Characterizing Interactive Loading Screens in Game and Non-game Applications

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1 Introduction and Background

Interactive loading screens are screens shown during waiting periods that provide visuals and widgets that can be interacted with through user input. Interactive loading screens are most commonly found in games, such as in *Skyrim (2011)*, where players can rotate 3D models of props from the game world, and *Assassin's Creed*, which provides players a tutorial space for character controls [1]. In contrast, interactive loading screens are uncommon in non-game applications, and few prior works examine these screens beyond their effects on user time perception and emotional response [2–5, 9, 11]. This work is the first part of a larger exploration of interactive loadings screens, involving prototyping and evaluation to examine how they could be applied to educate and familiarize users with complex digital creation tools. We began by investigating the design characteristics of interactive loading screens described by prior work. We documented the characteristics of interactive loading screens and the contexts in which they have been used, and associated them in terms of interaction type, loading duration, relatedness to app functionality, and explicitness of guidance.

2 Design Space of Interactive Loading Screens

The design dimensions of interactive loading screens characterized by our design space are: *interaction complexity*, defined by the number of user inputs, and the difficulty of the action (Figures 1a and 1b); *minimum loading duration*, describing the minimum time the screens are shown for; *relatedness to app functionality*, described by how related the interaction with the loading screen is to the application's functionality (Figure 1b); and *explicitness of guidance*, described by how explicitly a screen is trying to teach the user or immerse and familiarize them with using the application (Figure 1c).

Interaction complexity and loading duration. Figure 1a illustrates how interactive loading screen designs can be affected by different loading durations. We define the interaction complexity of a loading screen based on the number of interaction steps, and how simple or difficult the interaction is. *Simple input* refers to input of only 1–2 interaction events, and *complex input* refers to inputs involving more than 2 interaction events. *Function* in the figure refers to the action complexity. It is *simple* when the goal of the action is more open-ended, and *complex* when the action requires the user to achieve goals. Interactions with more than 1–2 interaction events are not used for loading times of around 2 seconds or less. We also see more loading screens with more complex interactions at longer loading times. We found that wait times of less than 2–5 seconds did not utilize complex interaction methods, if any at all. This is likely because it is difficult to design educational interactions in such a short time. The most interactive loading screen described using this short time interval is design 1, where a spinning wheel changes color when tapped once [2]. There appears to be a relationship between increasing time scale and increasing interaction complexity. Interactive loading screens with more complex interactions also appear to be more prevalent in games than non-game applications.

The text tips in *Elden Ring* (Figure 1 design 13) and the simple back and forth movement of a pixel character in *Fire Emblem: Three Houses* [1] (design 2) also involve minimal interaction. This suggests there is room to explore how to make more complex interactions work for brief loading screens.

A virtual transition space by Kim et al. [8] (design 15) uses a virtual reality environment to provide a separate space that serves as a connector between physical reality and a virtual reality application for learning Hangul, the Korean alphabet. In this transition space, participants use a controller to paint along an interactive pathway shaped as Hangul words to promote engagement and learning. Older games such as *Assassin's Creed* [1] (design 14) use similar styles of intermediate loading room loading screens, enabled because such games already have long loading durations. The *virtual transition space* (design 15) is not constrained by load times in the same way many games are, and instead uses an approach where users can remain in the transition space until they chose to move on, which we call a *user decision* wait time. This idea stands out as a potential solution to designing around shorter load times by simply extending this time to the user's preference.

We found that many interactive screens loading use wait times between 10 and 60 seconds, and prior work does not explore wait times longer than 2 minutes. In a study on peer-to-peer help sessions, Joshi et al. [7] found that 3 minutes was an appropriate amount of time for individuals to receive meaningful help in a task or learn from the experience. We wanted to consider this duration in terms of loading screens; however, none of the interactive loading screens we examined occurred in this time frame.

Interaction complexity and relation to app functionality. Figure 1b shows interaction complexity in relation to how related the loading screen is to application functionality. In non-game applications, interactive loading screens tend to have little or no relation to app functionality, whereas game screens have higher variation. In general, screens with more complex interactions appear to be more related to application functionality, except text tips in *Elden Ring* [1] (design 13). This exception is noteworthy, because it shows that complex interactions are not required to guide users. Loading screen designs that were more related to app functionality tended to be from games with the intent of either teaching, or simply to keep players in the head-space of the game.

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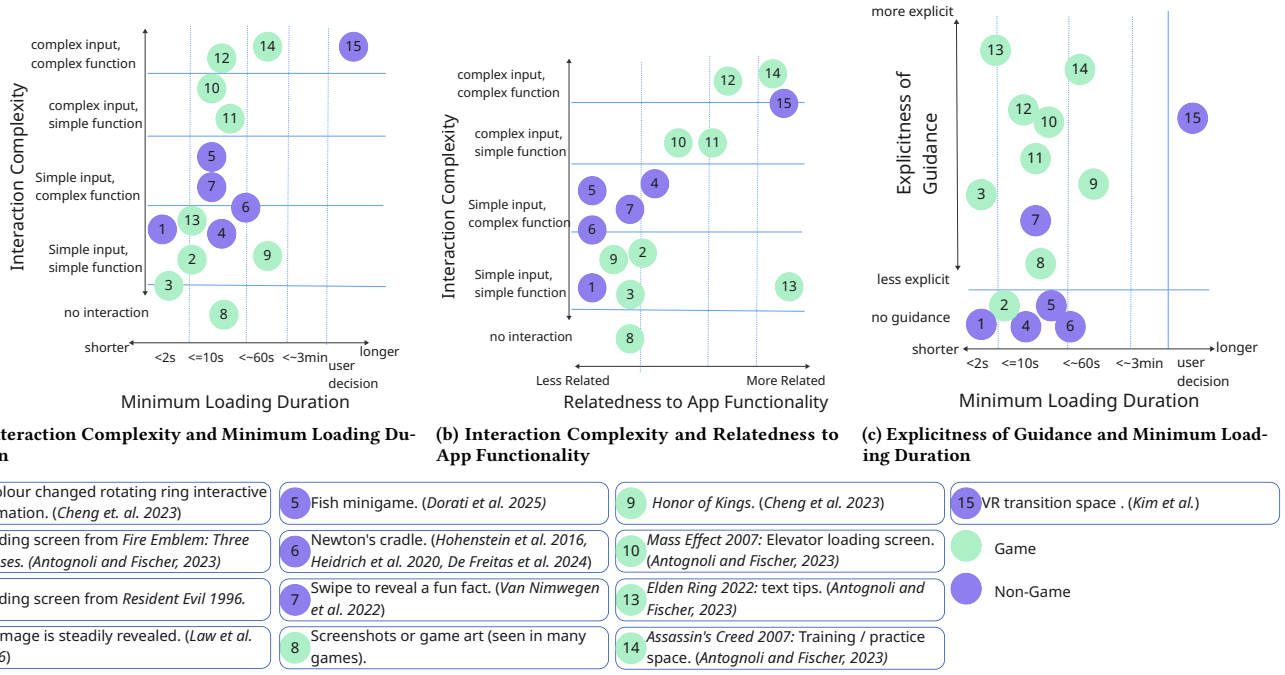

(a) Interaction Complexity and Minimum Loading Duration

(b) Interaction Complexity and Relatedness to App Functionality

(c) Explicitness of Guidance and Minimum Loading Duration

1. A colour changed rotating ring interactive animation. (*Cheng et. al. 2023*)
2. Loading screen from *Fire Emblem: Three Houses. (Antognoli and Fischer, 2023)*
3. Loading screen from *Resident Evil 1996.*
4. An image is steadily revealed. (*Law et al. 2016*)
5. Fish minigame. (*Dorati et al. 2025*)
6. Newton's cradle. (*Hohenstein et al. 2016, Heidrich et al. 2020, De Freitas et al. 2024*)
7. Swipe to reveal a fun fact. (*Van Nimwegen et al. 2022*)
8. Screenshots or game art (seen in many games).
9. *Honor of Kings*. (*Cheng et al. 2023*)
10. *Mass Effect 2007:* Elevator loading screen. (*Antognoli and Fischer, 2023*)
13. *Elden Ring 2022:* text tips. (*Antognoli and Fischer, 2023*)
14. *Assassin's Creed 2007:* Training / practice space. (*Antognoli and Fischer, 2023*)
15. VR transition space . (*Kim et al.*)

Game
Non-Game

Figure 1: Three representations of the design space. Legend depicts existing interactive loading screen designs (1–15).

Explicitness of guidance and loading duration. Figure 1c illustrates how the explicitness of guidance of interactive loading screens relates to the loading duration. This relationship is of particular interest to understand how prior loading screen designs guide users in limited time frames. Previously described interactive loading screens in non-game applications [2, 3, 6, 10] generally offer no guidance to users, and instead mainly serve as distractions to pass the time. The exceptions to this are the virtual transition space [8] (design 15), and a 'fun fact' reveal interaction in a mobile travel app [12] (design 7), because the fun fact relates to a relevant travel destination. We also found that, similar to Figure 1a, guidance is generally more explicit with longer minimum loading durations.

We ranked *Resident Evil's* loading screen [1] (design 3) as moderately explicit in guidance because it keeps players immersed in the game, and encourages players to not let their guard down in the case of a zombie door misdirect. *Elden Ring* [1] (design 13) also accomplishes a high explicitness of guidance in a short loading duration, because the guidance comes from quick-to-read text tips without complex interactions.

3 Discussion and Conclusion

In this work, we characterized a design space of dimensions and characteristics of interactive loading screens and how they can be used to guide users, and outlined how this design space can be applied to future designs.

We found that interactive loading screens with more complex interactions appear to be more prevalent in games than non-game applications, and that tutorial-like loading screens are more prevalent in games than non-game applications. These considerations motivate the value of further exploring interactive loading screen designs for non-game applications that can provide guidance to users.

Future work will prototype and evaluate interactive loading screen variant designs for use in complex digital creation tools (e.g., Photoshop), based on interesting and underexplored design dimensions from our design space. We hope this work inspires people to pay more attention to loading screens, and the possibilities of creative ways in which loading times in applications can be utilized.

References

[1] David Antognoli and Joshua Fisher. 2023. A Proposed Taxonomy for the Design Qualities of Video Game Loading Interfaces and Processes. https://doi.org/10.26503/dl.v2023i1.1928. In *Conference Proceedings of DiGRA 2023 Conference: Limits and Margins of Games Settings*. DiGRA, Tampere.

[2] Anping Cheng, Dongming Ma, Hao Qian, and Younghwan Pan. 2024. The effects of mobile applications' passive and interactive loading screen types on waiting experience. *Behaviour & Information Technology* 43, 8 (2024), 1652–1663. arXiv:https://doi.org/10.1080/0144929X.2023.2224901 doi:10.1080/0144929X.2023.2224901

[3] Polina Dorati and Réka Vásárhelyi-Nagy. 2025. Designing Loading Screens to Improve UX: Comparing Static, Animated and Interactive Interfaces. *Digitala Vetenskapliga Arkivet* (2025). https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1977979&dswid=4584

[4] Taylan Dufresne, Carl Gutwin, and T.C. Nicholas Graham. 2025. Fake it 'til you load it: User Perceptions and Performance with Fast-Loading "False Front" Web Pages. *Proc. ACM Hum.-Comput. Interact.* 9, 4, Article EICS020 (June 2025), 41 pages. doi:10.1145/3735593

[5] Gustavo Machado de Freitas, Natan Luiz Paetzhold Berwaldt, Gabriel Di Domenico, Alfredo Cossetin Neto, and Cesar Tadeu Pozzer. 2024. Interactive 2D vs. 3D Loading Screens in VR: Impact on User Experience and Perceived Wait Time. In *Proceedings of the 26th Symposium on Virtual and Augmented Reality* (Manaus, Brazil) *(SVR '24)*. Association for Computing Machinery, New York, NY, USA, 122–127. doi:10.1145/3691573.3691585

[6] Jess Hohenstein, Hani Khan, Kramer Canfield, Samuel Tung, and Rocio Perez Cano. 2016. Shorter Wait Times: The Effects of Various Loading Screens on

Perceived Performance. In *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (San Jose, California, USA) *(CHI EA '16)*. Association for Computing Machinery, New York, NY, USA, 3084–3090. doi:10.1145/2851581.2892308

[7] Nikhita Joshi, Justin Matejka, Fraser Anderson, Tovi Grossman, and George Fitzmaurice. 2020. MicroMentor: Peer-to-Peer Software Help Sessions in Three Minutes or Less. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '20)*. Association for Computing Machinery, New York, NY, USA, 1–13. doi:10.1145/3313831.3376230

[8] Seulgi Sylvia Kim, Zach Pino, and Anijo Mathew. 2026. The Impact of Virtual Transition Spaces on Learning Engagement and Memory Retention. In *Immersive Learning Research Network*, Jule M. Krüger, Matthew Schmidt, Anastasios Mikropoulos, George Koutromanos, Daniela Pedrosa, Dennis Beck, Stylianos Mystakidis, Genevieve Smith-Nunes, Anasol Peña-Rios, and Jonathon Richter (Eds.). Springer Nature Switzerland, Cham, 343–358.

[9] Takanori Komatsu, Chenxi Xie, and Seiji Yamada. 2024. Waiting Time Perceptions for Faster Count-downs/ups Are More Sensitive Than Slower Ones: Experimental Investigation and Its Application. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '24)*. Association for Computing Machinery, New York, NY, USA, Article 624, 13 pages. doi:10.1145/3613904.3641942

[10] Edith Law, Ming Yin, Joslin Goh, Kevin Chen, Michael A. Terry, and Krzysztof Z. Gajos. 2016. Curiosity Killed the Cat, but Makes Crowdwork Better. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (San Jose, California, USA) *(CHI '16)*. Association for Computing Machinery, New York, NY, USA, 4098–4110. doi:10.1145/2858036.2858144

[11] Wenan Li, Jinlei Shi, and Chunlei Chai. 2025. Enhancing User Experience during the Waiting Process: A Systematic Review of Loading Indicator Designs. *International Journal of Human–Computer Interaction* 0, 0 (2025), 1–33. arXiv:https://doi.org/10.1080/10447318.2025.2573834 doi:10.1080/10447318.2025.2573834

[12] Christof Van Nimwegen and Emiel Van Rijn. 2023. Time swipes when you're having fun: reducing perceived waiting time while making it more enjoyable. *Behaviour & Information Technology* 42, 3 (2023), 307–315. arXiv:https://doi.org/10.1080/0144929X.2022.2155576 doi:10.1080/0144929X.2022.2155576