

Digital Blind Boxes: Can Sensory Interaction Improve the Player Experience and Reduce the Potential Harms of Loot Boxes?

Dominik Szczepaniak

IT University of Copenhagen
Rued Langgaards Vej 7
2300 Copenhagen
+4591932064
perfin@gmail.com

Lana Stepisnik, Rune K. L. Nielsen

IT University of Copenhagen
Rued Langgaards Vej 7
2300 Copenhagen
+4591949352
lana.stepisnik@gmail.com, rkln@itu.dk

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INTRODUCTION

Loot boxes have become a common monetization and reward mechanism in contemporary digital games. These virtual items, also referred to as random reward mechanisms (RRMs), provide players with randomized rewards of varying rarity (Nielsen & Grabarczyk 2019). Over the last decade, loot boxes have received considerable academic attention, particularly because of their structural similarities to gambling and their association with problematic player behaviors, including excessive spending, psychological distress, and lower well-being (Drummond et al. 2025; Drummond & Sauer 2018; Villalba-García et al. 2025; Zendle & Cairns 2018). Existing research has largely focused on the ethical and economic implications of loot boxes, particularly their reliance on variable reward schedules and dark design patterns intended to maximize engagement and monetization (King & Delfabbro 2019; Mathur et al. 2019).

Comparatively little attention has been directed toward the interaction design of loot box systems and the experiential qualities of the opening process itself. Loot boxes typically reduce user interaction to a minimal action, such as pressing a single button, which is followed by an automatic opening sequence. In contrast, physical blind boxes and collectible systems emphasize embodied interaction and sensory engagement through tactile manipulation, anticipation, and ritualized opening practices (Dourish 2001; Molesworth & Denegri-Knott 2013). Research on anticipation and reward suggests that such sensory and interactional elements can substantially influence emotional engagement and perceived value (Clark et al. 2009; Knutson & Greer 2008; Larche et al. 2021).

The primary aim of this study is to investigate whether interaction design inspired by physical blind box opening rituals can enhance user satisfaction in digital reward systems. To this end, we introduce the digital blind box, defined as a randomized virtual reward mechanism that incorporates interactive opening mechanics inspired by physical unboxing rituals in order to enhance anticipation, engagement, and perceived value, while avoiding reliance on monetization-driven dark design patterns. Building on research on loot boxes, gamification, user experience design, haptics, and blind boxes, the study examines how sensory interaction may shape users' experiences of uncertainty-based rewards.

A secondary aim of the study is to examine the introduction of friction into the loot box experience. One reason why loot boxes may be more harmful to players than their physical counterparts is the ease and speed with which they can be purchased and opened. Friction is a central concept in research on gambling, habit formation, and addiction (e.g., Schüll 2012). Adding pleasurable friction to the loot box opening mechanic may improve the loot box in two ways: (1) by making the act of opening more enjoyable in itself and less focused on the reward, and (2) by slowing down the opening process, making it less automatic and less likely to cause financial harm.

To address the primary research question, we developed a digital prototype in the Unity engine. Users open the digital blind box in a manner that emphasizes the tactile and haptic qualities of the experience: clicking and holding a mouse button switches the system into opening mode, after which the user opens the box through a controlled dragging motion (Figure 1). Through this more intentional and embodied interaction, we aimed to simulate aspects of physicality by means of movement, visual feedback, and pacing, thereby enhancing player agency in the opening process.

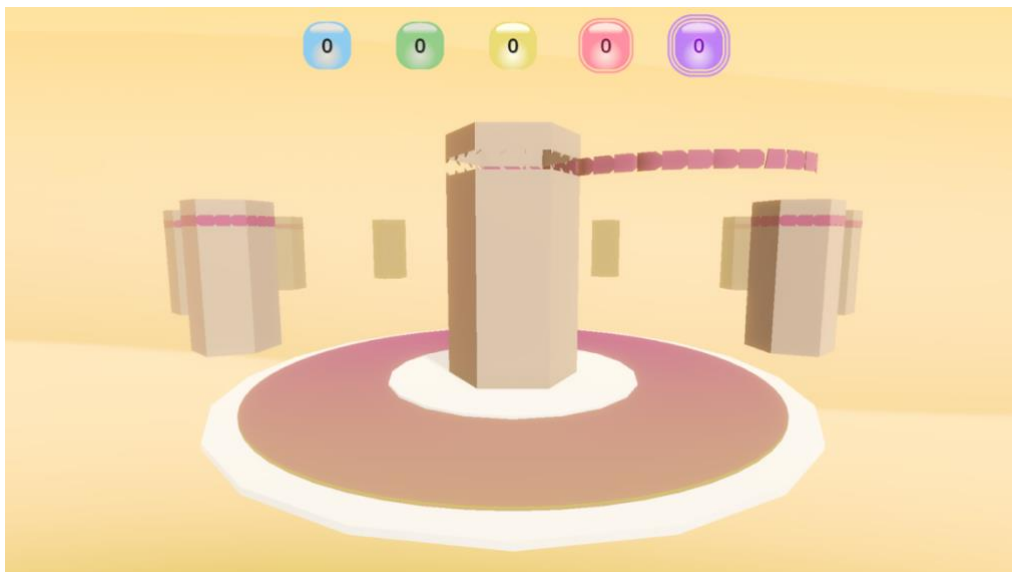


Figure 1: Digital blind box carousel with the drag-based opening mode.

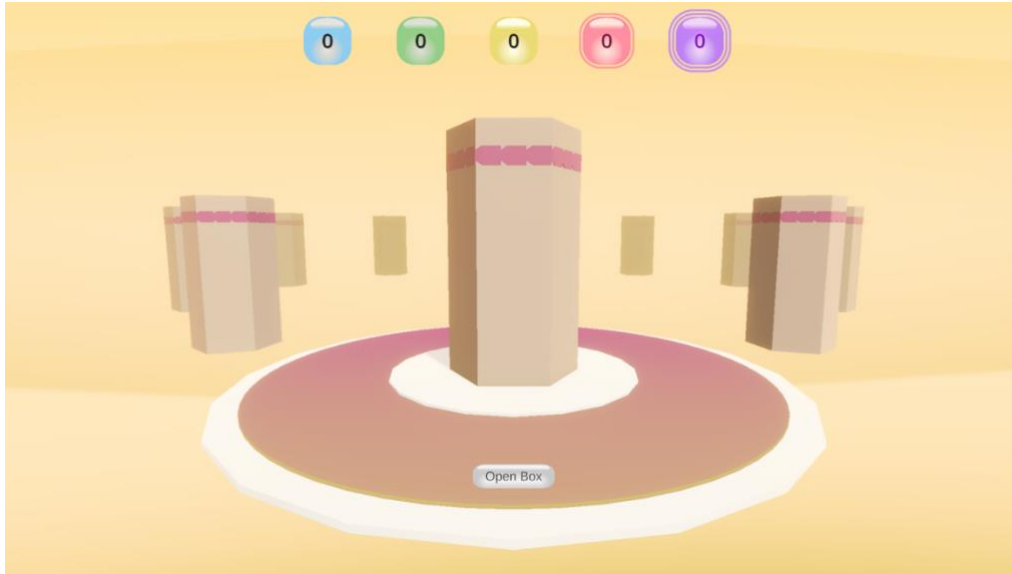


Figure 2: Digital blind box carousel with the button-based opening mode.

In addition to reconceptualizing the loot box experience, the study's practical goal was to explore whether such an interaction design could positively influence user satisfaction compared with a conventional opening mechanic consisting of a single button click (Figure 2). To this end, the study combines a literature review with a controlled within-subjects experiment ($N = 14$) using a custom questionnaire, the Digital Blind Box Interaction Questionnaire (DBBIQ), to measure and compare several constructs across the two versions. The constructs comprise enjoyment, personal gratification, visual aesthetics, usability/playability, frustration, perceived agency, anticipation, overall satisfaction, and interaction preference regarding the opening experience. Through this approach, the study aims to test the concept of perceived hapticity in digital blind boxes and to contribute to a broader understanding of how sensory interaction may shape user experience in digital reward systems.

The findings suggest that introducing an additional sensory input during the opening of a digital blind box can enhance user satisfaction (Table 1). The drag-based opening received higher scores than the button-based opening on most constructs, including enjoyment, personal gratification, perceived agency, anticipation, overall satisfaction, and interaction preference. Participants appeared to engage more actively when the interaction required deliberate input – what we describe as pleasurable friction – indicating that the added interaction made the experience more meaningful rather than merely functional. The drag-based interaction also yielded lower frustration scores than the button-based opening.

Differences in visual aesthetics and usability/playability between the two versions were not statistically significant, suggesting that the improvements in user satisfaction were attributable to the interaction itself rather than to differences in visual design or usability. These results support the concept of perceived hapticity, whereby visual and motor engagement can simulate a sense of touch in digital environments. Whether the added friction also reduces the potential harms of loot boxes, for instance by slowing the pace of purchasing and opening, was not tested in the present study and remains a question for future research. We propose further research into digital blind boxes and their gamification, as well as into the introduction of hapticity in novel interaction contexts.

	Version A (drag)	Version B (button)			
Construct	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>t</i> (13)	<i>p</i>	Cohen's <i>d</i>
Usability/ playability	5.43 (1.33)	5.96 (1.12)	-0.99	.340	-0.26
Enjoyment	5.71 (1.07)	3.39 (1.69)	5.03	<.001	1.34
Personal gratification	5.43 (1.28)	4.18 (1.41)	3.06	.009	0.82
Visual aesthetics	5.82 (1.40)	5.21 (1.41)	1.40	.184	0.37
Frustration	2.50 (1.89)	4.39 (1.85)	-2.81	.015	-0.75
Perceived agency	5.71 (1.59)	3.57 (1.99)	3.02	.010	0.81
Anticipation	5.64 (1.01)	3.93 (1.59)	3.92	.002	1.05
Overall satisfaction	6.36 (0.63)	2.79 (1.85)	6.85	<.001	1.83
Interaction preference	6.21 (1.05)	2.64 (1.55)	7.49	<.001	2.00

Table 1: Results of the DBBIQ for the drag-based (Version A) and button-based (Version B) opening modes.

BIO

Dominik Szczepaniak and Lana Stepíšnik are recent graduates of the MSc in Games (Design) at the IT University of Copenhagen. The project and the research reported here constituted their Master's thesis. Their backgrounds are in Architectural Technology and in Media and Communications, respectively. Rune K. L. Nielsen is Associate Professor of Game Psychology at the Center for Digital Play, IT University of Copenhagen, and supervised the thesis.

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CONFLICTS OF INTEREST

Rune K. L. Nielsen provided unpaid expert opinion as part of a legislative process regarding loot boxes that concluded in 2022. The other authors declare no conflicts of interest.

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