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Investigating Manipulative Design on Social Media Platforms - the Case of Kidinfluencers

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Abstract: The term kidinfluencer denotes children who produce entertaining content for social media platforms such as TikTok and Instagram. These young artists frequently publish videos or pictures that highlight their skills, pastimes or general activities in their daily routines, which draws a sizable audience. This can result in business collaborations with platform partners, providing children and caregivers with several options for income. Despite the success and fame of a few kidinfluencers, their use of social media has also sparked worries about their privacy, safety, and potential exploitation. This article explores this phenomenon from the perspective of risks brought by social media platforms, which treat children as relevant content creators but neglect their well-being and autonomy online. By mapping previous studies on the topic, we investigate the scenario of young influencers, using the notion of deceptive design patterns as a lens of analysis of platform manipulation of children's decisions and interests. To address the identified problems caused by these patterns, we (i) present a set of prototypes as suggestions for changing platforms' features as well as (ii) legal solutions to safeguard children's rights and best interests online.

Keywords: Manipulative Design, Kidinfluencers, Social Media Platform, Instagram

1 Introduction

The way people engage and consume media has changed dramatically as a result of the widespread use of social media platforms (e.g., TikTok, Instagram, Youtube), where digital influencers are playing an increasingly important role. The large impact caused by such content producers can be measured: the influencer marketing platform market was valued at USD 7.36 billion in 2021 and is expected to reach the value of USD 69.92 billion by 2029 [Research, 2022].

When kids are involved in the social media market scenario not as consumers but as producers of content for software platforms, they benefit from increased creativity and social skills. Besides, by acting as *kidinfluencers* (also called "micro-celebrities", i.e. someone who stands out with their content productions in digital environments and has high numbers of followers [KALAN, 2020]), children can be a source of income for their families, offering a financial lifeline. However, the involvement of children as influencers has raised concerns and sparked ethical debates. In a recent study, Permanasari et al. (2021) reinforce that *"children should not work (as they are) physically and psychologically immature, still developing and need education, and (...) vulnerable to violence and exploitation"* [Permanasari, 2021].

In the cinema industry, children's work is allowed under certain limitations, related to restrictions on age, working hours and type of activity performed. But in the context of social media, there are concerns about the effect of excessive exposure on children's cognitive and emotional development [Reid Chassiakos *et al.*, 2016]. One of the main arguments against the work of children as influencers is their lack of maturity and judgment when dealing with issues related to online privacy and exposure on the internet. Adolescent Internet users are potentially more at risk for identity theft, exposure to violence and pornography, and cyberbullying [Yu *et al.*, 2013]. Furthermore, this process raises a concern about the responsibility of parents, whose duty is to safeguard their children and ensure their well-being.

The involvement of kidinfluencers in advertising activities has raised concerns due to the potential exploitation and manipulation through tricks used by platforms. These tricks, known as deceptive or manipulative design patterns, were originally identified by Harry Brignull in 2010. This researcher, who coined the term dark patterns, is an UX practitioner with a doctoral degree in cognitive science [Gray *et al.*, 2018]. He defined deceptive patterns as ethically dubious design approaches, when interface characteristics and features of a given technology modify users' choice architecture to gain their attention, data, and money [Chordia *et al.*, 2023]. They potentially make users do things that they did not mean to, like buying or signing up for something [Brignull, 2018].

In this paper, we present a descriptive case study of kidinfluencers' activities on three social media software platforms governed by Big Techs: YouTube, Instagram, Tiktok. Our contribution is threefold: (i) portraying the scenario of kidinfluencers in terms of factors and impacts, as well as aspects such as actors, activities, pains and expectations, and regulations; (ii) describing the adoption of deceptive patterns by Big Techs on their platforms, together with an analysis of the interplay between these patterns and impacts on kidinfluencers; (iii) presenting prototypes (with interface enhancements) as well as legal solutions that demonstrate means to address the identified problems. This manuscript is an extended version of the work "How Social Media Platforms Manipulate Kidinfluencers? Analysing the Adoption of Deceptive Design Patterns by Big Techs" [Albuquerque *et al.*,

2023], presented in the XXII Brazilian Symposium on Human Factors in Computing Systems.

The remainder of the paper is organized as follows. In Section 2, we present a conceptual background on social media software platforms and children's privacy and protection online. Section 3 describes the research methodology. Our results are detailed in Section 4, with an analysis of kidinfluencers' overall setting in terms of (i) contextual factors and impacts, (ii) actors, activities and legislation, (iii) deceptive patterns that threat their welfare and autonomy, and (iv) interplay between such patterns and observed impacts. Section 5 presents prototypes and discuss legal solutions to address the mapped problems. Finally, Section 6 presents contributions, threats to validity and future studies.

2 Conceptual Background

2.1 Social Media Software Platforms

In the last decade, the IT companies have gradually shifted to complex **software ecosystems**, which are a set of businesses functioning collectively as a unit and interacting with a shared market for software and services, together with the relationships among them [Manikas and Hansen, 2013]. These ecosystems are leveraged by platforms (e.g. iOS, Android, etc.) which are means to aggregate the company itself (e.g., Amazon, Google, Meta, etc.), partners (e.g., advertisers, complementors, resellers, etc.) and users. Hence, they gather actors co-creating value via SDKs (a collection of tools, libraries and documentation that enables developers to create software applications for a specific platform or framework) and APIs (a set of rules and protocols that allows different software applications to communicate and interact with each other) to nurture an open innovation business model.

Google's **YouTube** exploded as an ecosystem largely maintained by users, who act as content creators. Creating content became a practice among children as well. Children started to dominate the list of top YouTube channel earners and viewer numbers. According to the American Community Survey [Survey, 2019], in 2019, 95% of 3- to 18-year-olds in the United States had home internet access. From unboxing videos to family vlogs to nursery rhymes, content created by and for children has emerged as a multi-billion dollar business [Feller and Burroughs, 2022]. In this context, children can become stars through YouTube and other social media platforms.

One of the main concerns regarding child use of YouTube is the potential exposure to inappropriate content. The Federal Trade Commission (FTC) penalized YouTube $170 million in 2019 for breaking the Children's Online Privacy Protection Act (COPPA) for gathering personal data from kids without getting permission from their parents. FTC determined that YouTube did not offer means to get parental consent for collecting personal information, while being aware that many of the channels on its platform were targeted at children under the age of 13 [FTC, 2019]. In response to the FTC's findings, YouTube updated its features and regulations to better safeguard kids using its service. For instance, in 2020 YouTube introduced "supervised experiences", a tool that enables parents to restrict their child's use of the platform to a list of reliable channels and videos [Youtube, 2020]. After this upgrade on the platform, YouTube allows parents to create individual profiles for the children; control and approve what their children could watch; and limit the usage time, among other features to protect the child.

Children also frequently explore **Instagram** features to communicate with friends, exchange images and videos, and interact with their favorite influencers. As noted by Alhabash et al. [Alhabash and Ma, 2017], Instagram has become a powerful marketing tool, with brands using influencers to promote their products to a young and impressionable audience. In this context, kidinfluencers have emerged as a fruitful segment, with children as young as three years old promoting products and receiving payment for their endorsements. Hence, we notice an increasing number of children and teenagers using Instagram as a way to earn money. However, there are serious health hazards for kids on this platform, particularly anxiety, depression, body image concerns [for Public Health, 2017], online grooming and harassment.

Finally, we highlight the key role of **TikTok**, from the Chinese IT company ByteDance. With a large selection of tools and filters for sharing short mobile videos, this social media platform reached the top-3 favorite platforms for children in 2021 [S. *et al*., 2021]. In 2020, TikTok disclosed that more than one-third of its daily 49 million users were under the age of 14 in the United States. The proportion of users younger than 14 was as high as 43% in Britain and 45% in France. With a total number of downloads that reached two billion globally [Feller and Burroughs, 2022; Sherman, 2020], TikTok also became a source of controversy, with concerns about children's privacy and safety. The company faced numerous accusations of non-compliance with its own rules and guidelines. In 2021, the Irish Data Protection Commission investigated how TikTok handled children's data and transferred such information to China, where its parent company is located. ByteDance answered the authorities by claiming to use *"approved methods"* [Lomas, 2021]. In another accusation, the UK Data Commissioner's Office alleged Tiktok had violated UK and European Union data protection laws by processing children's data without adequate security measures, transparency or consent of guardians [Ridley, 2021].

2.2 Deceptive Design Patterns Affecting Children's Well-being

According to the TIC Kids Online 2022 survey, which examined how children aged 9 to 17 utilize digital technologies, 86% of approximately 24 million Brazilian kids and teenagers in that age range who are Internet users reported having profiles on social media platforms (which represents around 21 million). Participation in social media occurs at high rates across all age groups, nearly reaching the entirety of Internet users aged 15 to 17 (96%) [Nic.Br, 2023].

Despite being frequent users, children are often unaware of cyber risks for lack of perception about theft, stalking, and harassment [Staksrud *et al*., 2013]. For instance, one of the key issues in protecting children's rights online is the collection and use of their personal data. Children under the age of 16 must obtain parental permission before having their data

processed by platforms, in accordance with the GDPR [Parliament, 2016] and its Brazilian version, the LGPD [Rapôso *et al*., 2019]. However, while using social media platforms, children may easily disclose personal data (e.g. name, address, phone number), sharing online behaviours without their knowledge or consent, despite the UN's premise of children's right to privacy [UN, 1989].

Children's well-being in a digital world involves protecting them against threats including cyberbullying, exposure to potentially harmful substances, and privacy invasions. Additionally, it involves providing children with access to secure digital environments that meet their developmental and educational requirements. However, the new forms of profit related to this scenario, largely formed by children working as influencers and engaging in sponsorship to promote products and brands, lead platforms to neglect the protection of children who produce online content [Geider, 2021].

Platforms adopt **deceptive design patterns** by structuring their features to modify users' set of choices and manipulate the flow of information. Most applications used by children have functionalities guided by manipulative design, with features that adopt manufactured time pressure, navigation restrictions and even "baits" to encourage longer gameplay or more purchases [Radesky *et al*., 2022]. Even the inclusion of a strategy known as "cuteness" can constitute a manipulative pattern, which has been identified, for example, in domestic robots [Lacey and Caudwell, 2019].

Hence, deceptive patterns go against those users' best interests, harming them and/or creating negative experiences [Mathur *et al*., 2021]. An example is a pattern like *confirmshaming* (i.e. when the user is emotionally manipulated into doing something that they would not otherwise do [Brignull, 2018]), which can be implemented through a character of an app saying *"don't just stand there, buy something!"* [Radesky *et al*., 2022]. It affects users' **autonomy**, which is the normative value according to which users have the right to act on their own reasons when making decisions, without being overly influenced or compelled by outside forces [Mathur *et al*., 2021]. The concept of autonomy is directly related to children's developing capacity for self-determination and decision-making.

This scenario raises concerns about children's privacy and safety, as well as their rights to access and participate in online spaces without fear of harm. Therefore, it motivates our study on the risks that a kidinfluencer faces on platforms heavily formed by manipulative design patterns.

3 Research Method

This paper reports a descriptive case study of the risks faced by kidinfluencers while acting on YouTube, Tiktok and Instagram platforms. The study was comprised of four phases: data collection through literature review; data analysis by extracting information from the articles selected; data synthesis with the use of techniques; and prototyping for illustrating alternative interfaces that do not put children at risk. Such four phases were performed during ten months by two researchers with a background in Computer Science (one professor with a PhD and one undergraduate student), one of which more focused on reviewing the results of activities performed, for double-check and enriched interpretation.

This research was triggered by a request from the Public Ministry of Labor from São Paulo/Brazil for a critical analysis of how Big Techs were dealing with children performing artistic activities on their platforms in terms of protection, security and privacy online.

In the first phase, **data collection**, we searched for relevant papers using three academic engines (Google Scholar, IEEExplore and ACM Digital Library) with the string ((*child* OR *kid* OR *kids* OR *children*) AND (*influencer* OR *artistic labour* OR *artistic labor*)) OR (*kidinfluencer*)) AND (*social media* OR *social network* OR *platform* OR *TikTok* OR *Instagram* OR *Youtube*). We analysed all resulting titles and abstracts in terms of their contribution to understanding the use of social media platforms by children who produce content, as a form of (artistic) child labor. We must note that the large number of entries on Google Scholar led us to examine only the first 100 articles listed. In addition, we conducted a backwards search to verify whether an article had references to previous works that were also relevant for the topic.

We enhanced this dataset by examining grey literature, as it became a relevant source of up-to-date information for researchers from varied scientific areas [Kamei *et al*., 2021]. Hence, we used Google News to search articles on the topic, adopting the same set of keywords. In total, we selected 23 papers, including journalistic and scientific articles. The final data analysis spreadsheet is available in https://tinyurl.com/yc79vyvu.

During **data analysis**, we structured the selected articles in a break-down sheet with the columns: author, title, keywords, and publication date. From the articles, we extracted data that were relevant to explain the context of kidinfluencers acting in platforms: (1) actors, (2) activities, (3) pains/concerns, (4) expectations, (5) platform rules and country regulations, and (6) platform features and technologies.

We performed **data synthesis** in two ways. Firstly, we considered techniques such as the *Onion Diagram* and *User Journey map* to represent contextual information (stakeholders of the problem and a child's feelings, respectively). An onion diagram shows dependencies among actors in a specific context or organization, and a journey map is a visualization of the process performed by a person to accomplish a specific goal [Gibbons, 2018]. More details are given in Section 4.1 about the application of these techniques.

Secondly, we considered a categorization of manipulative design patterns available at the website "Deceptive Design" [Brignull, 2018] to assess to what extent social media platforms act against a child's best interests. Each pattern was analyzed in each platform, and we mapped tricks used by tech companies to make kids do something they did not mean to, or did not have the ability to distinguish or properly understand. The synthesis of items 1-5 is described in Section 4.1, while item 6 is discussed in Section 4.2.

Finally, a **prototyping** phase was conducted in light of the interpreted evidence. We aimed at creating interface prototypes for the YouTube platform to illustrate ways to address the issues identified in terms of kidinfluencers' individual welfare and autonomy. We propose four screens, which are presented and described in Section 5.

4 Kidinfluencers Work in Social Media Software Platforms

4.1 Overall Setting and Impacts

In Figure 1, we have two sets of elements that depict the context in which kidinfluencers operate, factors and impacts, which we describe in the subsequent paragraphs. Based on a review of formal and gray literature (comprising articles from widely circulated newspapers, government reports, among other non-scientific sources), we could identify a set of seven elements that make up the scenario of a child producing content for platforms like YouTube or Instagram.

In the set of **factors** driving the scenario of kidinfluencers, the *lack of autonomy* stands out, considering that the accounts of these influencers are usually managed by their caregivers. This is linked to the *limited awareness* of this audience. In other words, children's lack of judgment prevents them from understanding the environment in which they are operating and the activities they are performing. Some of YouTube's biggest stars are too young to grasp the responsibilities of an internet celebrity and either inhibit or consent to their involvement in videos. It's worth noting that caregivers can also fall victim to this lack of discernment. A derived element is *low digital literacy*. It means children are in the process of digital literacy, understanding aspects such as terms of use, business models, and digital content production, which increases the likelihood of online risks (e.g., they become more vulnerable to advertising agencies).

These factors favor *labour exploitation* since the activity of many kidinfluencers does not involve financial compensation, unlike child labor. Often, only received items (gifts, demonstration products, or gifts sent by a company to influencers) are obtained in the face of advertising resulting from pressure to produce content for long hours and frequently (as viewers - the "followers" - place intense expectations of constant presence and continuity of content production online). The digital child influencer's routine includes obligations beyond recording new content to promote received products, with or without a contract with a brand. Their responsibilities may also involve responding to fans and participating in events such as autograph sessions and influencer meetings.

Therefore, there is an unofficial provision of services, in which the platform and/or caregivers (who often quit their jobs to manage their children) financially benefit from the expressions produced by minors under 16 years old, without this being understood as artistic child labor, despite the interest and revenue generated by the content. Work performance occurs to the extent that there are, in the daily lives of children, activities carried out routinely; monetization, commercial exchanges, or rewards for production; and guidance of performance based on external expectations.

Finally, a technical aspect, also seen as a strategy used by companies, deserves to be included in this context: *design for engagement*. Such attention capture strategy turn social media platforms into an indispensable part of users' daily routines (with Instagram alone, among platforms governed by Meta, boasting over 2 billion active users)[1]. This vicious cycle is perpetuated by mechanisms such as autoplay and pull-to-refresh. The former activates the "next video" feature, which automatically plays to keep users engaged with content on the platform, while the latter translates into the functionality of infinite scrolling, wherein users scroll down a page and content continuously loads automatically [Monge Roffarello and De Russis, 2022].

As a consequence of this attention economy, the notion of social investment retains users through constant rewards and acts as the cornerstone of social media platforms. Metrics such as total of reactions or followers have the potential to establish a kind of "bond" between users and the platform on which they have a profile. Hence, such functionalities instill in users the perception that it is necessary to continue using the platform not to lose their "progress" [Monge Roffarello and De Russis, 2022]. They retention kidinfluencers in the virtual environment by establishing a culture of "gamified fame". These aspects generate a set of effects that nourish the company's business model at the expense of the well-being of the child producer of digital content.

Such engagement-focused design exploits kidinfluencers' psychological vulnerabilities to maximize time spent, daily visits, and/or interactions with the digital service against the individual's will [Lukoff *et al*., 2021]. Hence, it is possible to "trap" influencers on the platform, in a clear user retention strategy aimed at increasing content production. On Meta's social media platforms (Instagram and Facebook), Google's (YouTube and YouTube Kids), and ByteDance's (TikTok), such design is implemented through four features: views, reactions, comments, and friends/followers. These and other statistics can be proactively accessed by the user through a business management dashboard, in the case of commercial accounts, as exemplified in Figure 2, with an account management interface linked to Instagram. Here, we see, from left to right of the screen, the total number of views, likes, comments, shares, and saves for a particular video.

Consider, for illustration, the dynamics of adopting such features by Instagram, during the production of new videos by a kid influencer. From official accounts (when they are over 13 years old, the minimum age range required by platforms) or unofficial accounts (when they have profiles with an age range below 13 years due to deliberately loose age verification features[2]), these children receive notifications as the numbers grow (such as when new likes appear for a posted content) or when they reach what the platform considers a desirable numerical target for their videos (e.g., 1500 views).

In the latter case, because it involves what is called "unpredictable interaction", there are positive comments associated with the outcome, such as *"Congratulations! Your last video was the one with the most views in the last 30 days!"*. The same happens when the platform identifies that new people

[1] O Globo. "Número de usuários do Instagram ultrapassa 2 bilhões e se aproxima do Facebook". 2022. Available at: https://oglobo.globo.com/economia/tecnologia/noticia/2022/10/numero-de-usuarios-do-instagram-ultrapassa-2-bilhoes-e-se-aproxima-do-facebook.ghtml

[2] According to the TIC Kids Online 2022 survey from NIC.BR (a non-profit association established on March 8, 2005, by members of the Brazilian Internet Steering Committee), which examined how children aged 9 to 17 use digital technologies, 86% of the approximately 24 million Brazilian children and adolescents in this age group who are internet users reported having profiles on social media platforms (representing around 21 million).

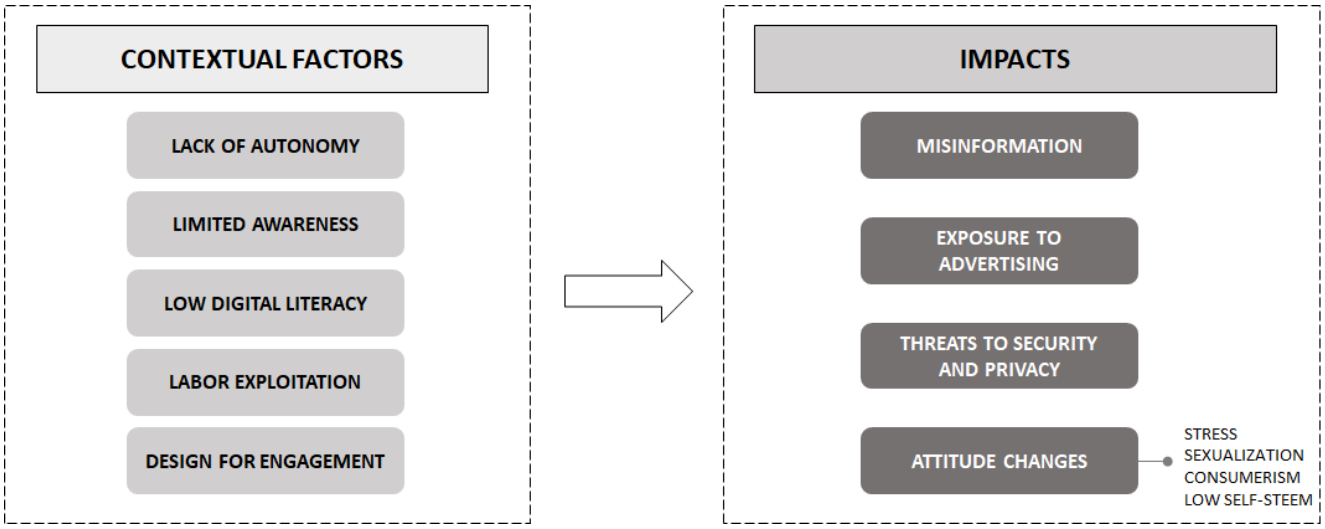

Figure 1. Factors and impacts in the scenario.

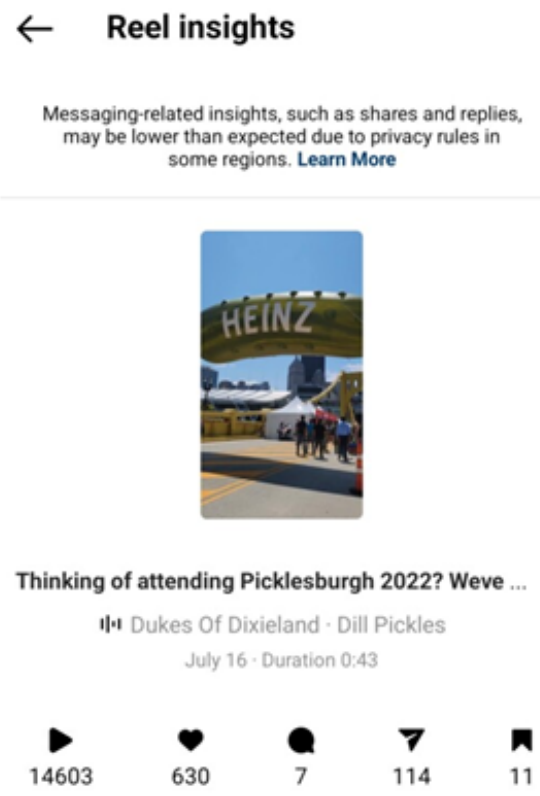

Figure 2. Screenshot of the business dashboard with statistics ("insights") related to social investment features.

have started following the profile after the content has been posted, for example.

Through these techniques of variable virtual rewards, psychological vulnerabilities similar to those of individuals targeted by gambling addiction are exploited in children[Monge Roffarello and De Russis, 2022]. In this process of positive reinforcement, the manipulative social investment design pattern removes autonomy and influences the well-being of the kidinfluencer by subverting the expectation of rational control over (i) the time spent on the platform, (ii) the type of content produced, and (iii) the frequency with which it is generated.

Its features deceive these users into being retained on the social network, with their decision-making process directed by it. With longer stays and more data about their digital experience, the platform can trace the behavioral profile of this audience. That is, this telemetry is aimed at modeling functionalities based on emotions, values, personality traits, and opinions to build an understanding of users' psychological state [Crepax and Mühlberg, 2022]. Therefore, kidinfluencers are manipulated to continue nurturing the platform out of fear of losing rewards or falling behind others (in principle, their real competitors, given the dissemination of brands, products, and obtaining benefits, including financial ones, by advertisers). This establishes a typical Fear of Missing Out (FoMO) situation, with the fear of being left out of these technologies or not developing at the same pace as them [Sousa and Oliveira, 2023].

In terms of **impacts**, the content produced by child influencers is widely recognized as being of low quality. In other words, their audience (typically other children) consumes videos that may put them at risk of *misinformation* – something rather common in social media, where users publish information without real commitment to the truth [Santoro and da Costa, 2021]. Hence, they are exposed to harmful messages, such as those surrounding body image. According to the University of Michigan (2020), only 4% of the YouTube videos children consume have high educational value[3]. Another correlated effect, to which the audience falls victim, is *exposure to advertising*, with abusive and disguised marketing communication.

On one hand, in the UK alone, the most popular kidinfluencer accounts can earn thousands of pounds from their sponsors and brands. Seven-year-old Nastya is one of them, with parents managing her channel, propelling her to the 6th place among the highest-paid YouTubers, with earnings of $28 million[4]. Meanwhile, Ryan Kaji, currently 10 years old,

[3]Beata Mostafavi. "Young Kids' YouTube Viewing Dominated by Consumerism, Ads". Michigan Medicine, University of Michigan. 2020. Available at https://www.michiganmedicine.org/health-lab/young-kids-youtube-viewing-dominated-consumerism-ads.

[4]O Globo. "Conheça a youtuber russa de 7 anos que faturou US$ 28 milhões em 2021". Available at https://oglobo.globo.com/cultura/conheca-youtuber-russa-de-7-anos-que-faturou-us-28-milhoes-em-2021-25358085

has been enjoying toys on his YouTube channel since he was 4. His audience (total subscribers) amounts to 32 million. In 2020, he earned $29.5 million from licensing, landing him a spot on Forbes' 2020 list of highest-paid YouTubers. In exchange, these children showcase partner products in their posts, seamlessly integrating messages into the content produced by child influencers amidst the characteristic artistic staging of their channels, as detailed by the Alana Institute[5].

This scenario is leveraged by a prior phenomenon named "sharenting", where parents and children act as "sharing influencers" on various platforms to obtain millions of followers and lucrative sponsorship. Such digital exposure via photos or videos of children, whether artistic or everyday, can cause *threats to privacy and security online*. Pedophile networks may exploit the social media recommendation algorithms to find content involving children and use comments and direct message features to leave obscene responses and exchange links to child pornography[6].

As caregivers normalize the absence of privacy, they can share details of their children's lives (even before they are born) and share content that makes a child feel uncomfortable, leading to negative self-perception and even depression or suicide (when such intentional or unintentional presentation triggers cyberbullying). A notable example in the family vlogging industry is the YouTube channel "The Ace Family", which attracts millions of viewers (currently, the channel has 18.4 million subscribers).

However, the most negative effects are concentrated on the children themselves, whether they are producing or consuming the content. *Attitude changes* vary with regular and intensive platform access. On the side of the child influencers, there is a tendency towards low self-esteem. Furthermore, child influencers are more susceptible to stress, as they need to produce digital materials constantly, respond to fans, and even participate in events. It is also worth noting that these children are often sexualized, being positioned in "erotic" poses on accounts managed by their parents to increase the number of followers.

Finally, both influencers and those who follow them are oriented towards a culture of consumerism, with encouragement of excessive purchases. In other words, unboxing videos, which depict the act of unpacking gifts or purchased items, convey the false idea that possessions are the most valuable things in life, introducing frivolous values and the concept of inclusion/exclusion among children.

Channels with approximately 1.5 million subscribers use covert advertising (in a "natural" way; without text or audio warnings), with parental participation, to promote brands. In one of the channels, there are several videos about school supplies, highlighting sponsored brands or stationery.

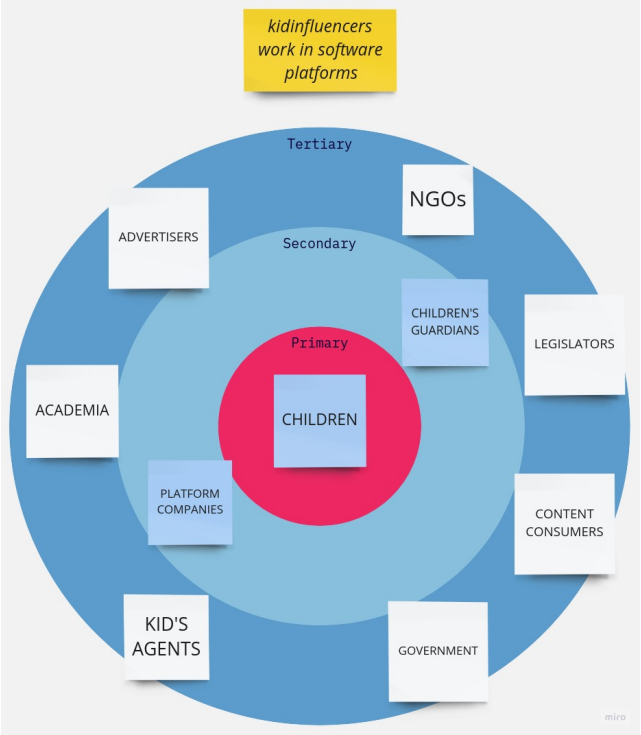

Figure 3. Actors represented in an onion diagram.

4.2 Actors, Activities and Legislation

The context of child influencers includes diverse **actors**, as we represent in the onion diagram in Figure 3. We organized these actors by degree of proximity to the problem being investigated. The children themselves, who create and consume content, are the center of the scenario, and close to them are their families and caregivers, and the platform companies, which moderates the content produced. At an outer level, we observed advertisers, associations and agencies that seek to protect children's rights, governments and legislators, content consumers and academic researchers. In Figure 4, we present a complementary view of actors, highlighting aspects such as **activities or responsibilities** (e.g. how platforms facilitate or control those users).

The exposure of children on the Internet as influencers raises many **pains and concerns**. The cognitive abilities, emotion regulation, and moral development are still immature for children under 12 [Burgess *et al.*, 2011]. These abilities could help them understanding the persuasive intent of advertising and strategies used to persuade them, control the emotions that advertisements may arouse, and evaluate the fairness and appropriateness of advertising (e.g., use of stereotypes). A strongly developed advertising literacy is essential for a critical reflection on advertising, avoiding subconscious persuasion [Hudders *et al.*, 2017]. Another issue is the negative impact on children's mental health.

The excessive use of social media can lead to problems such as anxiety, depression, sleep disorders, and self-esteem issues [Winther, 2017]. Figure 5 shows a user journey describing a child's main activities and feelings while acting as an influencer, based on [Hudders *et al.*, 2017; Smith *et al.*, 2018; Hu and Wu, 2018; Nicoll and Nansen, 2018; O'Neill, 2019]. The colors in the map represent mood variation, with red indicating when the child is sadder and experiencing more suffering, and blue when feeling happiness and excite-

[5]Alana Institute. "Representation about massive children's advertising aimed at children". Available at https://criancaeconsumo.org.br/wp-content/uploads/2021/08/denuncia-mpba-atualizada-1.pdf

[6]Newsweek Magazine. "YouTube Lets Parents Exploit Their Kids For Clicks" - 10/04/21 - Avaiable at https://www.newsweek.com/youtube-lets-lawless-lucrative-sharenting-industry-put-kids-mercy-internet-1635112

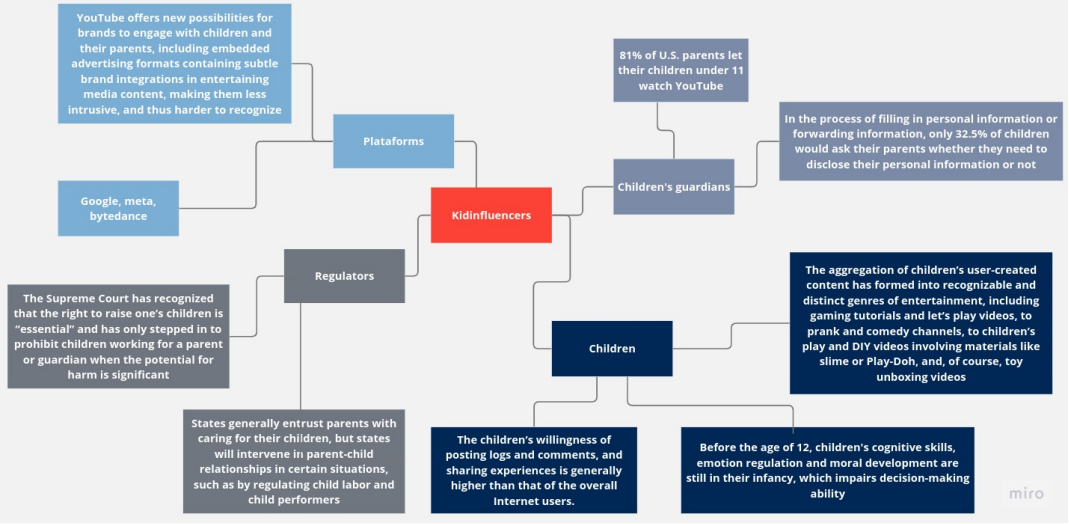

Figure 4. Mindmap of actors and responsibilities.

ment. Being closer to the boundary between the two indicates more neutral feelings. We perceive a variation of feelings, from great happiness to disappointment and sadness.

In terms of **expectations**, kidinfluencers usually aim to obtain what many influential vloggers often receive: (i) free products from brands in return for a mention in a video on their social media accounts on TikTok or Instagram, for instance; (ii) payment to create a sponsored post or video and distribute it to their followers [Veirman *et al*., 2019]. Regarding child influencers, this desire to receive free gifts is even stronger due to their lack of maturity, making them willing to have an extensive work schedule. In this context, parents and guardians may see their children as a way to earn extra money by creating content for the internet, even if this may affect the physical and mental well-being of the children.

Children who create content for social media platforms are partially protected by **laws, guidelines, and policies** focused on the child's experience on the Internet. The Children's Online Privacy Protection Act (COPPA), a federal law of the United States, establishes guidelines for collection and use of personal information from children under the age of 13. An example is mandating IT companies to get permission from parents before data collection that can nurture their services. This regulation limits platforms, websites and applications from collecting children's personal data, which could be available to third parties like advertisers. In 2015, the FTC issued an Enforcement Policy Statement on Deceptively Formatted Advertisements, including advertorials, online advertising or sponsored content [Craig and Cunningham, 2017].

Child labor exploitation and privacy were two main concerns that we identified with respect to regulation of kidinfluencers activities. In order to protect child influencers, some countries have put specific legislation and rules into place, including defining working hours limitations and minimum age requirements. Some examples:

- USA: some States explicitly regulate child performers. California's *Online Eraser* law allows children to request the removal of their content by online operators such as Meta or Google, but it's unclear how that might apply to content posted by their parents. A recent bill aims to expand the labor law to include children appearing in monetized videos posted on platforms. If approved, this law would require children to present a work permit, meet schooling requirements and have regulated working hours and conditions [O'Neill, 2019];
- France: a law came into force in 2021 that regulates the activity of YouTubers under the age of 16. It posits those influencers in the same level of children and teenagers who work on TV, cinema or as advertising models. Their earnings must be deposited into a bank account that they can only access at age 18 and parents must seek permission from the administrative authority to record videos of children under the age of 16 for monetary gain. Besides, there is a limit of weekly hours for the activity, reducing the risks to education. Finally, children can request deletion of their personal data without parental permission [Perez, 2020];
- Brazil: current legislation prohibits advertising aimed at children, considering their protection against commercial exploitation as a social value to be satisfied by companies. In addition, there is a need for authorization of child labor when its purpose is the child's participation in artistic representations. However, this obligation does not extend to kidinfluencers (i.e., there is no legal imposition of judicial authorization for the performance of these activities by these children) [Alana, 2021].

Additionally, to ensure the safety of kidinfluencers on their platforms, social media platforms like YouTube and TikTok also have their own rules for child content creators. For instance, YouTube has a specific policy for child creators that entails parental approval and limits the kinds of content that can be produced and distributed. For child producers, TikTok has policies that ban live streaming and direct texting. Recently, those Big Techs have revised their terms of use and general rules. After a US$170 million fine for illegal background tracking of children in 2020, Google implemented COPPA-compliant measures on Youtube (e.g. disabling ads and personalized comments on videos that could attract children). Then, in August 2021, Google announced new policy changes to raise children's privacy, protection and well-

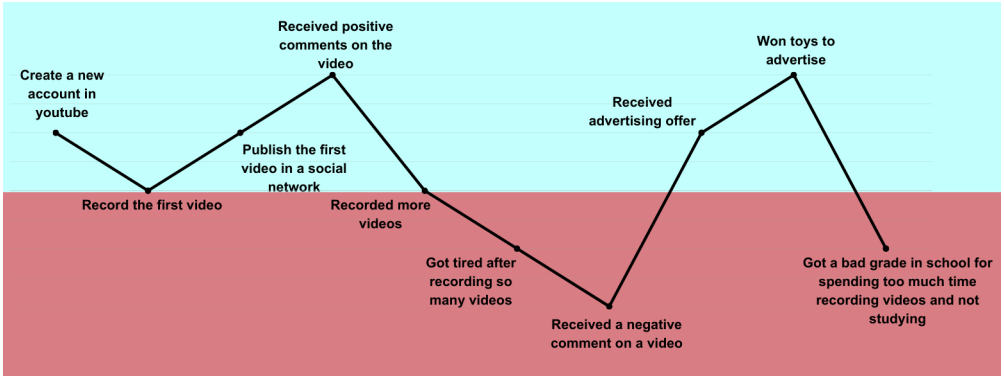

Figure 5. A kidinfluencer user journey.

being online (e.g., removal of "overly commercial" content from YouTube Kids such as the famous "unboxing videos" that encourage viewers to buy a product; definition of default upload setting to "high privacy" for users aged 13-17; and reminders indicating who can see their videos as well as others to "take a break" for 13-17 year-olds) [Perez, 2021].

4.3 Manipulation via Deceptive Patterns

We used an initial taxonomy of deceptive design patterns [Brignull, 2018] as a lens of analysis of the problems observed in kidinfluencers' context. Our goal was assessing which of these patterns are used by YouTube, TikTok and Instagram, i.e. how these social media platforms affect the decision-making of children who are content producers. In particular, some of these patterns affect children in general, also involving those who consume content from platforms.

We identified six out of the twelve deceptive design patterns presented by Brignull [Brignull, 2018]. In Table 1, we list a set of the deceptive design patterns identified, together with our analysis of their use in the social media platforms studied: Trick Questions, Privacy Zuckering, Misdirection, Confirmshaming, Disguised Ads and Forced Continuity.

The **Trick Questions** pattern asks users a question that seems straightforward, but is designed to steer them towards a particular option. We found it in the three platforms, on registration features. For example: a user is asked by the platform to select between "yes" and "no" options, but the question's wording is unclear, making it difficult to determine which choice best covers the desired result. On TikTok, there is an advertisement stating, "Invite your friends and earn up to R$3,365.00". However, achieving that amount by inviting new contacts proves to be an unreliable and non-trivial process. The conditions are written in tiny letters and placed on a page that is difficult to access. Children may find this especially difficult since they do not have the knowledge or experience to detect and avoid such manipulative techniques.

To capture viewers' curiosity and persuade them to click on the video, content providers on YouTube, for instance, may utilize Trick Questions in the titles or thumbnails of their videos. Users may as a result be duped into viewing content that is not what was advertised or pertinent to their interests. Similar tactics can be used by kidinfluencers on Instagram and TikTok to entice followers to interact with their posts or take part in challenges without fully comprehending the potential repercussions. Concerns regarding transparency, permission, and user manipulation are brought up by the use of trick questions. These platforms can influence people's behavior or expose them to misleading content by preying on their curiosity or need for engagement.

Privacy Zuckering is a manipulative pattern that tricks users into sharing more personal data than they intended to [Nelissen and Funk, 2022]. The data collected by the application may be used for targeted advertising, data mining, or other purposes that the user did not intend or expect. An example of this pattern is when a website or app requires users to agree to lengthy and complex terms of service agreements, without clear information about how their personal data will be used or shared. We mapped this pattern in the three platforms evaluated. When using Youtube (e.g. posting something, interacting with some content), kidinfluencers may share personal data about them without their knowledge, which the platform uses to expose them to targeted advertising. Similar criticism has been leveled towards TikTok for its data harvesting methods, which include obtaining users' biometric information.

For example, in 2020, the app was found to be accessing users' clipboard data without their explicit consent. TikTok addressed the issue and claimed it was a bug [Doffman, 2020]. In 2019, YouTube was fined $170 million for collecting personal data from children. The FTC has been investigating YouTube for its handling of data from users under the age of 13. Young children are protected by a federal law that requires parental consent before companies can collect and share their personal information [Guardian, 2019]. Concerns have been expressed regarding the platform's capacity to safeguard users' privacy, particularly young children who are more susceptible to internet dangers. Instagram has also been charged for violating users' privacy, with reference to its methods of data acquisition. The platform has been criticized for gathering user information without their knowledge or agreement and utilizing it to target advertisements.

Misdirection occurs when the user's attention is deliberately focused on one thing, to divert their attention from another one. For example, using small or low-contrast text, creating a cluttered interface, or placing important information (e.g. privacy settings) in unexpected locations. In Instagram, the privacy settings are hidden and not easily accessible. Sections such as *personal data*, *password and security*, and *information and permissions* do not provide ways for kidinflu-

Pattern	Description	Instagram	Youtube	Tiktok
Trick Questions	When glanced upon quickly the question appears to ask one thing, but when read carefully it asks something else entirely different.	X	X	X
Privacy Zuckering	The user is tricked into publicly sharing more information about them than they really intended to.	X	X	X
Misdirection	The design purposefully directs the user's attention to one thing in order to distract them from another.	X	X	
Confirmshaming	The act of guilting the user into opting into something.	X	X	X
Disguised Ads	Adverts that are disguised as other kinds of content or navigation, in order to make the user click on them.	X	X	X
Forced Continuity	When the user's free trial period of a service comes to an end and the credit card is charged without warning.		X	

Table 1. Use of deceptive design patterns by social media platforms to manipulate kidinfluencers.

encers or their caregivers to manage personal data.

Another deceptive design pattern available in the three studied platforms is **Confirmshaming**, which is the act of embarrassing or blaming the user for choosing something [Mathur *et al*., 2021]. An example: when a platform uses a design element like a large "No" button or adopts unattractive design for the option of declining a service or subscription. By feeling as though they are making a mistake by turning down the offer, the user may be more inclined to accept it. Users may suffer as a result of confirmshaming's pressure to make decisions they may not want to make. Companies may increase consumer trust and deliver a pleasant user experience by being open and moral in their design methods.

An example that we found on all three platforms is persuasive advertisements that attempt to influence the user. When the user tries to close them, they may receive a message suggesting they are making a mistake, such as *"Are you sure you want to miss out on this unmissable opportunity?"*. A child may end up (i) clicking in the advertiser due to such pressure or embarrassment (as it is something they are not emotionally prepared to manage) or (ii) asking parents to pay for a service they may no longer need or desire as a result of feeling guilty and second-guessing their decision to quit or unsubscribe.

Disguised Ads are adverts that are disguised as other kinds of content or navigation, in order to get users to click on them [Brignull, 2018], and can also be categorized as a deceptive design pattern. In the context of children social network users, this deceptive design patterns appear in Tiktok and Instagram Stories between the videos and on Youtube, where the user may have to wait for the advertisement to end to be able to see the videos.

Finally, **Forced Continuity** is a deceptive design pattern that occurs when the user is tricked into signing up for a membership by making the process of unsubscribing or canceling difficult or confusing [Brignull, 2018]. For example, a Big Tech might offer a free trial period for a platform product or service, requiring users to enter their credit card information to sign up. Once the trial period is over, the service will automatically start charging the user's credit card on a regular basis unless the user cancels the subscription. This deceptive design patterns occurs specifically on YouTube paid membership (Youtube Premium), which enables child influencers to obtain a secondary revenue stream (e.g. followers can provide them with donations) in addition to what they already earn through ads. YouTube offers a 30-90 days period of free trial, requiring credit card information, but cancelling the membership is not straightforward.

In 2015, Google launched YouTube Kids, which claims to be specifically designed for children under the age of 13. This app is a response to concerns about inappropriate content being accessible to children on the main YouTube platform. YouTube Kids features a simplified interface that is easy for children to navigate, with large icons and voice search capabilities. The content on YouTube Kids is curated by a team of human reviewers, as well as by machine learning algorithms that filter out inappropriate content.

The app also allows parents to set up profiles for a child, limiting screen time and the types of videos that can be accessed. Although YouTube Kids is a good alternative for the safety of children on YouTube, we could still find manipulation patterns such as Trick Questions and Misdirection.

4.4 Interplay Between Deceptive Patterns and Impacts on Kidinfluencers

Our analysis also enabled the association of the previous set of deceptive patterns (cf. Section 4.3) with the impacts observed on children once they act as influencers in the studied social media platforms (cf. Section 4.1). Such interaction is shown in Table 2 and described in the following paragraphs.

Initially, we noticed that manipulation via *Trick Questions*, *Privacy Zuckering* and *Misdirection* patterns threaten kidinfluencers' security and privacy. The Trick Questions strategy considers that users (particularly children, with lack of digital literacy in terms of data protection and limited attention to formal aspects such as privacy terms) will adopt a scan reading approach. Hence, companies can make a privacy policy seem to say one thing, when in fact it is actually declaring something that is not in the user's best interests.

The visual interference from the Misdirection pattern hides data protection and security features in social media sections that are not intuitively related to such information. This reinforces the idea that improper privacy management may not derive from difficulties from users, but instead from the software solution being based on a restricted model or mechanism of rules that fail to meet users' expectations [Rodrigues *et al*., 2019]. In addition to such chaotic or overwhelming interface, Privacy Zuckering collects a larger amount of personal data from children using the platform. In this way, Big Techs directly affect the privacy of kidinfluencers, something that is already threatened by the exposure of their routines in regular posts via sharenting.

Pattern	Misinformation	Exposure do Advertising	Threats to Security and Privacy	Attitude Changes
Trick Questions			X	
Privacy Zuckering			X	
Misdirection			X	
Confirmshaming				X
Disguised Ads	X	X		X
Forced Continuity				X

Table 2. Impacts faced by kidinfluencers due to deceptive patterns.

The *Disguised Ads* pattern raises kidinfluencers and their followers' exposure to advertising. Profiles with little or no signaling of ads on platforms such as Instagram and Youtube prevent caregivers to draw a line between acceptable and excessive commercial content. For instance, all of the sudden, a video from a given profile may start a toy or overall product unpackaging, which can be part of a playlist. The same deceptive pattern can lead to attitude changes: by sending their products to a kidinfluencer, partners from a social media profile or channel establish a dynamics in which those who produce content speak directly to others that consume content and may buy a product due to the identification and respect for an influencer.

Therefore, Big Techs achieve their goal to boost the sales of platform's partners while such companies pave the way for developing consumer desires in children in an abusive manner, taking advantage of their vulnerability[7]. We also noticed the lack of quality from ads promoted or watched by an influencer raises misinformation. Since the process of receiving products or services for publicity on their profiles is not guided by criteria defined by caregivers or verified by the platform, algorithms will promote the resulting posts if they seems to be engaging (e.g. high number of comments, shares, likes or views). Hence, the platform may spread hidden advertising content without questioning its veracity or suitability for children, whose media literacy is low and unbalanced due to their varied contexts (e.g. region, social class)[8].

Finally, the combination of *Confirmshaming* and *Forced Continuity* is the seed for continuous attitude changes. The visual interference or trick wording involved in the process of cancelling a subscription causes a kidinfluencer and their caregivers to maintain the monetized account active. Hence, the whole process of creating new posts under pressure of time and increasingly seeking for new achievements (such as new followers and views or paid advertisement) triggers stress, low self-steem and even sexualization, as social media platforms often promote posts with improper exposure of children to raise followers, clicks, and engagement. Instagram, for example, serves up a stream of videos with sexually suggestive content (a combination of children, sexual content and advertisements) to accounts that follow preteens[9].

[7]Alana Institute. "Representation about massive children's advertising aimed at children". Available at https://criancaeconsumo.org.br/wp-content/uploads/2021/08/denuncia-mpba-atualizada-1.pdf

[8]Alana Institute and ITS Rio. "Protection of Children and Adolescents in a Digital Environment - report". Available at https://criancaeconsumo.org.br/wp-content/uploads/2021/12/relatorio-workshop-its-alana-1.pdf

[9]National Post. "Instagram's Reels algorithms serves up sexualized content of children: report". Available at https://nationalpost.com/news/world/instagrams-reels-algorithms-sexualized-content-children

5 Design and Legal Solutions

5.1 Alternative Designs

We developed early prototypes that illustrate initial ideas for how some deceptive patterns could be avoided in social media platforms. We considered YouTube to create the examples and focused on mobile applications as a higher percentage of children have more access to smartphones than to regular computers [Ofcom, 2022]. In addition, smartphones are the gadget kidinfluencers use to create and post their content.

Figures 6, 7, and 8 illustrate the following problem in YouTube Kids: the platform lacks a mechanism to verify if the individual creating an account as a parent is truly an adult. This problem falls under the category of deceptive design patterns, specifically the Trick Questions pattern, as it involves a question where there is no mechanism to verify if the user is providing truthful information. Despite the question being straightforward, there should be some method of age verification, as it is an app designed for children. In order to address this issue, a proposed solution includes an additional screen where age confirmation is required by submitting a photo of an identification document, as depicted in Figure 9. However, to avoid risks in terms of privacy, the uploaded image must be deleted after being processed by the algorithm.

Although YouTube Kids is a good alternative for the safety of children on YouTube, it does not address the problem of child influencers, as it does not allow publishing videos. Thus kidinfluencers continue to use the main YouTube platform. In the YouTube platform, one problem observed is not having an extra check when publishing a video, making it possible for children to post videos without parental consent, often resulting in the sharing of children's information without parental authorization. The US congress recognized that parents should be in control of their children's data online with the Childhood Online Privacy Protection Act (COPPA), which gives parents authority over the information websites collect from their children [O'Neill, 2019]. This problem can be categorized as the deceptive design patterns Privacy Zuckering. As a possible solution, when publishing a video, we suggest an extra screen with digital recognition, as shown in Figure 10. This feature would require explicit permission from caregivers, who could allow or prevent the upload of this data from a child to the platform. In case they consider this is a sensitive data to be offered to Big Techs, an alternative option could be to use an extra password.

Our final example addresses advertisement. According to studies conducted by the NGO Alana Institute [Alana, 2022], the advertising content developed in the digital en-

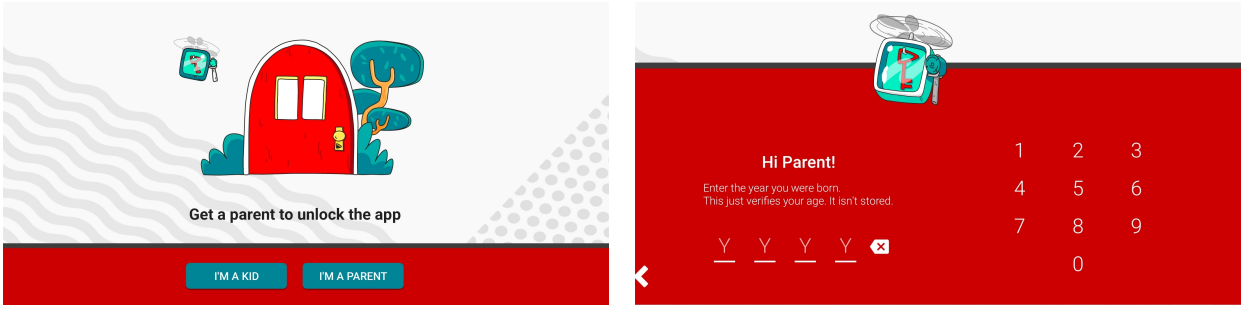

Figure 6. Initial flow to enter the account.

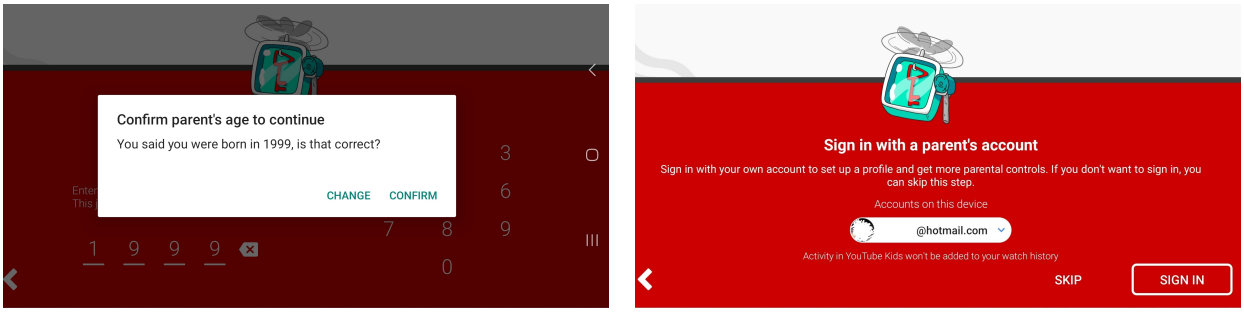

Figure 7. Weak confirmation.

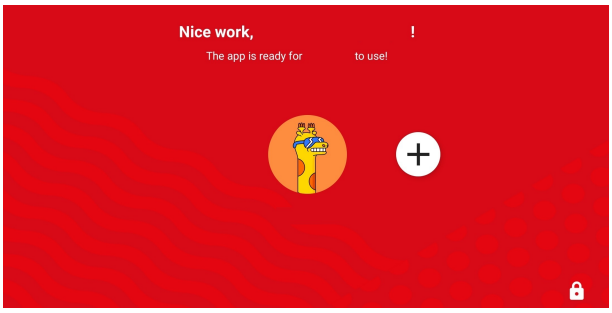

Figure 8. Account access.

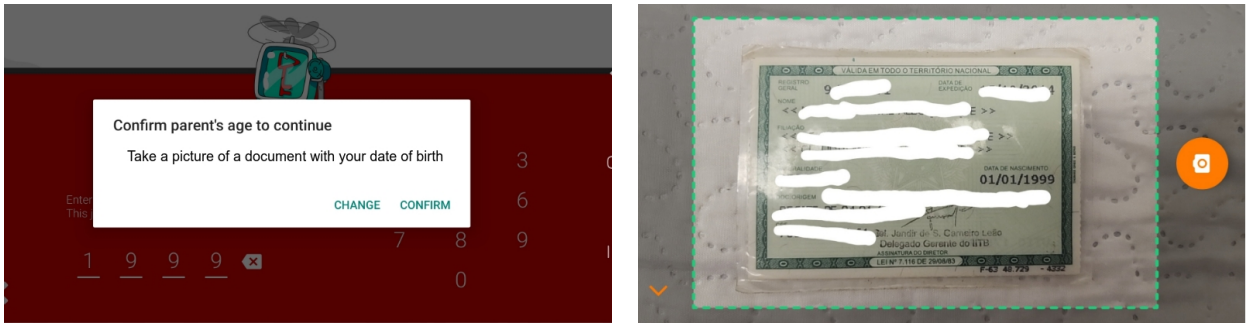

Figure 9. Proposed prototype for sending the document that proves user's age.

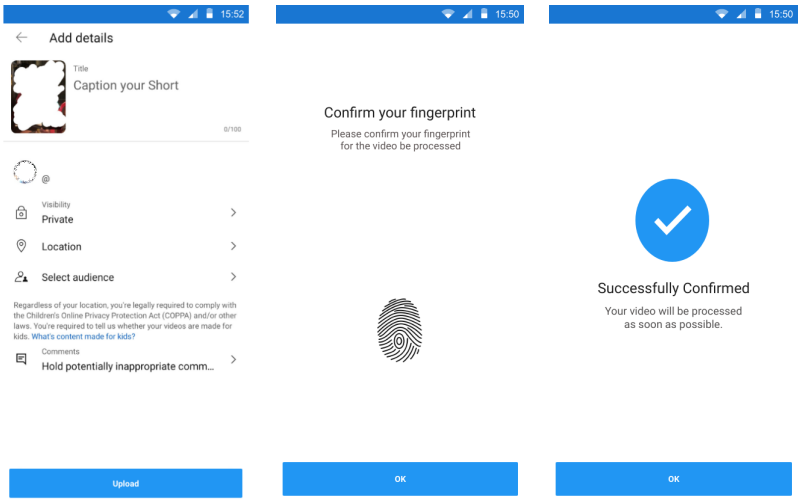

Figure 10. Proposed prototype with fingerprint confirmation to post a video.

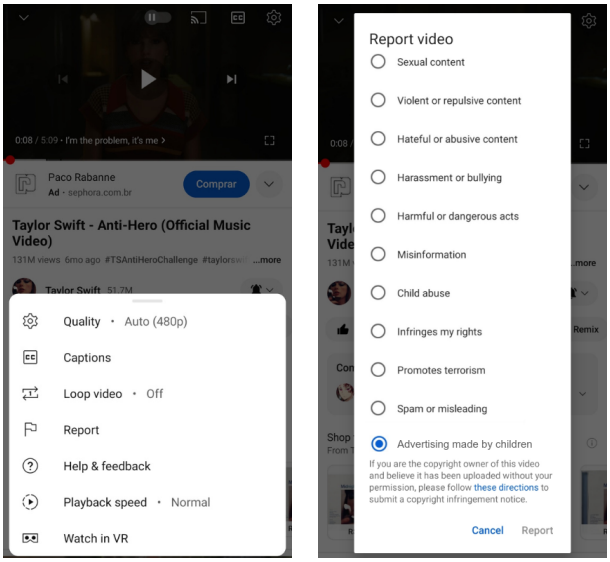

Figure 11. Proposed prototype to report a advertising made by children.

vironment is not easy to identify, leading to error even in adults, constituting veiled advertising, which enhances the illegality and harmfulness of marketing communication directed to the children's audience. Unmarked advertising involving the participation of children is an example of Disguised Ads and should be treated with even greater severity than unmarked advertising created by adults, as it involves child labor. Hence, platforms should offer features to report unmarked advertising made by children (in Figure 11).

5.2 Legal Aspects

The Children's Code or Age Appropriate Design Code (AADC) [ICO, 2020], a part of the United Kingdom's regulatory landscape, serves as a complementary initiative for data protection laws such as the GDPR. This code extends beyond merely safeguarding children's data, emphasizing how the design of digital products and services significantly shapes the online experiences of young individuals, thereby broadening the regulatory focus. It is noteworthy that the code incorporates design considerations to cater to various age groups, beyond the child-centric perspective.

The AADC addresses the concept of design techniques aimed at influencing user behavior. Employing the term "nudge", the code suggests that such strategies steer or encourage users to follow paths preferred by the solution's developers (e.g., designers, programmers, etc.), affecting their decision-making processes [Grace *et al.*, 2023].

This code advises platform designers and online service providers to avoid features designed to prolong usage time. This recommendation stems directly from attention-capturing manipulation patterns. Strategies aimed at prolonging a child's online engagement are termed "sticky" characteristics, encompassing rewards and notifications that incentivize users to continue posting, watching video content, or remaining online to receive these stimuli.

An intriguing aspect of this code is its promotion of using such strategies for positive ends. That is, directing children not towards making poor privacy decisions, but rather towards enhancing their online protection levels or even their overall health and well-being. This is evident in cases where platforms like Instagram allow users to set and receive notifications upon reaching predefined usage time limits, reinforcing the importance of disconnecting.

Similar provisions are established in Article 40 of the Brazilian National Bill No. 2630 [dos Deputados, 2023]. The indication that digital platforms accessible to children *"must base their services and terms of use on the best interests of these users and adopt appropriate and proportionate measures to ensure a high level of privacy, data protection, and security"* includes suggestions for limiting service usage time and creating mechanisms to actively prevent children from using services if said service or platform feature does not meet the needs of this audience.

6 Conclusion

Our main **contribution** was to (i) identify and exemplify the use of deceptive design patterns by large platforms and (ii) propose alternative designs that foster the welfare and autonomy of kidinfluencers. We discussed how technology plays a critical role in shaping the dynamics of child influencer marketing, from the platform design to the algorithmic recommendations and the data collection practices. Therefore, there is a need for a comprehensive approach that considers ethical, legal, and social implications of child influencer marketing and foster children's rights by design.

Threats to validity include the possibility that relevant articles may have been missed in our search procedure, despite our best attempts to gather evidence in a structured manner (e.g., search string, extraction spreadsheet, etc.). However, by conducting a reverse search, we were able to reduce this threat. Relying on evidence from journalistic articles posed another risk because they can be prone to personal opinions. We addressed this problem by taking into account platform's documentation and by performing tests where we manually went through the platforms and mapped the problems according to the deceptive design patterns.

In **future work**, we plan to implement the following research agenda in collaboration with partner institutions:

- Expand our investigation by selecting articles in other fields, such as Law, Social Sciences and Psychology. For instance, the Communication area has explored how data capturing and analyzing by IT commpanies drives psychic and emotional aspects of users.
- Present our results directly to platforms through partnerships with NGOs such as Alana Institute (Brazil) and Fairplay (UK), which maintain a close relationship with Big Techs to promote the protection of children online.
- Perform a more thorough study of social media platforms, including an inspection analysis and a user study with kidinfluencers. It will allow us to consider bright design practices (i.e. persuasive design solutions that prioritize user goals and well-being over companies' desires and business objectives [Sandhaus, 2023]) to refine, evolve and create prototypes to be validated with children and guardians.

Authors' Contributions

Nathalia Albuquerque contributions: conceptualization, data curation, formal investigation methodology, project administration, writing – original draft.

George Valença contributions: conceptualization, data curation, formal investigation, methodology, project administration, validation, writing – original draft.

Taciana Pontual contributions: conceptualization, data curation, formal investigation, methodology, project administration, validation, writing – original draft.

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