



# Understanding User Engagement Mechanisms on a Live Streaming Platform

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**Abstract.** As part of new emerging eCommerce innovations, live streaming has started to gain lots of attention in business world because of its potential capability to boost sales online. Enabling interactions among a real-time seller, users (i.e., viewers) and peer users in e-Commerce platforms, live streaming is promising to facilitate real-time interactions among seller, users and peers online, which are likely to alleviate the physical separation between sellers, users and products in cyber space. Although some businesses are proactive to invest on this new live stream platform with a goal to more effectively engage their users, it is still largely unknown whether this effort can ultimately increase their consumer conversion rates. Accordingly, this research aims to gain more in-depth insights into users' acceptance of live streaming shopping. Based on multimedia learning and information foraging theories, this research conceptualizes user engagement mechanisms (i.e., *product interactivity*, *communication immediacy*, and *peer cues*) associated with a live streaming platform and furthermore explores how these mechanisms are likely to improve users' *product evaluation* and their *serendipity* to explore more unexpected products, and in turn how they impact users' attitude and intention to buy products on a live streaming platform. Through an online survey study with 200 users on a live streaming platform, this study finds that the identified three user engagement mechanisms significantly improve users' capability to evaluate products and their serendipity behavior online, which also have a positive impact on users' attitude and intention to shop on a live streaming platform.

**Keywords:** Live streaming · User engagement · Interactivity · Serendipity · Product evaluation

## 1 Introduction

Live streaming is defined as “the broadcasting of real-time, live video to an audience over the internet” [1]. Its increasing popularity makes the live streaming an important evolving innovation, which has started to change the landscape of the traditional e-Commerce due to its potentials to significantly increase consumer conversion rates. Hence, a new notion of live commerce is being formed. As an example, the Chinese

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live-streaming market was forecast to grow US\$4.4 billion in 2018 with viewer numbers topping 456 million [2]. Lately, in mainland China, Taobao Live, one of the most popular live streaming platforms, has achieved a consumer conversion rate of 32%, “meaning 320,000 products are added to customers’ carts per million views” [2]. In the United States, businesses such as Facebook, YouTube, Instagram, Periscope etc. also started to adopt this new live streaming platform. For instance, Kohl’s, as one of the primary retail chains, has made its first live streaming held through Periscope during the New York Fashion Week, so they were able to effectively guide their remote consumers to find relevant products and looks online [3]. Despite many companies’ efforts in using live streaming to increase their user awareness and engagement of their products, it remains a challenge to gain their investment returns off these efforts [2, 3]. Therefore, it is important to understand underlying user engagement mechanisms and how effective user engagement enabled by live streaming technologies is to convert live streaming viewers to real consumers who can make immediate decisions to purchase their products online. As an initial step, this research aims to explore the user engagement mechanisms that can be uniquely identified on the live streaming platform and their impact on users’ perceived capability of product evaluation and serendipity, which in turn influence the users’ attitude and intention to use the live streaming for shopping.

## 2 Related Theoretical Background

Live streaming is unique in terms of its channels for sellers to engage and interact with its online users (i.e., viewers) through live product demonstrations by sellers and synchronous user interactions enabled by live streaming platform’s functionalities, such as live videos, real-time online chat, conversation and other additional capabilities to leverage two-way instantaneous communications (1) between viewers and the seller and (2) between peer online viewers on the platform. As a result, live streaming is likely to create a sense of spatial and communication immediacy, which makes viewers immerse themselves *in-the-moment* and not *behind-the-screen* [3]. Its real-time functionality on rich media communication entices users to actively interact with the seller to acquire authentic sensory information about a product through touching, seeing, hearing and following online peers’ cues on the live streaming platform, and therefore, influences users’ purchase decision making process.

In this research, we theorize the user engagement mechanism in a living steaming context through multimedia learning and information foraging theories, in that they are associated with users’ learning process to gain a product knowledge and their serendipity behavior, which we believe to further influence users’ attitude and intention to make purchase decisions on a live streaming platform.

### 2.1 Multimedia Learning

How users learn a product’s features demonstrated on a live streaming platform is somewhat similar to how students learn a new subject in a multimedia environment through multiple sensorimotor channels including auditory, visual, and other external

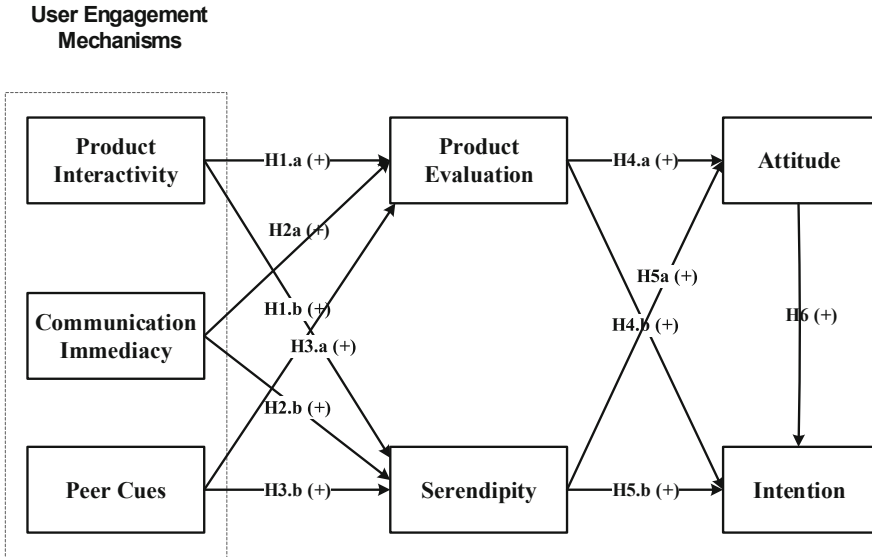
cues from peers and teacher. Prior studies [4, 5] have documented that appropriate use of multiple sensory cues in multimedia can enhance learners' spatial perceptions of objects. In a live streaming context, consumers are likely to more effectively build their respective mental representations through both auditory and visual cues delivered through static and live videos of a product, and thereafter facilitate them to learn about a product and gain heightened product knowledge. Hence, compared with traditional e-Commerce shopping platforms where consumers typically gain product information through browsing static product presentations, live streaming shopping platforms afford consumers better capability to evaluate a product through simultaneous online interactions with sellers, other consumers and products.

## 2.2 Information Foraging Theory

Information foraging theory is often applied to understand users' strategies and technologies to seek, gather, appraise and acquire information based on their environmental cues [6]. In our study context, live streaming platform allows users to directly interact with the seller, view other viewers' activities, such as what inquiries they asked, buyers' feedback, and other users' posting, adding products to shopping carts, or processing order and making payment in a real time. They are exposed to a very rich environment that is full of seller and peer user-generated contents in real-time live video, text message formats and beyond.

Serendipity has been widely studied in information science, marketing and various other domains. It is defined as "the faculty or phenomenon of finding valuable or agreeable things not sought for" in Marriam-Webster online dictionary, so it represents the unexpected or unplanned valuable occurrence of events through an accidental discovery. Users' serendipity behavior by interacting with certain technologies refers to as the extent to which a user believes that a platform triggers her/him to discover useful but unexpected products in a search process [7, 8].

Based on the multimedia learning and information foraging theories, we theorize three mechanisms of user engagement: (1) *Product interactivity*: Live streaming videos, which the seller uses to demonstrate product features, enable multiple channels of sensory product information disclosure, and three-way real-time interactions between seller and viewers and between peer viewers online, open up new opportunities for users to clarify the product uncertainty, so users are likely to be more effectively engaged to acquire the product features before they make purchase decisions; (2) *Communication immediacy*: Flexible non-verbal and verbal communication channels in real time together immerse and reinforce the user engagement; (3) *Peer cues*: Live streaming shopping provides users the opportunity to observe other peer users' online shopping activities. Such observational learning can generate unexpected triggers, driving users to seek and gather more relevant information to understand their own product preferences or needs or even to be further persuaded to consider some unplanned products. Therefore, exposing a user to peers' online shopping activities can potentially be an effective way to engage consumers due to their social influence. In this study, focusing on these three user engagement mechanisms, we proposed a research model, which is presented in Fig. 1.



**Fig. 1.** Proposed research model

### 3 Brief Hypothesis Development

Based upon online interactions at e-Commerce websites, users can gain actual product knowledge, which refers to “the extent to which consumers understand product information” [9, p. 478]. According to multimedia learning theory, rich product interactivity through triggering multiple sensory channels and real-time interactions among the seller and peer viewers afforded by the live streaming platform is likely to significantly reduce users’ uncertainty of a product and improve users’ capability to evaluate a product. In addition, it is also possible to entice users’ new interests to explore unplanned products that are initiated and acquired by other peer viewers, so we hypothesize:

H1a. There is a positive relationship between *product interactivity* and *product evaluation*.

H1b. There is a positive relationship between *product interactivity* and *user serendipity*.

Users are empowered to communicate product information along with the seller synchronously on a live streaming platform, and thus the live streaming platform can cause communication immediacy among the sellers and users, especially when users are immersed in an entertaining environment, associated with how the sellers strategize to promote products and attract online viewers. Communication immediacy enabled by the live streaming platform can make users feel like thrilling and you are there yourself, similar to the spatial immediacy effects by arts [10], so the live streaming can significantly mimic a real shopping environment where users can communicate easily without being constrained by the online channel. This communication immediacy is

likely to positively affect users' product evaluation and to arouse their serendipity behavior:

H2a. There is a positive relationship between *communication immediacy* and *product evaluation*.

H2b. There is a positive relationship between *communication immediacy* and *user serendipity*.

In addition to seller's product live video demo by the seller on the live streaming platform, there are also some other live external cues based on peer user-generated contents and their real-time interactions, which are often aggregated for products and semantically depict various product features. These cues are likely to be sensed by users and therefore impact their understanding and evaluations of a product. In addition, any additional cues can trigger users' unexpected interests in other products which are not initially planned.

H3a. There is a positive relationship between *peer cues* and *product evaluation*.

H3b. There is a positive relationship between *peer cues* and *user serendipity*.

Given the uniqueness of live streaming platform functionality, we expect the identified three user engagement mechanisms are likely to be more persuasive than the traditional e-Commerce platforms, where real-time interactions and rich sensory product information are lacking. The amount of information shared and gathered through live streaming is likely to boost sales through converting viewers to consumers who buy products online. It adds some fun entertainment features for viewers and to have real-time options to clarify complex procedures/features of a product while enabling the ways to take control of the current fan base for certain product brands. According to [11], product evaluation is likely to have a positive influence on people's purchase intention. While users acquire more information about a product, they become more capable of evaluating their product needs and preferences to meet their psychological standards before making the order. Because of reduced product uncertainty and more confidence to evaluate certain products, the users are expected to make a sounder decision in a real-time manner, and their intentions of using the live streaming for shopping are likely to be strengthened. User serendipity behavior can also be triggered through real-time observations, interactions and synchronous user-generated contents posted by their peer viewers. For example, while the users are acquiring intended product information, they can often be enticed to some unexpected product search paths introduced by other peer users' inquiries about other unintended products to the seller. This peer social influence is likely to foster more unexpected product discovery. We thus expect users' product evaluation and their serenity behavior will have a positive impact to users' attitude and intention to purchase on the live streaming platform.

H4a. There is a positive relationship between *product evaluation* and *user attitude*.

H4b. There is a positive relationship between *product evaluation* and *user intention*.

H5a. There is a positive relationship between *user serendipity* and *user attitude*.

H5b. There is a positive relationship between *user serendipity* and *user intention*.

The attitude measures how people think about their product experiences by ways of watching real-time product demonstration on the live streaming platform. The intention in our study context refers to as how likely users will use the live streaming platform for shopping in the future. Based on the theory of reasoned action, an individual’s behavioral intention is impacted by one’s attitude toward the action and one’s subjective judgement on performing the action [12]. So, we echo the following hypothesis, that has been widely proved:

H6. There is a positive relationship between *user attitude* and *intention*.

### 4 Study Design

An online survey study was conducted in mainland China. To attract user participation, every participant was led to the lucky draw after submitting their answers. The online survey consisted of two sections: First section was an introduction to live streaming e-Commerce platform and second section was the user questionnaire, which we adopted instruments that have been validated in previous research studies shown in Table 1. In total, we received 247 responses. Forty-seven were excluded because of their ages younger than 18 or missing questions, so we eventually had 200 valid user responses.

**Table 1.** Measurement instruments

Construct	Item	Questions	Source
Attitude	ATT1	Bad—Good	[13]
	ATT2	Unappealing—Appealing	
	ATT3	Unpleasant—Pleasant	
	ATT4	Boring—Interesting	
	ATT5	Dislike—Like	
Intention	INT1	It is likely that I will buy products via the live streaming e-commerce platform	[14]
	INT2	I will use the live streaming e-commerce platform the next time I want to shop online	
	INT3	I will definitely try the live streaming e-commerce platform	
Product evaluation	PEV1	If I had to purchase the product on the live streaming e-commerce platform today, I would need to gather very little information elsewhere in order to make a wise decision	[13]
	PEV2	I feel very confident about my ability to judge the quality of the product displaying on the live streaming e-commerce platform	
	PEV3	I could accurately evaluate the capability of the products from the interaction between sellers and other buyers	
	PEV4	I could accurately evaluate the quality of the products from the interaction between sellers and other buyers	

(continued)

**Table 1.** (continued)

Construct	Item	Questions	Source
Serendipity	SER1	From the communication between sellers and other buyers, I could find some clothes which I like but I had not planned for	[15]
	SER2	Watching clothes displaying on the live streaming e-commerce platform could provide some unexpected but useful findings	
Communication immediacy	COM1	Live streaming e-commerce platform allows me to give and receive timely feedback regarding the products	[16]
	COM2	Live streaming e-commerce platform allows me to use rich and varied language (varied words expressions or emoji) in my messages	
	COM3	The live streaming e-commerce platform allows me to communicate about the product as I would in the store	
Product interactivity	PIN1	Live streaming e-commerce platform allows me to acquire a wide variety of product features (such as texture, appearance of clothes on different models, different possible clothes combination and so on)	[14]
	PIN2	The live streaming e-commerce platform provides accurate sensory information about the products	
	PIN3	The experience on live streaming e-commerce platform gives me as much as sensory information about the product as I would experience in a store	
Peer Cues	PEC1	Live streaming e-commerce platform allows me to view other buyers' actions (e.g. adding product to shopping cart; processing orders or making payment) in real time	Self-developed
	PEC2	Live streaming e-commerce platform allows me to view inquiries asked by other buyers and receive timely feedback	

## 5 Data Analysis and Results

We used SEM modeling approach to examine our proposed research model for this study. The following Table 2 presents the measurement model analysis results, which are satisfying. Data analysis results demonstrate most of our hypotheses are significantly supported except H 2.b, meaning that communication immediacy does not impact users' serendipity behavior (See Fig. 2).

**Table 2.** Measurement model analysis results

Construct	Item	1	2	3	4	5	6	Composite reliability	Average variance extracted
Attitude	ATT1	.728						0.936	0.745
	ATT2	.864							
	ATT3	.750							
	ATT4	.813							
	ATT5	.848							
Intention	INT1	.769						0.905	0.760
	INT2	.782							
	INT3	.646							
Product evaluation	PEV1		.567		.532			0.858	0.668
	PEV2		.649						
	PEV3		.626						
	PEV4		.723						
Serendipity	SER1			.820				0.858	0.751
	SER2			.680					
Communication immediacy	COM1			.658				0.838	0.722
	COM2				.814				
	COM3				.656				
Product interactivity	PIN1					.828		0.826	0.704
	PIN2					.593			
	PIN3		.466			.412			
Peer cues	PEC1						.722	0.805	0.674
	PEC2						.720		

Note: PEV1 and PIN3 were deleted for loading on multiple constructs. COM1 was deleted for loading on unintended construct.



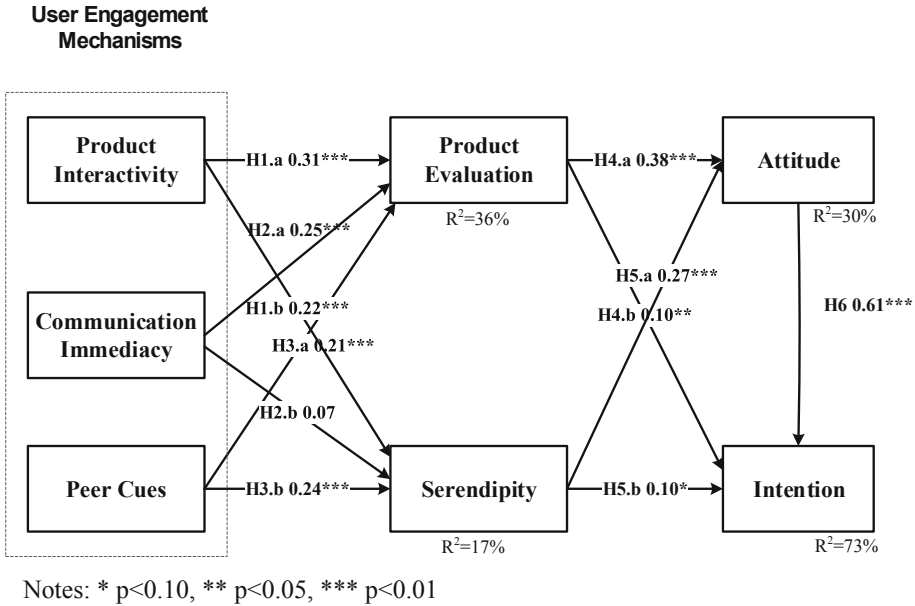


Fig. 2. Proposed research model and SEM results

## 6 Study Findings and Implications

In sum, this study successfully identified three user engagement mechanisms on the live streaming platform, which are useful for online businesses to develop their own strategies to effectively engage their potential consumers (i.e., viewers). We reported that the live streaming platform can effectively empower users to be more capable of evaluating whether a product meets their needs and preferences due to rich sensory product cues enabled by live streaming’s user engagement mechanisms.

We expect this study will contribute to the understanding of the current popular live streaming commerce phenomenon and raise the interests in our community to further explore more in-depth the user engagement mechanisms, and to effectively design more enjoyable user experiences, so businesses can achieve their goals to convert more online viewers to consumers, who are likely be persuaded to make immediate purchase decisions on such a platform. Future research can be expanded in multiple ways through integrating more marketing strategies and fostering more persuasive user experiences to boost online business sales and transactions in field studies with authentic online consumers and live streaming businesses.

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