furthermore, Scheibe and Zimmer [37] explored similar results for SLSSs websites. Here, the authors consulted findings from Hofstedes country comparison [17] where China is presented as a pragmatic culture. The explanation about China's society could be that they are "driven by competition, achievement and success" [17] which are attributes of gamification, providing a possible explanation for the gamification phenomenon in Chinese SLSSs.

In contrast to other social networking services, SLSSs offer a great variety of gamification elements to their users. Since the primary interaction among users on SLSSs follows the one-to-many communication model during a live stream, gamification elements offer an additional way of interaction on SLSSs.

This study shows that there is a great variety of game mechanics which can be used in many different ways (e.g. different kinds of currencies). The most often implemented game mechanics on SLSSs mobile apps are *customization* and *following others* followed by *gifts* and *collecting* as well as *currency* and *points. Capturing a moment* of a stream was implemented the least often. On Ustream, no gamification elements are implemented, and we hypothesize that there are no gamification elements needed, as it is provided for the professional and public live streaming.

Comparing our results to the study of Scheibe [35], she found out that streamers are feeling very rewarded and motivated when getting fans or subscribers. Also, gifts have a strong positive effect on the streamer's motivation, but also on the viewer's motivation when giving gifts to streamers. Earning coins is seen as a reward by all users.

When taking a look at the results from Scheibe and Zimmer [37] about the applied gamification elements on SLSSs websites, a few differences can be observed while keeping in mind that one year has passed since the mentioned study was conducted. Additional gamification elements could have been added to the SLSS websites as well. For example, customization is more often implemented on SLSS mobile apps than on the SLSS websites. Further research should concentrate on the differentiation of applied game mechanics to a website and to a mobile app, as the user experience and behavioral effect may vary depending on the distinct interface structures and layouts.

The limitations of this study should be mentioned. First, we have only observed a small amount of SLSS mobile applications. There is an undefined number of services which remain undiscovered, since in China there are over 200 individual live streaming

systems [27]. The number of services that were checked in this study is 20, whereof only eleven are Chinese.

Furthermore, live streaming platforms from other countries were not examined and should be considered in further studies, e.g. African, South American, and other Asian countries. Although our approach followed the four eyes principle, there might be a bias by missing gamification elements while checking the services.

As an outlook, other types of social networking services should be checked and compared to SLSSs. As research points to the implication that SLSSs are mostly applied by generation Z, this could be an important aspect on why gamification works for live streaming; is generation Z more prone to apply gamification elements than for example the baby boomers or generation Y? Also, comparing the acceptance of SLSSs without gamification elements and with gamification elements, like e.g. Wilk, Wulffert, and Effelsberg [42] did, but with public SLSSs would be an interesting investigation.

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