

The Rise of Infinite Scrolling in Software Design

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

In recent years, there has been a notable change in how users engage with vast amounts of content online. One of the most prominent changes has been the rise of infinite scrolling as a form of parsing large amounts of content. Initially popularized by social media giants like Facebook, Instagram, Twitter, and TikTok, infinite scrolling can now be found on almost any website outside of the social media space, from e-commerce to news websites.

Infinite scrolling offers users a continuous browsing experience by dynamically loading new content as they scroll down a webpage or application. Traditional pagination for online websites involves breaking down a large amount of content into separate pages, typically displaying a limited number of items per page. Users navigate through these pages using numbered links or arrow buttons located at the bottom of the page to access additional content. Instead, infinite scrolling continuously loads more content as the user approaches the end of the page. This approach shows more content to the user and potentially eliminates the chance of a user leaving the website when prompted to click the next button to load more content. In this paper we are going to explore the question, what is the significance of the rise of infinite scrolling in software design? Specifically, we will explore the combination of infinite scrolling with curated content tailored to a user's interests.

Background

In 2006, a UX designer named Aza Raskin created the user interface (UI) convention of infinite scrolling as a means of eliminating pagination which was present on most websites. Pagination is a common feature found on webpages, serving the purpose of breaking down large sets of content into more manageable chunks. Typically appearing at the bottom of a webpage,

pagination presents users with a series of numbered buttons or links that allow them to navigate through different pages of content. This design enables users to easily move between various sections or items, such as search results, blog posts, or product listings, without overwhelming them with too much information at once. Raskin documented his creation of infinite scrolling, called “Humanized History” at the time, on his blog stating, “to let you spend more time reading, and less time thinking about navigation” (Raskin, 2006b). Raskin claimed that the concept of pagination was an outdated practice, however, no one ever cared to go back and redesign what the internet would look like without pagination (Raskin, 2006a).

Infinite scrolling did not take off right away like Raskin thought. It took a couple years before its popularity skyrocketed. The success of infinite scrolling can be attributed to the rise of smartphones in the mid 2010s. These new smartphones featured touchscreens, offering a new way of interacting with webpages when compared to a normal computer. The small pagination buttons often found on websites out at the time were hard to press on mobile devices, thus infinite scrolling started to become alternative to pagination buttons. Soon companies such as Facebook, Twitter, Instagram, and Pinterest all adopted infinite scrolling for their mobile application as well as their website.

Infinite scrolling aligns with the principles of user-centered design, prioritizing convenience, and intuitiveness within the interface. By eliminating the need for explicit user inputs to access additional content, it reduces friction in the browsing journey, leading to higher engagement rates and longer session durations. This seamless user experience not only fosters a sense of immersion but also cultivates habitual usage patterns, as users find themselves effortlessly drawn into a continuous loop of exploration and discovery.

With users being so accustomed to Infinite scrolling, it has changed the expectations and behaviors of users. Users expect to see as much content as possible and expect that it never ends. This shift has prompted developers and designers to prioritize continuous and immersive experiences across various digital platforms, from news websites to e-commerce platforms.

Furthermore, the widespread adoption of infinite scrolling has had ripple effects on content creation and consumption patterns. Content creators, aware of the importance of capturing and retaining user attention have tailored their content to fit the short form scrolling format. This has led to the proliferation of visually engaging and bite-sized content optimized for consumption in a continuous stream. Similarly, users have adapted their browsing habits to accommodate the infinite scroll, often engaging with content in shorter bursts and expecting instant gratification.

Discussion of Literature

With the rise of social media platforms and specifically short form video content on these platforms, we will be exploring how infinite scrolling plays a part in this. We are going to specifically examine different social media apps that employ infinite scrolling.

In 2021, a study was conducted on a set of Facebook users to determine how many users regretted using the platform for too long. Specifically the study looked at usage time within Facebook's news feed feature. In that study, Mildner and Savino found that around 25% of its participants in the study regretted using Facebook's news feed feature for too long (Mildner & Savino, 2021). Facebook employs infinite scrolling on this feature to serve what feels like endless content to its users. Another study conducted the same year, found that infinite scrolling

as a feature on applications led to the highest amount of retrospective regret among users (Cho et al., 2021).

Looking at social media applications that employ infinite scrolling, a paper published in ACM in 2023 explored infinite scrolling and how users feel often “stuck in a loop” where they scroll forever (Rixen et al., 2023). The study followed 46 participants tracking their smartphone usage and prompted users with a survey whenever they quit the app or “broke out” from a session. The study primarily focused on the social media apps that employed infinite scrolling such as, Facebook, Instagram, Twitter, Reddit, and TikTok (Rixen et al., 2023). Analyzing different session durations: short, medium, and long, they found boring content to be one of the top reasons users would quit the app and break out of the session (Rixen et al., 2023). A couple other reasons include tasks that a user needs to tend to, notifications, or self-regulation about usage time on the app.

The study also found sessions that involved TikTok were significantly longer than any other application that was part of the study (Rixen et al., 2023). This can be supplemented by data found by SensorTower that found the average adult in the US spent 95 minutes on TikTok, while the next infinite scrolling social media was 51 minutes by Instagram (Chan, 2022). Interestingly, all the platforms that employ infinite scrolling studied in the ACM study, except for Reddit, all appeared in SensorTower’s top 6 most used social media platforms in the US (Chan, 2022). For this paper, we are going to dive deep and examine TikTok, the widely popular social media platform that has seen unparalleled growth globally.

Case Study: TikTok, The Success of Short-Form Video

TikTok is a social media platform allowing users to share short videos ranging from 3 seconds to 10 minutes, embellishing them with filters, music, or other effects. TikTok's main form of interaction is a single infinitely scrolling feed of videos. Videos are suggested to users based on numerous factors, including watch time, likes, comments, and more. The algorithm used to suggest videos is highly advanced and proprietary to the app.

TikTok has also dramatically changed the type of content that creators are making. Creators are now taking their long form videos and reformatting them to be short form video content for TikTok and its competitors (Herald, 2023). This reflects users desire to get more content in a shorter amount of time and because there is an infinite amount of content on the platform if it does not capture their attention quick enough, they will just scroll to the next video. Some creators have noticed the need for capturing the attention of users because of this a new type of content has started to surface on TikTok called sludge content. Sludge content is when a short form video posted to TikTok has two unrelated videos splitting the screen. For example, often one clip will be from a podcast taking up half the screen while the other half is a video of a video game being played. This sludge content is created with the goal of capturing a user's attention longer than they normally would get without the sludge in order to increase the number of views on that video. However, this content also reflects how the need to capture a user's attention on the platform is becoming increasingly difficult with the sheer amount of content always available to a user.

One-way TikTok differs from its rivals is how content is served to its users. TikTok's content does not revolve around people you follow. Content on Facebook and Instagram is primarily based on posts from accounts you follow with small amounts of suggested content

based on those followed accounts (Alexandra, 2022). TikTok on the other hand allows you to follow accounts to see their content, but primarily focuses on showing you suggested content curated specifically for you. TikTok calls this the “For You” page. By primarily serving engaging suggested content curated specifically to your interests, TikTok hopes that you will spend more time watching the content you love. Because of this stark difference in the type of content served, TikTok can be seen as more of an entertainment application rather than a social media platform. This comparison to entertainment could explain why TikTok’s usage time is significantly higher when compared to its rivals (Rixen et al., 2023).

As mentioned earlier, TikTok has some of the highest average session times compared to other social media platforms. There could be several reasons for TikTok having the highest session times. For one, TikTok is based around short-form videos where other social media platforms such as Instagram and Facebook are based on more static forms of content such as photos and text. However, since TikTok has had tremendous growth in recent years, both platforms have started to adopt short form as an additional media type for their platforms with varying levels of success (Frier, 2022). In the case of Instagram, they have created a new feature called “Reels” which is an exact copy of TikTok (Alexander, 2020).

TikTok specifically created its suggestion algorithm to solve the main reason users close the app, boring content (Smith, 2021). In the ACM study they highlighted how boring content was one of the main reason that caused users to close the app (Rixen et al., 2023). Since the primary way of viewing content on TikTok’s is through its curated “For You” page, they want to try and eliminate any potentially boring content that may be served to a user. This differs wildly when compared to Facebook and Instagram. In recent years, both platforms have been sprinkling in suggested content throughout the infinitely scrolling feed of content (Facebook, 2024). While

both platforms have been trying to suggest more and more entertaining content to users, they cannot deviate too far from their main product which was connecting you to your friends (Facebook, 2024). Because of this, Facebook and Instagram may still have to serve you potentially boring content created by your friends or account you follow or stale content that you might have already seen.

Analysis

As we have discussed, short form videos tailored to a user's interests paired with an infinite scrolling platform have become increasingly popular and garnered longer session times compared to other forms of infinite scrolling content. The question arises, what causes this type of infinite scrolling to garner longer usage time?

Infinite scrolling is like a psychological behavior documented in the 2005 study called "Bottomless Bowl". In that study, Wansink showed that refilling someone's bowl of soup, hence the name bottomless bowl, people will consume 73% more soup without recognizing a greater feeling of feeling their hunger is satisfied (Harris, 2019). This study suggests that as the amount of food on your plate increases the intake also increases. This can be applied to infinite scrolling where feeds of infinitely scrolling content means if users are given more content it's inevitable that they will consume more without realizing (Neyman, 2017).

The primary objective of social media platforms is to maximize user engagement. By prolonging user sessions, it not only increases the probability of users returning to the platform, but it also allows them to show more ads to users. Prolonged usage also allows platforms to collect more user data, such as their interests, which they can then use to create targeted ads for a user. As the primary revenue source comes from selling ads it is thus advantageous to create a platform that captures the attention of a user.

As discussed earlier, the ACM study published in 2023 found that one of the top reasons users break out of a session on a social media platform is due to boring content. It seems that Tik Tok specifically designed their application to combat the main reason users break out of a social media session, boredom. Tik Tok curates' content that is tailored to each individual user based on their interests. This tailored content usually aligns with the interests of the user, grabbing a user's attention. This engaging content on the platform can explain the higher session times when compared to other social media platforms. Thus, Tik Tok can use this interest data about to sell tailored ads back to their users, generating more revenue. Since Tik Tok is for profit it is in their best interests to keep users on the platform for as long as possible to generate as much revenue as possible. In addition, short-form videos can warp a user's perception of how much time they spend on the application. Since users will often spend more time looking at 5 Tik Tok videos versus 5 photo posts on Instagram, Tik Tok is effectively increasing the engagement time for each post shown.

However, this highly engaging and tailored content could potentially lead to addictive usage of that platform as well as potentially creating a smartphone addiction. Recent studies have found that usage of social media platforms may fill an individual's psychological voids such as loneliness (Li et al., 2024). Filling this void in a someone's life may result in addiction to continuously use that application (Blackwell et al., 2017). Specifically, this content is tailored specifically for each user leading them to watch more and more content that could be potentially interesting to them, thus increasing active user time. This was further proven by Qin, Omar, and Musetti in their 2022 paper studying causes of addiction to TikTok. They found that when users had an application where the system continuously provided enjoyable content that exhibited concentration and time distortion from the user, they were more likely to form an addiction to

that platform (Qin et al., 2022). They were able to apply these findings to TikTok where they found the deeply tailored algorithm contributed to individuals becoming addicted to the platform and habitually using it (Qin et al., 2022).

However, there could be negative consequences to curating tailored content for each user. For example, if a user sees the same types of videos repeatedly, they may create unrealistic comparisons and expectations, contributing to feelings of inadequacy and stress (Arooj et al., 2022). Future research needs to be conducted on these potentially negative effects as they could potentially have long lasting impacts on an individual's mental health.

Conclusion

In conclusion, the rise of infinite scrolling represents a paradigm shift in how users engage with online content, offering a seamless and immersive browsing experience across various digital platforms. Initially popularized by social media giants and subsequently adopted by numerous websites and applications, infinite scrolling has become ubiquitous in the digital landscape. However, the convenience and intuitiveness of infinite scrolling come with significant implications for user behavior and well-being. Research indicates a correlation between infinite scrolling and addictive usage patterns, with users often spending extended periods engrossed in endless streams of curated content. Platforms like TikTok, with their highly personalized suggestion algorithms and engaging short-form videos, have particularly high session times, raising concerns about the potential for addiction and its impact on mental health.

The impacts of addictive smartphone and social media usage extend beyond individual well-being to encompass broader societal issues such as social isolation, sleep disorders, and psychological distress. Addressing these challenges requires a multifaceted approach involving

collaboration between technology companies, policymakers, mental health professionals, and researchers. While infinite scrolling has revolutionized the way we consume online content, its unchecked proliferation poses significant risks to user well-being. By prioritizing user welfare, promoting transparency, and fostering interdisciplinary collaboration, we can harness the potential of infinite scrolling to create digital experiences that are both engaging and mindful of user needs and boundaries.

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