

The Architecture of Attention: Persuasive Design Features and Child Well-being on Digital Platforms

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Key Recommendation: Canada's future Digital Safety Commission must have the authority, expertise and resources to address harmful design features. The Commission must prioritize the development of a comprehensive Children's Code that sets clear standards for how these design features should be added, modified or disabled to ensure a safe digital environment for children and youth.

Background

Children's experiences on digital platforms are shaped not only by the content they encounter but also by the design features that determine how content is recommended, delivered, and consumed. Across social media, gaming, video-sharing, and artificial intelligence (AI) services, platforms are coded with engagement-maximizing design features, including attention-disrupting features (e.g., infinite scroll, autoplay, push notifications), personalization features (e.g., algorithmic recommender systems that personalize content based on a user's interests and behaviour), account discoverability features (e.g., user recommendation systems that expose minors' accounts to unknown users), and reward-based features (e.g., streaks, likes, follower counts) (Table 1). **Given the distinct neurodevelopmental characteristics of childhood and adolescence, young people are uniquely vulnerable to these engagement-maximizing design features**, which have the potential for negative effects on attention, behaviour, and emotional well-being, as well as exposure to the risks associated with harmful content and unsolicited interactions.¹⁻³

Evidence from digital safety frameworks in other jurisdictions suggests that effective regulation requires both meaningful obligations on platforms to mitigate harmful content and the authority to influence the design choices that can expose children to such content or amplify its harms.^{5,6}

The promise of Bill C-34: Ensuring safety-by-design

As Canada considers passing the Safe Social Media Act (Bill C-34),⁴ it must ensure that the independent digital safety regulator ("the Commission") proposed in the bill has robust authorities to address the impact of platform design features on children's safety and well-being. Evidence from digital safety frameworks in other jurisdictions suggests that effective regulation requires both meaningful obligations on platforms to mitigate harmful content and the authority to influence the design choices that can expose children to such content or amplify its harms.^{5,6} Together, these priorities require a comprehensive regulatory framework that ensures the following types of design features are addressed across platforms.

Attention-Disrupting Design Features

Persuasive design refers to features deliberately constructed to influence user behaviour.¹ Features, such as infinite scroll, autoplay, push notifications, and game progression mechanics, remove or reduce natural stopping pointsⁱ and encourage prolonged engagement, making it difficult for users to disengage. This is particularly true for children and youth whose cognitive and self-regulatory capacities are still developing.

These features can disrupt children's attention in different ways. Notifications can capture and redirect attention even during brief interactions. For example, an experimental study found that smartphone notifications

triggered a transient slowdown in cognitive processing lasting approximately seven seconds, even when users did not interact with the alerts.⁷ Notifications perceived as personally relevant caused the greatest disruption, while notification frequency was the strongest predictor of distraction.⁷ Other attention-disrupting features, including infinite scroll, autoplay, and game progression mechanics, operate by intensifying and prolonging engagement. For example, digital games employ progression mechanics, including recurring quests, daily challenges, and open-ended progressionⁱⁱ that are designed to sustain players' attention by reducing natural stopping points and encouraging continued play.¹

Promisingly, experimental research examining “design frictions”ⁱⁱⁱ shows that small design changes can reduce attention-disrupting effects without limiting platform functionality. For example, replacing infinite scrolling with natural stopping points reduced mindless scrolling and improved users' awareness and recall of consumed content.⁸

Personalization-Focused Design Features

Algorithmic recommender systems amplify persuasive design by continuously tailoring content based on users' behaviour, preferences, and engagement patterns. Rather than simply responding to users' preferences, these systems influence what content young people are repeatedly exposed to, how long they remain engaged, and how frequently they return to digital services.⁹ Neuroimaging research suggests that personalized recommendations capture and sustain attention more effectively than non-personalized content. More specifically, personalized content is associated with greater activation of the default mode network, including the dorsomedial prefrontal cortex and the ventral tegmental area, a region involved in reward processing and motivation.⁹

Further, a 2025 systematic review found that greater use of short-form video platforms was consistently associated

with poorer mental health outcomes, including depression, anxiety, loneliness, stress, and problematic social media use, as well as reduced attention, executive functioning, and academic performance.³ The review identified the algorithmically curated and rapidly consumed nature of short-form video platforms as potential contributors to excessive engagement. Short-form video platforms therefore represent an intensive form of personalized content delivery in which continuously tailored content can encourage compulsive viewing, making it especially challenging for children to disengage. Given that the most used digital platforms amongst children and youth are ones that rely heavily on short-form video, this design feature likely contributes to significant excessive engagement.^{10,11}

Research also demonstrates that recommender systems amplify harmful content. Investigations of short-form video platforms, including YouTube, TikTok, and Instagram, found that engagement with body image or mental health content quickly resulted in the platforms making recommendations to engage with increasingly harmful content on eating disorders, self-harm, and appearance, often within minutes of user activity.^{12,13} An internal, unpublished study by Meta, made public through whistleblower disclosure, found that teenage girls were exposed to approximately twice as much “high negative appearance comparison” content as teenage boys, illustrating how recommender systems can repeatedly expose young users—especially girls—to psychologically harmful material.¹⁴

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ⁱ Natural stopping points are points within a digital experience at which the completion of a task or piece of content provides an opportunity for users to pause and disengage. Features such as infinite scroll and autoplay can reduce natural stopping points by continuously presenting new content without a clear endpoint.¹

ⁱⁱ Games with open-ended progression do not have a clear point of completion and can be returned to repeatedly.¹

ⁱⁱⁱ Design frictions are points of difficulty in users' experience with technology.⁸

Similar personalization-driven design patterns are also emerging in AI-enabled conversational systems. Features such as emotional personalization and simulated social relationships can encourage sustained engagement and raise serious concerns about young people's ability to discriminate between what's "real" and "artificial" and to disengage.¹⁵

Account Discoverability Features

Account discoverability features use algorithmically curated user recommender systems to make children's accounts discoverable to other users, including adults they do not know. In practice, this feature can make young people visible and accessible to adults outside of their social networks, facilitating unsolicited contact and interactions. These design choices create risks that differ from content recommender systems: they do not simply shape what children see, but also determine who can find, contact, follow, or communicate with them. In doing so, **account discoverability features can expose young people to unwanted contact, grooming, predation, and harmful interactions that may move across platforms or extend beyond the digital environment into the real world.**

For example, Roblox uses "Friend Recommendations" to suggest people users may know and want to connect with, drawing on account information, activity, and existing friendships. This feature has allowed adult strangers to send connection requests to, communicate with, view the profiles of, and access other personal information about young children without parental notification or consent.¹⁶ These risks are compounded when contact initiated on one platform moves to another ostensibly more private one, where monitoring, reporting, and safety protections may be weaker.

The risks posed by account discoverability features are reflected in children's interactions with unknown adults online. Children are not only exposed to strangers' posts through personalized feeds.¹⁷ A survey by the child safety non-profit Thorn shows that two-thirds of pre-adolescents interact with unknown adults online and one-third receive requests for explicit imagery from unknown adults.¹⁸ In an environment where 58% of teenagers report that social media platforms make daily recommendations that they friend or follow someone they don't know,¹⁹

account discoverability decisions directly shape not only what a child sees online but also who can reach them, where those interactions continue, and whether online contact can escalate into real-world offline risk.

Platforms' decisions about privacy features can also impact children's physical safety, including whether location data plays a role in connection recommendations, whether location is shared publicly or between contacts, and whether private messaging is available between unknown adults and minors.

Reward-Based Design Features

Reward-based features, including visible "like" counts, follower metrics, streaks, badges, and other social validation mechanisms, encourage repeated engagement by reinforcing habitual platform use and the pursuit of social validation. While youth and adolescents are especially responsive to social validation and peer feedback, younger children are also often drawn to reward-based mechanisms.¹ Reward mechanisms are common in digital games, where gaming passes and progression-based rewards encourage children to continue playing to maximize the value of their purchases, creating engagement loops that reinforce repeated play and extended time online.¹

Among adolescents, evidence suggests that reward-based features contribute to unhealthy social comparison. Meta's internal, unpublished Project Daisy research, also made public by a whistleblower, found that hiding public like counts on Instagram significantly reduced negative social comparison among teenage girls and highly active users, supporting a causal link between visible engagement metrics and these harms. The research also showed that hiding like counts reduced user engagement, highlighting the competing incentives for platforms to mitigate harms to young people while maintaining user engagement.¹⁴

RECOMMENDATION

The evidence consistently demonstrates that persuasive design features are a significant source of harm to children and youth online. These design features are highly problematic and prevalent across multiple platform types, including social media, gaming, video-sharing services, and AI-enabled platforms.

For Canada’s digital safety framework to be both comprehensive and future-proof, we recommend the following:

- **The proposed Digital Safety Commission must have sufficient authority, specialized expertise, investigative powers, and resources to address harmful design features effectively.** The scope of the Commission must be sufficiently broad to address problematic platform architecture and design features with the potential to harm children and youth, and to adapt as new design practices and technologies emerge.
- **The Commission must prioritize the development of a comprehensive children’s code** to support effective implementation of the legislation. The code should specify the design features that should be disabled or modified, as well as the new safety features to be integrated to ensure a safe online experience for young people. The code should be developed in consultation with young people, caregivers, child development experts, and health professionals.

Table 1. Cross-Platform Engagement-Maximizing Design Features and Implications for Children and Youth

	Design Features	Examples	Function	Implications
Attention-Disrupting Features	Infinite scroll	Endless scrolling through dynamically loaded content	Removes natural stopping points	Increases mindless scrolling and reduces users’ awareness and recall of consumed content (normative dissociation) ^{3,8}
	Autoplay	Automatic playback of recommended content	Eliminates decision points between content	Encourages prolonged viewing and reduces opportunities to disengage ^{1,3}
	Push notifications	Alerts, reminders, streak notifications	Interrupts users’ daily activities and prompts re-engagement	Disrupts attention even when ignored; personalized notifications produce the greatest disruption ⁷
Personalization Features	Algorithmic recommender systems	Personalized feeds, “For You” pages, “Explore” pages	Tailors content using behavioural and engagement data	Associated with poorer mental health, reduced attention and executive functioning, sustained engagement, and amplification of harmful content ^{3,9,12,13}
	Emotional personalization	Emotionally responsive interactions, relationship-building capabilities	Personalizes interactions and reinforces user behaviour to encourage continued engagement	Encourages sustained engagement and raises concerns about children’s ability to disengage and protect their privacy ¹⁵
Account Discoverability Features	People/User recommendation systems	“People You May Know,” friend/follow suggestions, suggested accounts	Recommends users based on contacts, location, or mutual connections	Enables recommendations to connect with adult strangers, increasing opportunities for unwanted contact and grooming ¹⁸
	Account discoverability settings	Searchability of accounts by email/user ID, public profiles, contact syncing	Makes users, including child and youth users, more discoverable to others on the platform	Expands children’s visibility to unknown users and can increase unwanted contact ¹⁷
	Messaging and contact features	Direct messaging between unknown users, group invites, geolocation sharing	Enables users to directly initiate communication with users outside their existing networks	Creates opportunities for unwanted contact, sexual exploitation, predation, and privacy-related risks ^{16,18}
Rewards-Based Features	Streaks, badges, leaderboards, and daily rewards	Achievement systems, collectibles	Reinforces repeated behaviour through rewards	Encourages habitual checking and repeated engagement; particularly appealing to younger children ¹
	Visible engagement metrics	Like counts, follower counts, view counts, repost counts	Makes social feedback and peer validation publicly visible	Increases social comparison and peer pressure ^{1,14}

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