The effects of game mechanics on user retention in using social live streaming services

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Abstract
Purpose – Social live streaming services (SLSS) have infused gamification into interface design and feature applications. Firms adopt gamification mechanisms to win customer loyalty in the live streaming and SLSS markets. Based on the mechanics-dynamics-aesthetics (MDA) framework and uses and gratifications 2.0 theory (UGT 2.0), this study aims to investigate the effects of game mechanics (mechanics) on enjoyment and user retention (aesthetics) through rewards and social interaction (dynamics) in the context of SLSS.

Design/methodology/approach – This study used an online survey via Google Forms, SurveyCake and social media platforms like Facebook, Instagram and Line to collect data from 232 SLSS users in Taiwan. Partial least squares structural equation modeling (PLS-SEM) was adopted to analyze the data.

Findings – The results validated the relationships between game mechanics and dynamic elements (rewards and social interaction) that triggered aesthetic elements (enjoyment feelings) among users. In addition, users experienced a sense of enjoyment that led to usage retention when using the gamified SLSS. Further, this study found enjoyment crucial for users to stay interactive with gamified services.

Originality/value – Driven by UGT 2.0, this study closed the gaps by integrating the MDA framework into the SLSS context and better understanding how game mechanics are connected to rewards and social interaction, leading to enjoyment and user retention when using SLSS. This study provides fresh insights into gamification-oriented SLSS practices. It offers significant theoretical and managerial implications and provides guidelines for SLSS platform operators on fostering user retention.

Keywords Gamification, Social live streaming services, Mechanics-dynamics-aesthetics (MDA) framework, Enjoyment, User retention, Uses and gratifications 2.0 theory (UGT 2.0)

Paper type Research paper

Introduction
Social live streaming services (SLSSs) are an emergent form of online multimedia communities, with real-time audio and video content transmitted via live-streaming technology (Chen and Lin, 2018). Using SLSS, users have interactive experiences, a sense of belonging in online communities and psychological well-being (Wolff and Shen, 2024). With the live-streaming market projected to be worth $330.51 bn by 2030 (Grand View Research, Inc., 2022), young adults now spend more time viewing live-streaming content than traditional cable shows. For example, Twitch, a leading SLSS platform in the USA, boasts over seven million streamers, attracting an average of 30 m monthly visitors (Bai et al., 2024). Correspondingly, firms are rapidly following suit in exploring the critical role of SLSS in increasing user engagement.

Because there are many SLSS platforms for business activities, the conversion cost for users of live-streaming platforms is low. Prior studies have highlighted that one of the major
challenges livestream practitioners face is retaining existing customers (Zhang et al., 2022b; Li et al., 2021). This is because customer retention is essential for business success, as it costs 1/5 of the price of customer acquisition (Reichheld and Schefter, 2000). Given the importance of user stickiness in live streaming platforms (Liu et al., 2023; Bao and Zhu, 2023; He et al., 2023; Li et al., 2021), SLSS operators continue to utilize “gamification” to engage users (e.g. Qian et al., 2022; Liu et al., 2024). Thus, the question of how gamification can effectively cater to the preferences of distinct user segments and contribute to user retention still needs to be clarified.

SLSS is essentially a manifestation of “gamification,” which applies game-like design elements and ideas in a non-game setting (Hu et al., 2022). Deploying gamification creates an opportunity to unleash users’ needs and desires for greater immersive engagement, such as entertainment, social interaction or rewards (Tobon et al., 2020). Gamification has gained tremendous momentum toward adoption in the SLSS context (e.g. Chen and Lin, 2018; Scheibe, 2018; Scheibe and Zimmer, 2022; Hu et al., 2022; Qian et al., 2022, 2023; Zheng et al., 2023; Li et al., 2021). To the best of our knowledge, although a scarcity of research has systematically investigated the relationship between gamification and user retention (Zhang et al., 2022a, 2023; Jacobides et al., 2024; Hamari, 2013), even less is known about which gamification elements are more conducive to fostering user retention toward SLSS (e.g. Qian et al., 2022, 2023; Li et al., 2021). Because a common implementation of gamification involves game mechanics (Parapanos and Michopoulos, 2021), the main objective is to examine the effects of game mechanics on user retention in the SLSS context.

This study fills gaps and chooses the MDA framework (Hunicke et al., 2004) as the theoretical support for the following two reasons: First, SLSS platforms are predominantly technological, social and community-oriented, with unique social interactions occurring during live streams (Hilvert-Bruce et al., 2018). In the SLSS context, game mechanics can significantly influence the relationships between community members. MDA is a formal approach to help understand the relationships between game features, user behaviors and user perceptions (Li and Fang, 2020). Second, most studies have adopted the MDA framework to analyze gamification processes from a game design perspective (e.g. Xu et al., 2017; Sezgin and Yüzer, 2022). Existing MDA studies are still fragmented, lacking investigations of user perceptions of game mechanics features, user reactions and user experience evaluation in the context of SLSS. Therefore, this study investigates user behaviors toward gamified SLSS platforms by applying the MDA framework. This approach enables us to analyze the features of game mechanics and identify dynamics that support those features and features that align with core aesthetic goals (e.g. fostering a stronger sense of community).

In addition, it would be beneficial to define a new set of gratifications that emphasize how technologies fulfill users’ requirements and become the primary source of satisfaction for SLSS operators, which can be explained by the uses and gratifications theory 2.0 (UGT 2.0). We understand why users use a specific media technology, such as live streaming services – interface features that suggest how users can interact with the interface and contribute to content construction – as novel sources of media gratifications (Sundar and Limperos, 2013). For example, the novelty of live-streaming technology might be a driving factor in their preference for platforms like Facebook Live. The ability to broadcast live to an audience and receive instant feedback can be exciting and appealing. Moreover, people use different social media for different social purposes (Quan-Haase and Young, 2010), such as young users who might find it more rewarding to engage with like-minded individuals in real-time discussions and events on Facebook Live.

Considering this, the study explores the potential for game mechanics to generate new forms of gratification, enhancing the dimensions, significance and effectiveness of UGT 2.0 for SLSS research in understanding the use of game mechanics from its early phases and beyond. Applying UGT 2.0 to the context of SLSS allows us to uncover the specific
motivations and gratifications that users derive from these platforms. Therefore, this study formulates a research question (RQ) to address the identified gaps.

RQ1. Based on the MDA framework and UGT 2.0, how do game mechanics (mechanics) affect user retention (aesthetics) through user reactions (dynamics) in the SLSS context?

This study contributes to the SLSS, MDA framework and UGT 2.0 literature. First, based on the MDA framework, this study explains how users evaluate the features and properties of the game mechanics and examines the roles of user behaviors in response to game mechanics features in user perceptions in the SLSS context. The application of the MDA framework aids researchers in understanding how game mechanics features influence user retention when using SLSS, which helps SLSS platform operators properly apply its approach to create enjoyable SLSS. Second, this study enhances the use of UGT 2.0 within the context of SLSS. We identify the MDA that can be categorized into modality-based and interactivity-based gratifications (mechanics), agency-based gratifications (dynamics) and navigability-based gratifications (aesthetics). Third, prior studies have yet to discuss user retention in the SLSS context well. The results of this study can be a starting point for relevant research and establish a basic understanding of user stickiness in the SLSS context.

Literature review

Social live streaming services (SLSS)

SLSS are an evolutionary feature of social media, blending live-streaming functions into social media platforms. Live-stream video and text-based media became the norm across all SLSS platforms (Qian et al., 2022). Well-known examples of SLSS are Facebook Live, Instagram Live, Twitch, Bigo Live, etc. These platforms allow members to start a live broadcast by streaming their mobile camera feed to friends or a larger audience. Unlike traditional live streaming (such as TV channels and sports), where the contents are often professionally produced (e.g. sports events) and can be well prepared for viewers, SLSS supercharges the viewer’s social experiences and adds value by providing rich, real-time and immersive experiences of watching events online (Kim and Kim, 2020).

SLSS platforms implement gamification elements that make users feel rewarded and motivated through interaction with the game mechanics (Scheibe, 2018). For example, Facebook Live has gamification elements featuring various “Facebook Live Badge” icons, such as flag, diamond, star, festival, loyalty badges and most-sharing badges (Figure 1). Such badges are shared with similar outcomes with Instagram Live, whereby reciprocally, the users get additional features, signify achievement and get more attention than other audiences. Additionally, Bigo Live incorporates gamification elements portrayed on the screens. Several mechanics elements can be identified, such as badges, the number of guests/viewers, ranking lists, leaderboards, etc (Figure 2). Thus, using SLSS, the viewers are much more dynamic, engage remotely and participate in shared live experiences (Hamilton et al., 2016).

Mechanics-dynamics-aesthetics (MDA) framework

The MDA framework was initiated by Hunicke et al. (2004) to explain crucial components of game production and design. Mechanics are the gamified elements that interact with users on the interface, such as credit points, gifts, badges and leaderboards. Dynamics emphasizes interactivity, like progressive feedback on goal achievement, to facilitate user usage and attain progress. Game dynamics refers to the player’s reactions in response to game mechanics that game providers have applied. Such reactions involve a person’s desire and satisfaction, such as seeking altruism, competition, rewards or self-expression (Bunchball, 2010).
Competition and collaboration are especially essential in social gameplay settings. Such game dynamics require commitment and user interactions (Ruhi, 2016). Aesthetics signifies the emotional effects of the user, including hedonic motivation, perceived fun, enjoyment and feeling connections. Players are seeking more than just “fun” and “pleasure;” it involves instrumental gratifications that motivate them to interact with the game (Ruhi, 2016). For example, suppose the combination of mechanics and dynamics could enable users to have a stimulating experience with the audio-visual game effects, create an immersive experience with a make-believe world, engage with well-scripted plots, pose obstacles to boost mastery, promote a social network for cooperation and interaction, explore the unknown, foster creativity and pursue a pastime for enjoyment or alleviate boredom. In that case, it will make users perceive the aesthetics of a game (Lu and Ho, 2020). To advance knowledge on gamification in the SLSS context, adding game mechanics can increase user enjoyment (Krath et al., 2021), but we still need to gain a deeper understanding of how users respond to game elements that impact users’ behavior. Thus, based on the MDA framework, how game mechanics (mechanics) change users’ behavior (dynamics), which in turn evokes enjoyment responses (aesthetics), was analyzed.

Game mechanics as Mechanics (M). The five components most commonly used for game mechanics are points, badges, levels, leaderboards and challenges (Parapanos and Michopoulou, 2021) that significantly contribute to users’ intrinsic incentive to continue using the gamified information system (Bitrián et al., 2021). Game mechanics are tools,
widgets or techniques to gamify the environment in the context of a website or an application (Bunchball, 2010). It is known that achievement and social-oriented features are growing in adoption across SLSS platforms (Zimmer et al., 2020; Qian et al., 2022). SLSS has a dominant focus on achievement and social-oriented features as the foundation for supporting the SLSS game mechanics (Scheibe and Zimmer, 2019).

Achievement-oriented features such as badges helped display a person’s accomplishment and make it known to others (Hamari and Koivisto, 2015; Koivisto and Hamari, 2019) and leaderboards instilled a sense of comparison among each other within gaming communities (Xi and Hamari, 2019; Koivisto and Hamari, 2019). Badges are a visual element that can be earned by accomplishing given tasks or conditions (Hamari et al., 2014; Scheibe and Zimmer, 2019). Badges signify the completion of a goal for an individual and are helpful for social promotion (Zichermann and Cunningham, 2011). Badges track the player’s progress and are treated as optional goals for performing activities beyond the range of core activities and services (Hamari, 2013). In addition, leaderboards are bound for performance tracking and feedback purposes and to foster a competitive environment to shape players’ behavior in gamified activities (Bunchball, 2010).

Users process social-oriented affordances such as competition, cooperation, team players and social networking features, producing a sense of relatedness and connection (Koivisto and Hamari, 2019). The more players interact with social-oriented elements, the more information exchange would be encouraged between players; it would subsequently promote social relationships and form social interaction with others (Xi and Hamari, 2019; Wee and Choong, 2019). Socialization has been treated as an essential motive for players to use social-oriented platforms and services, mainly SLSS platforms (Scheibe, 2018; Xi and Hamari, 2019; Hu et al., 2022). Socialization encourages the gifting behavior of the user when using SLSS (Hu,
One of the crucial social gameplay elements that urged consumers to indulge in role-playing games was recognized as socializing (Tychsen et al., 2008). Socializing is foundational for building game mechanics, especially multiplayer online role-playing games (Dechant et al., 2020). In the context of SLSS, likes, followers/fans, emoticons, gifts, moments and guests in a stream are part of the social-oriented game elements widely used in social network platforms (Scheibe, 2018). User’s achievement satisfaction comes from winning in the game mechanics and social satisfaction comes from connections made with other users. Victory in the game leads to a desire for social display and sharing, while collaboration and communication with others facilitate winning (Mao and Cho, 2024). Therefore, this study adopts achievement-oriented features and socialization as the game mechanics in the context of SLSS.

Rewards and social interaction as Dynamics (D). Game dynamics refers to the player’s reactions in response to game mechanics that game providers have applied. Such reactions involve a person’s desire and satisfaction, such as seeking altruism, competition, rewards or self-expression (Bunchball, 2010). Giving rewards is a representative type of live interaction (Chen and Liu, 2024). Live streaming presents two kinds of reward-based behaviors, namely, material and psychological rewards behaviors (Wang, 2019). Material reward are the exchangeable points, prizes and gems earned from performing live-streaming actions on the platform. In contrast, psychological rewards, such as the need to feel a sense of participation and recognition, are examples of this behavior (Sinclair and Tinson, 2017). Meaningful game dynamics focus on the game’s hedonic function in overcoming one’s intrinsic motivation, which leads to deep engagement and satisfaction (Deci et al., 1999). Game dynamics that tap into players’ intrinsic motivations, such as autonomy, competence and relatedness, are particularly effective at fostering psychological rewards (Suh et al., 2018). This is why psychological rewards are the main reason for viewers to continue visiting live-streaming platforms (Wang, 2019). Thus, in the SLSS context, we focus on psychological reward-based behavior and identify rewards as a dynamic element of users’ reactions to game mechanics.

Moreover, game dynamics is an essential element to actualize benefits as it focuses on the behavioral and interactional patterns of individuals (Hunicke et al., 2004). This study has convinced consumers that feelings of pleasure arise physically and psychologically after forming social interactions with others. While it is not surprising to learn that social interaction is an important component of game dynamics (Lu and Ho, 2020), deeper research into the identification of game dynamics focusing on social interaction is still scarce (Huang and Zhou, 2021). The lack of empirical evidence has led this study to provide a holistic model by introducing game dynamics that focus on social interaction and explaining the game mechanics by which social dynamics increase user enjoyment and retention. Hence, this study identifies social interaction as another core dynamic element in the SLSS context.

Enjoyment and user retention as Aesthetics (A). Enjoyment is the user’s feelings of pleasure and utility, reflecting their intrinsic interests and motivations (Guo and Poole, 2009). For example, enjoyment is a significant intrinsic motivation to drive gifting behavior in gamified SLSS (Hu et al., 2022). Based on previous research, one’s interaction with a broadcaster could be conceptually decomposed into enjoyment and a parasocial relationship with the broadcaster, as social live streaming is primarily a hedonic media platform (Bründl et al., 2017). Further, gamification effectively motivates users’ usage intentions through a gamified experience in play (Höllig et al., 2020). The outcome of the gamified experience was that participants were satisfied with the experience, which would invoke positive feelings (Hunicke et al., 2004; Xu et al., 2013). Ultimately, they would perform actions to connect closer to the gamified product and related service. That means using SLSS would aim to enhance the platform’s user retention rate. Thus, when users interact with SLSS, aesthetics evoke desirable emotional responses in the user. Through a gamified experience, users resonate
with the enjoyment conveyed by SLSS and eventually become SLSS enthusiasts. This study’s “aesthetics” dimension consists of enjoyment and user retention in the SLSS context.

**Uses and gratification theory 2.0 (UGT 2.0)**

UGT 2.0 posits that individuals seek out media and technology to satisfy their specific needs and derive benefits from their use (Malodia et al., 2022). Based on the MDA framework, this study follows the categorizations of gratifications of Sundar and Limperos (2013) and posits four types of gratifications for participation in SLSS: mechanics (modality-based and interactivity-based gratifications), dynamics (agency-based gratifications) and aesthetics (navigability-based gratifications).

**Modality-based gratifications** refer to multiple modalities (e.g. text, pictures, audio and video) used to present media content, appealing to different aspects of the human perceptual system (e.g. hearing and seeing) (Sundar and Limperos, 2013). The game mechanics of SLSS offer multiple modalities (such as points, badges, levels, leaderboards, challenges, etc.), making it “cooler” and enhancing consumers’ desire to associate with it. Coolness in game mechanics enhances the enjoyment of using SLSS, increasing users’ adoption. In this way, achievement-related modality gratifications can influence users’ adoption of content delivered by game mechanics.

**Interactivity-based gratifications** are associated with features that allow users to make real-time changes to the content (Sundar and Limperos, 2013). The interactivity affordance goes to the heart of audience activity by allowing users to interact with and through the medium. In the context of SLSS, users can purchase virtual gifts embedded in the platform (e.g. a loving heart and a rocket) to show their appreciation and support for the streamers (Zhang and Liu, 2024), showing users’ socialization toward game mechanics.

**Agency-based gratifications** allow users to be the sources of information and facilitate two-way communication between content creators and viewers (Sundar and Limperos, 2013). In the SLSS context, users need to feel a sense of participation and recognition (Sinclair and Tinson, 2017). Because of psychological reward behavior, users are motivated to participate in each live-streaming channel and post comments on others’ creators. In this way, psychological rewards are achieved by letting users serve as content sources, individually and collectively and conveying others’ reception of their postings (Sundar and Limperos, 2013). Thus, rewards are considered agency-based gratification in this study. In addition, SLSS enables users to express their ideas and receive responses from streamers and other viewers (Zhang and Liu, 2024). In the SLSS context, with video and text chat that afford more social cues and synchronous communication, viewers experience heightened intimacy and perceive relational closeness with a streamer (Wolff and Shen, 2024). Hence, social interaction in this study is considered an agency-based gratification.

**Navigability-based gratifications** refer to the enjoyment of navigating through Internet-based media, allowing users to move through the medium (Sundar and Limperos, 2013). To enhance aesthetics, SLSS provides abundant information for users to browse and create a sense of fun and exploration. Therefore, enjoyment is considered a navigability-based gratification in this study. By addressing these critical issues based on the MDA framework and UGT 2.0, this study builds a novel theoretical model (see Figure 3).

**Hypothesis development**

**Game mechanics for rewards and social interaction**

Game mechanics apply tangible/intangible elements such as badges, leaderboards, chat rooms, gifts, emojis, etc. (Hunicke et al., 2004) to achieve different categories of rewards (e.g. recognition, appreciation and prosocial incentives) (Paharia, 2013). For example, the
Starbucks Mobile app uses achievement mechanics to reward loyal customers. Every time their customer completes an achievement, they receive special offers from the company (Petridis et al., 2014); Pokemon GO has game mechanics linked to movement and provides wearable devices that automate some of the playing to free resources from the players to focus more on exercise and movement; then, players could obtain rewards from moving. In addition, game mechanics encourage specific behaviors based on performance, promoting interactions and elevating user engagement (Dzandu et al., 2022). Meanwhile, achieving challenging goals in game mechanics can generate strong incentivizing effects (i.e. rewards) (Phillips and Gully, 1997). For example, viewers are betting on competitions with friends on Twitch’s game mechanics to achieve rewards (Qian et al., 2023). Based on the MDA framework, game mechanics with achievement and socialization elements (mechanics) allow users to overcome challenges in the game and play for increased rewards (dynamics) to pursue a sense of accomplishment in the context of SLSS. Therefore, we propose the following hypothesis:

**H1.** Game mechanics are positively related to rewards on SLSS platforms.

Game mechanics make social interaction more accessible for users and thus change consumer behavior (Koivisto and Hamari, 2019). Game mechanics such as achievement elements can fulfill social connection needs when applied in the social network environment (Xi and Hamari, 2020). Achievements with their friends could encourage social interaction within a community (Lu and Ho, 2020). Thus, it is reasonable to believe that users and streamers can enhance social interaction within the gamified live stream environment. In addition, users process social-oriented mechanics such as socialization, producing a sense of relatedness and connection (Koivisto and Hamari, 2019). The more users interact with social-oriented elements of mechanics, the more information exchange is encouraged between users; it subsequently promotes social relationships and forms social interaction with others (Xi and Hamari, 2019; Wee and Choong, 2019). Thus, based on the MDA framework, game mechanics generate a sense of social relatedness and connection when users interact with the achievement and socialization elements of game mechanics (mechanics). Accordingly, users will have social interaction behaviors (dynamics) such as connecting social networking in the game and playing to interact with friends in the SLSS context. Hence, we propose the following hypothesis:
H2. Game mechanics are positively related to social interaction on SLSS platforms.

Rewards for enjoyment, user retention and social interaction

The game’s dynamics trigger the user’s emotions of enjoyment (Ibanez et al., 2014). For example, game competition could create a sense of enjoyment (Sailer et al., 2017). Users are motivated to compete for the rewards as they find the games attractive, challenging and fun (Lu and Ho, 2020). Besides, rewards promote perceived enjoyment (Goh et al., 2017). In the SLSS context, when users receive rewards (dynamics), they are more likely to have positive emotions (aesthetics) (Hwang and Choi, 2020). Thus, we propose the following hypothesis:

H3. Rewards are positively related to enjoyment on SLSS platforms.

User retention is a critical criterion to assess whether a system is successful, especially when the system has been adopted by users for a while (Zhang et al., 2023). The connection between rewards and engagement phases within the gamified cycle is meaningful and brings the continuing motivation prompted by gamification (Liu et al., 2011). Gamified features that stimulate user interaction within the SLSS context, such as the number of guests/viewers watching/joining the live stream content, badges obtained from supporting the live streamer or the contents or either following/being followed, are possibly influencing the user’s feelings and their intention in usage. Further, suppose users take additional chances to get rewards within the game. In that case, they are more likely to articulate positive experiences about the game, forming the basis of users’ intention to stay in the SLSS context. Thus, we propose the following hypothesis:

H4. Rewards are positively related to user retention on SLSS platforms.

Game dynamics impact social interaction (Siitonen, 2007). With the new gamification system, the expectation of rewards increases, thereby improving social interaction (Johnson et al., 2018). Similarly, including rewards for consumers was associated with feelings of hedonism and social interaction (Zhang et al., 2021). For example, rewards together with identified motivations, such as gaining meaningful reviews from other users, have stimulated them in such a way to perform reciprocal actions in their social communities by posting, reviewing and sharing more product or campaign information they’re interested in with their friends and families (Wang et al., 2019). This study proposed that when users can get or obtain rewards by posting, reviewing and sharing information in the SLSS context, their social interactions may be increased. Hence, rewards stimulate and encourage users to engage in or conduct social interaction processes in the SLSS context. Therefore, we propose the following hypothesis:

H5. Rewards are positively related to social interaction on SLSS platforms.

Social interaction for enjoyment and user retention

Social interaction comprises various complicated constructs, including contexts, participant involvement, non-verbal and verbal behavior, personal expression in specific time intervals and joint and reciprocal activities (De Jaegher et al., 2010.; Chen and Lin, 2018). Social interaction is an essential contributor to social gratification in the context of online players (Li et al., 2015). A positive social interaction is believed to bring positive social feedback as perceived by users when interacting with a particular environment or system.

Pe-Than et al. (2014) reported that if the game was perceived to enhance social interaction, the player enjoyed playing it more. Players would have felt more pleasure and fun if they had formed better social interaction. Social interactions among the players are a critical source of joy and happiness (Lu and Ho, 2020). Meaningful social interactions could enhance the fun for
a user in a game (Jegers, 2007). When users are allowed to play with friends or streamers, they receive entertainment value from their interactions with friends and thus exhibit positive feelings toward the SLSS platform. The more interactions there are between users and a streamer or other viewers (dynamics), the more likely users are to develop emotional attachments (aesthetics). Hence, social interaction is believed to be vital in operating the gamified SLSS environment to enhance users’ fun experiences. Thus, we propose the following hypothesis:

H6. Social interaction is positively related to enjoyment on SLSS platforms.

For audiences and viewers, it is more sensible for live streamers to continue using such SLSS in the future. Li et al. (2015) posited that social interaction significantly induced continued intention toward social network games. Further, Li et al. (2021) have proven the significant effects of interaction that drive emotional attachment to the streamers, leading to user retention using a live streaming platform. In addition, human interaction is essential in enhancing customer engagement in gameplay and acts as a critical motive of social exchange within such environments (Brodie et al., 2011). When users can interact within the SLSS platform (dynamics), such as by watching/joining the live stream content, badges obtained from supporting the live streamers or the contents or by following/being followed, they will intend to stay (aesthetics) in the SLSS context. Thus, we propose the following hypothesis:

H7. Social interaction is positively related to user retention on SLSS platforms.

Enjoyment for user retention. Perceived enjoyment is part of an individual’s motivators (Lin et al., 2005; Yin et al., 2011) and is an essential predictor of gamification (Yang et al., 2017). When a user has a higher degree of enjoyment of the SNS service, the tendency to stay in use has risen as well. Perceived enjoyment should be a motivating factor in assessing the effectiveness of gamification. In this study, enjoyment refers to a user’s intrinsic feelings when they actively stay on SLSS platforms; it is suggested that enjoyment influences user retention. Users who perceive enjoyment while using SLSS tend to express an intention to adopt the SLSS platforms. Thus, we propose the following hypothesis:

H8. Enjoyment is positively related to user retention on SLSS platforms.

Method
Measures
Game mechanics are conceptualized as a formative second-order construct, including two first-order constructs, namely, achievement-oriented features and socialization. Achievement-oriented features were modified from Xi and Hamari (2019). Socialization was adopted from Hu et al. (2022). Rewards were adapted from O’Brien et al., 2018 and Bitrián et al. (2021). Social interaction was adapted from Chen and Lin (2018) and Li et al. (2021). Enjoyment was modified from Chen and Lin (2018). User retention was modified from Lu and Lee (2010) and Li et al. (2021). A five-point Likert scale with a range of 1 (strongly disagree) to 5 was used to score the items (strongly agree).

Sample and data collection
The greater influence of social live streaming has gained massive popularity among young adults in East Asian countries. Notably, China has been nominated as the primary market for social live-streaming platforms, where it has attracted millions of active users and generated substantial revenue (Wan and Wu, 2020). Knowing that Taiwan shares a similar socio-cultural context with China, it is a relevant location for understanding the phenomenon of using SLSS and its impacts on Taiwanese streamers and viewers. According to the 2023
World Digital Competitiveness Ranking (DCR) released by the International Institute for Management Development (IMD), Taiwan ranked 9th out of 64 major countries and economies worldwide in 2023 (InvesTaiwan, 2023). Of which, Taiwan’s digital innovation technology is the strongest pillar among four categories (investment in telecommunications, communication technology, wireless broadband and internet bandwidth speed). This suggests that Taiwanese residents are more tech-savvy and act as adopters of many ICT applications.

Moreover, in the current situation of watching live streams, Taiwan has a high percentage of live streaming awareness and usage. About 85.2% of 2,153 Taiwanese respondents were found to be spending time watching live-streaming videos (TWNIC, 2023). Because there are many SLSS platforms in Taiwan (e.g. LANG LIVE, Bigo Live, 17LIVE, PDLIVE, SUGO: Voice Live Chat Party, TanTan, DayLive, Wave, etc. (Similarweb.com, 2024), user retention is essential for guaranteeing long-term profitability in the highly competitive SLSS market. The issue of how to facilitate user retention has become a challenge for scholars and practitioners. Therefore, studying the user behaviors of SLSS in Taiwan may bring valuable insights for researchers and practitioners of SLSS in devising suitable research/marketing strategies.

This study used a random sampling approach to gather data. The original English version of the questionnaire was translated into Chinese. To avoid bias and ensure validity, the Chinese version was translated back into English to ensure accuracy. Three marketing professors were selected for pilot testing of the questionnaires for their suitability. According to their feedback, the questionnaire was revised to fit the study context better and eventually, the final version was created (see Appendix: the instrument of this study). The survey is provided in Chinese, and the distribution regions are targeted at users in Taiwan. The questionnaire is built using Google Forms and SurveyCake and distributed over social media platforms like Facebook, Instagram and Line. Besides, this study applied snowball sampling to distributing online surveys and expanding the sampling region. Respondents are accessible through an online survey by scanning a QR code. The survey forms are being preset to restrict users from making more than one attempt, which could eliminate duplicate data for accurate and validated results.

A total of 283 survey questionnaires were collected from July to September 2022. To collect data from representative samples, we used one screening and filtering question on the first page of the online questionnaire. A screening question like “Please indicate whether you are using the live streaming services.”; a filtering question like “Whether you have used any SLSS in the past three months?” will be asked to filter out the target respondents. The respondents could move to the next page of the questionnaire only after responding to the two questions with a “yes.” After filtering out the target respondents from the samples, which are confined to having experiences using their preferred SLSS platforms, 232 valid questionnaires were received. Such a sample size seems adequate since effective sample sizes for partial least squares (PLS) can range from 211 to 246 (Wongkitrungrueng and Assarut, 2020). Additionally, the minimum size should be ten times the largest construct (Barclay et al., 1995). Thus, the suggested sample size for this study ranged from 100 (i.e. ten times the number of items in the game mechanics construct, which is the largest number of indicators) to 246 (the average sample size).

The data are then filtered and pre-processed to exclude unfit conditions and missing values to ensure accurate analysis. About 67.81% were females and 68.79% were 18–25; 65.95% had a bachelor’s degree and 50.86% had more than one year of experience using SLSS, with 71.12% reporting having used SLSS for more than 15 min at a time. The demographic profile showed that SLSS users are relatively young and generally well-educated. Table 1 shows the demographics of the samples.
Common method variance (CMV)
Before we started to gather data, the questionnaire was designed with a statement for respondents’ clear understanding that the survey was not for any commercial use and would be used only for academic research. In addition, we addressed procedural remedies by protecting respondent anonymity, reducing evaluation apprehension, improving item
wording and separating the measurement of predictor and criterion variables. Most importantly, we assured respondents that there were no right or wrong answers and that they should answer questions as honestly as possible (Podsakoff et al., 2012).

In the post-data collection stage, we used the Harman’s one-factor to test for CMV because the data were self-reported. In our estimation of the samples, in the unrotated factor solution, the largest factor explained 20.86% of the total variance, indicating no threat of CMV. Second, the variance inflation factor (VIF) values were examined for full collinearity testing. If all VIF values are less than or equal to 3.3, the model is free from CMV (Kock, 2017). Table 3 shows that all VIF values were less than 3.3, suggesting no evidence of CMV in the data. Third, there were no extremely high bivariate correlations between constructs (r > 0.90) (Bagozzi et al., 1991; Benitez et al., 2022). The highest correlation is 0.779, which does not indicate any exceptionally correlated variables, meaning that the data do not suffer from CMV.

Data analysis and results
Measurement properties
This study used PLS as a suitable tool because it has taken a count of the analysis for a small sample size and allows formative constructs in modeling non-normality conditions (Lohmöller, 1989). For validating the reliability and validity of variables, Cronbach’s alpha and composite reliability (CR) were prioritized in the test, with accepted values of 0.80 or higher for both measurements (Chin, 1998). Cronbach alpha’s values ranged from 0.84 to 0.91, whereas CR values ranged from 0.89 to 0.94. Both indicators exceeded the minimum requirement threshold value of 0.80, indicating that the constructs had discriminant validity (see Table 2). Further, convergent validity has exceeded the recommended threshold AVE value of 0.5 (Fornell and Larcker, 1981). In addition, discriminant validity was examined by determining whether the square root of AVE in the diagonal was greater than the interconstruct correlations. The square root of the AVE values for each variable ranged from 0.78 to 0.92, which is greater than all interconstruct correlation values, indicating that the constructs had discriminant validity (see Table 3).

Hypotheses testing
Figure 4 depicts the standardized path coefficient. The significance of the standardized paths was assessed through a bootstrapping process with 5,000 subsamples (Ringle et al., 2015). Table 4 shows the results of the hypothesis testing. Game mechanics have positive impacts on rewards (β = 0.700, t = 13.812, p < 0.001) and social interaction (β = 0.316, t = 3.226, p < 0.001); therefore, H1 and H2 are supported. Rewards significantly positively affect social interaction (β = 0.493, t = 5.406, p < 0.001); thus, H5 is supported. Rewards (β = 0.457, t = 3.921, p < 0.001) and social interaction (β = 0.437, t = 6.496, p < 0.001) have significantly positive effects on enjoyment; therefore, H3 and H6 are supported. Enjoyment significantly positively affects user retention (β = 0.430, t = 3.611, p < 0.001); thus, H8 is supported. However, rewards (β = 0.138, t = 0.152, p > 0.05) and social interaction (β = 0.059, t = 0.602, p > 0.05) showed insignificant results toward user retention; thus, H4 and H7 are unsupported. Based on the R², game mechanics explain 49% of the variance in rewards; game mechanics and rewards explain 56% of the variance in social interaction; rewards and social interaction explain 68% of the variance in enjoyment; enjoyment explains 34% of the variance in user retention. Based on the average variance accounted for (AVA), the AVA value for the model is 0.51, which is greater than the cutoff value of 0.10 (Falk and Miller, 1992). These results indicate the adequate explanatory power of the structural model.
An essential part of model evaluation is the examination of fit indices reflecting the predictive power of estimated inner and outer model relationships. The goodness of fit (GoF) (0 ≤ GoF ≤ 1) represents an index for validating the PLS model globally (Tenenhaus et al., 2005). GoF is the geometric mean of the average communality and the average \( R^2 \). Moreover, in line with the effect sizes for \( R^2 \) in the GoF (small: 0.1; medium: 0.25 and large: 0.36) (Wetzels et al., 2009), these values serve as baseline values for validating the PLS model globally. According to the
results in Table 4, GoF = \sqrt{[(0.51) \times (0.49)]} = 0.34, which exceeds the cutoff value of 0.25 for a medium effect size and can be considered satisfactory.

Post-hoc mediation analysis
Because H4 and H7 are unsupported, this study further assesses whether enjoyment mediates the relationships between rewards, social interaction and user retention. We used regression-based factor scores as the data about rewards, social interaction, enjoyment and user retention. It was revealed that the indirect effect of rewards on user retention through
enjoyment was significant ($\beta = 0.267, t = 3.794$). Thus, the result shows that the relationship between rewards and user retention is mediated by enjoyment. In addition, the indirect effect of social interaction on user retention through enjoyment was significant ($\beta = 0.138, t = 2.754$). Hence, the relationship between social interaction and user retention is mediated by enjoyment. As a result, it is noticeable that enjoyment has mediating effects on the relationships between rewards, social interaction and user retention. When users get rewards and have social interaction derived from the SLSS, enjoyment plays a crucial aesthetic element within the gamified SLSS platform, which has effectively triggered users’ responses and is incredibly effective for users to keep using the SLSS. This mediation analysis reinforces the results obtained in the test of hypotheses (Benitez et al., 2020).

### Discussion and conclusions

The primary objective of this study is to highlight how users using game mechanics of SLSS affected their dynamic elements (i.e. rewards and social interaction) and aesthetics elements (i.e. enjoyment and user retention). The results support the main premises of the proposed research model: (1) Game mechanics are positively related to rewards and social interaction on SLSS platforms (H1 and H2); (2) Rewards are positively related to enjoyment and social interaction on SLSS platforms (H3 and H5); (3) Social interaction is positively related to enjoyment on SLSS platforms (H6) and (4) Enjoyment is positively related to user retention on SLSS platforms (H8). However, our findings revealed that the effects of rewards and social interaction on user retention were not significant (H4 and H7).

There are four possible explanations for this. First, most firms’ gamification strategy offers users tangible rewards (e.g. cash, vouchers and discounts) to achieve user retention. For example, this strategy is commonly used by ride-hailing firms such as Grab, Gojek and DiDi; loyalty programs such as Starbucks Points and e-commerce initiatives such as Taobao’s Packets (Jacobides et al., 2024). These companies focus heavily on throwing money (i.e. tangible rewards) at users and thus may have more user retention. This is different from the intangible rewards (i.e. psychological rewards) examined in this study. Second, the correlation matrix (see Table 3) showed strong relationships between rewards ($r = 0.50, p < 0.01$), social interaction ($r = 0.47, p < 0.01$) and user retention; using single regression analysis, it was shown that rewards ($\beta = 0.336, t = 4.25, p < 0.001$) and social interaction ($\beta = 0.240, t = 3.03, p < 0.01$) had significant positive effects on user retention. Thus, we suspected that the effects of rewards and social interaction on enjoyment may weaken the effects of rewards and social interaction on user retention. Third, some users may be short-term content consumers and for certain SLSS, they may only visit for a specific event or topic rather than being continuous participants. Fourth, the SLSS market is fiercely competitive and users have numerous choices. Even if one platform provides psychological rewards and social interaction, other platforms may offer more attractive features or experiences, making users more inclined to transfer or use multiple platforms and reducing user retention.

### Theoretical implications

First, existing SLSS studies predominantly focused on using consumer behavior theories in studying live-streaming contexts or built hybrid models, such as UGT (Asante et al., 2024; Long and Tefertiller, 2020), self-determination theory (Giertz et al., 2022), SLSS’ gifting behavior model (Hu et al., 2022), socio-technical approach (Li et al., 2021), service dominant logic (Liu et al., 2023, 2024) and co-interactive behavior (Bründl et al., 2023). This study closed the gaps by applying the MDA framework to the SLSS context and better understanding how gamification affects user behaviors and emotions when using SLSS. Specifically, prior studies based on the MDA framework are conceptual and few studies have operationalized
the constructs for each component of MDA (Li and Fang, 2020). We operationalized “mechanics” as game mechanics, “dynamics” as rewards and social interaction and “aesthetics” as enjoyment and user retention.

Second, consistent with Ciuchita et al.’s (2023) view of gamification functions, our findings contributed to the gamification literature. Ciuchita et al. indicated that there are four critical functions, namely, production, exchange, consumption and distribution. We responded and applied these aspects in the MDA framework; specifically, production serves as “mechanics,” exchange serves as “dynamics,” consumption serves as “aesthetics” and distribution serves as “use intentions.” As such, we contributed to gamification research by providing the typology of MDA in the context of SLSS.

Third, this study successfully framed game mechanics as a second-order hierarchical construct. Reflecting on this issue, research on developing game mechanics should focus on achievement-related features and socialization. There is evidence that the hierarchy of these dimensions introduced in this study can help researchers conceptualize game mechanics. Therefore, we supplemented the gamification research (e.g. Lu and Ho, 2020; Xi and Hamari, 2019; Qian et al., 2022, 2023; Hu et al., 2022) by indicating that achievement-related features and socialization of game mechanics can be an alternative way for firms to enhance users’ interactivity toward the gamified SLSS settings. Further, enjoyment is the most critical mediator affecting users’ engagement with the SLSS context. These results agree with the view of Hamari and Koivisto (2015) that enjoyment directly correlates with how much people are willing to use gamification services. Thus, this study provided a more comprehensive view of user behaviors within the SLSS environment.

Fourth, this study contributes to the UGT 2.0 research (Agarwal et al., 2023; Zhang and Liu, 2024; Sundar and Limperos, 2013) in the MDA framework literature by identifying four types of users’ gratifications (i.e. modality, interactivity, agency and navigability) that are closely linked to the characteristics of the MDA framework (i.e. mechanics, dynamics and aesthetics). Specifically, we untangle the MDA elements that represent the four main types of gratifications users derive in the SLSS context to fulfill their needs: game mechanics (modality-based and interactivity-based gratifications), rewards and social interaction (agency-based gratifications) and enjoyment (navigability-based gratification). The findings enhance our knowledge of the antecedents of user retention in the SLSS context.

**Practical implications**

Our study provided guidelines for SLSS platform operators on how to foster user retention. First, gamification features embedded within the game mechanic’s dimension, such as achievement-oriented (e.g. badges and leaderboards) and socialization, have played a core ingredient in designing gamified SLSS. SLSS platform operators should emphasize inculcating smoother and more interactive phenomena, especially in achievement- and social-oriented gamified services or platforms.

Second, SLSS platform operators should maintain rewards and social interaction as important dynamic elements within their gamified SLSS context to retain users and enhance the user experience. This study provides suggestions for brand practitioners about building client/customer relationships through SLSS platforms and optimizing their marketing and customer relationship strategies. It is advisable to engage their users by having a campaign/activity that encourages more socialized activity among their users and the SLSS platform itself. By creating a socialized environment and inculcating social interactivity within the activity phenomenon within a SLSS, users gain rewards such as recognition and attention from the SLSS platform and experience pleasure and willingness to engage with the SLSS’s activity.
Third, users can have an entertaining and enjoyable online experience while taking advantage of the ubiquitous characteristics of SLSS platforms, allowing them to watch a live stream or interact with friends anytime and anywhere. Therefore, SLSS platform operators should enhance the entertainment aspects of user retention. Additionally, enjoyment significantly mediates the indirect effects of rewards and social interaction on user retention. SLSS platform operators must understand the users’ psychological motivations to facilitate a good usage process. Game dynamics have the advantage of including rewards and social interaction features while adding enjoyment elements to a good usage experience. SLSS platform operators must recognize the impacts of these features on users and focus on developing dynamic features with the most vital hedonic values (e.g., enjoyable, pleasurable, fun, exciting and interesting) based on the results of this study. As a result, using rewards and social interaction features to emphasize SLSS user experiences could shape user retention.

Fourth, four types of user gratifications can provide valuable insights for the designers and developers of live streaming platforms. SLSS platform operators can use this information to improve service design, user engagement tactics, marketing communications, enjoyment development and user retention strategies. By addressing specific challenges and understanding the driving forces behind SLSS usage, SLSS platform operators can enhance their offerings, respond to user issues and improve the overall user experience. This may involve designing game mechanics (modality-based and interactivity-based gratifications), offering reasonable rewards or expanding social interaction models (agency-based gratifications) and developing practical enjoyment approaches (navigability-based gratifications).

**Limitations and further research**

This study has limitations. First, concerning enjoyment as part of the aesthetic element behind the MDA model, this study does not count the dual division of enjoyment in passive and active behavior (Bründl et al., 2017). Furthermore, there are future improvements required to experiment with other gamification features as part of the mechanics’ dimension, such as challenges, immersive-oriented mechanic elements, gifting, etc. to build up a holistic view of gamification frameworks and be representative in the context of SLSS. In addition, it is expected to explore moderating factors such as generation cohorts, age and gender in the SLSS context. Still, comprehensive and viable research is highly encouraged by investigating other aspects derived from the MDA framework that would provide business leaders and marketers with more valuable insights on how gamification could drive the success of their businesses.

Second, data sampling was only conducted in the Taiwan context. Hence, future research could improve results by extending to other geographical regions, having more significant sample sizes and ensuring equal sampling distribution among gender groups upon data collection. Third, the Taiwanese respondents in this study do not explicitly differentiate the user types and confirm their Chinese origin/natives for using the SLSS. To enhance the ability to approach the right respondents, future research should confirm the potential respondents’ nationality before surveying. Fourth, this study only solicited respondents with prior experience using SLSS and asked them to complete the questionnaire based on their experience using their preferred SLSS. Future research should investigate the most popular SLSS platforms and compare user behaviors on different SLSS platforms in Taiwan.

Fourth, our data only comes from SLSS users in Taiwan, resulting in doubt about the generalization of our findings. Future research should conduct surveys in multiple countries with varied social, cultural and economic contexts to test whether our research model could bring robustness to the generalizations. A comparison across Eastern and Western cultures is highly encouraged to deepen the understanding of donation. Finally, as with any
investigation that relies on online survey data, our findings do not have self-selection and self-reporting biases. As a result, future studies investigating the use of SLSS should include usage data from SLSS providers to validate survey data.

References


Scheibe, K. and Zimmer, F. (2022), “Gender differences in perception of gamification elements on social live streaming services”, in Research Anthology on Feminist Studies and Gender Perceptions, IGI Global, pp. 405-422.


**Further reading**


(The Appendix follows overleaf)
### Table A1.
The instrument of this study

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement-related features</td>
<td>ARF1 Badges/medals/trophies are important to me</td>
</tr>
<tr>
<td></td>
<td>ARF2 Virtual currency/coins are important to me</td>
</tr>
<tr>
<td></td>
<td>ARF3 Points/scores/experience points are important to me</td>
</tr>
<tr>
<td></td>
<td>ARF4 Status bars/progress bars are important to me</td>
</tr>
<tr>
<td></td>
<td>ARF5 Avatar/virtual identity/profile levels are important to me</td>
</tr>
<tr>
<td></td>
<td>ARF6 Leaderboards/rankings/highscore lists are important to me</td>
</tr>
<tr>
<td>Socialization</td>
<td>SL1 I want to interact with people in SLSS</td>
</tr>
<tr>
<td></td>
<td>SL2 I want to get connected with people in SLSS</td>
</tr>
<tr>
<td></td>
<td>SL3 I follow others’ doing in SLSS</td>
</tr>
<tr>
<td></td>
<td>SL4 I do what other people do in SLSS</td>
</tr>
<tr>
<td></td>
<td>SL5 I want to get people's attention in SLSS</td>
</tr>
<tr>
<td></td>
<td>SL6 It feels great to get people's attention in SLSS</td>
</tr>
<tr>
<td>Social interaction</td>
<td>SI1 When watching a live-stream, I can exchange and share opinions with the streamer easily</td>
</tr>
<tr>
<td></td>
<td>SI2 When I am watching a live stream, the streamer knows I'm concerned about him or her</td>
</tr>
<tr>
<td></td>
<td>SI3 When watching a live-stream, I feel closer to the streamer</td>
</tr>
<tr>
<td></td>
<td>SI4 When I am watching a live stream, the streamer provides sufficient opportunities to respond and ask a question</td>
</tr>
<tr>
<td>Rewards</td>
<td>RE1 Using this SLSS is worthwhile</td>
</tr>
<tr>
<td></td>
<td>RE2 My experience is rewarding when using SLSS</td>
</tr>
<tr>
<td></td>
<td>RE3 I feel interested in this experience when using SLSS</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>EN1 Using SLSS is enjoyable</td>
</tr>
<tr>
<td></td>
<td>EN2 Using SLSS is pleasurable</td>
</tr>
<tr>
<td></td>
<td>EN3 Using SLSS is fun</td>
</tr>
<tr>
<td></td>
<td>EN4 Using SLSS is exciting</td>
</tr>
<tr>
<td></td>
<td>EN5 Using SLSS is interesting</td>
</tr>
<tr>
<td>User retention</td>
<td>UR1 I browse SLSS almost every day</td>
</tr>
<tr>
<td></td>
<td>UR2 I am in the habit of looking for new videos on SLSS while accessing the internet</td>
</tr>
<tr>
<td></td>
<td>UR3 I would visit SLSS frequently</td>
</tr>
</tbody>
</table>

**Source(s):** Authors’ own creation

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