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New Trends in Online Crime Using Social Networking Sites and Apps against Children and Adolescents: Police-Based Longitudinal Research

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Abstract

The digital industry has developed substantially from the beginning of the new century with new online tools such as social networking sites (SNSs) and Apps, providing new scenarios for criminality sometimes difficult to recognize due to their digital nature. This paper examines how SNSs and Apps are exploited as digital tools of criminality against teens, tweens, minors, and adolescents, and highlights the criminal perspectives. Specifically, the research presents the first phase (Dec.2015 – Dec.2021) of the empirical longitudinal research HUMANIZATECH (HTECH), which is an archive of data on the criminal use of SNSs and Apps against minors, collected from 174 police departments across the globe. The main findings include 1) a profile of potential victims, 2) a swift to a more sophisticated criminal dynamics related to OCSEA, 3) an evolution on the use of SNSs towards human trafficking, further explaining 4) a list of 58 platforms proved to be used to lure teens, tweens, and adolescents, followed by 5) a list of 23 more used for minor offences and currently under the radar of law enforcement agencies. The study underscores the need to educate the children and their parents about the potential criminal use of digital platforms.

Keywords: SNSs, Apps, Social Media, Minors, Parenting, Online Child Sexual Exploitation and Abuse (OCSEA), Sextortion, Human Trafficking.

Introduction

By the end of the first decade of 2000, digital technology had evolved and created so-called “Social Media” platforms such as MYSFACE 2003, FACEBOOK 2004, YouTube 2005, or TWITTER 2006, that allowed users to “post” and share short messages, photos, and/or videos, as well as “follow” other users. After 2010, there were GRINDR 2009, INSTAGRAM 2010, SNAPCHAT 2011, TINDER 2012, VINE 2013, BUMBLE 2014, etc. In just a decade, humans have seen themselves immersed in a process of “digitalization”

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of rituals and behaviors, addressing implication at cognitive, social, and emotional spheres (Yamamoto & Ananou, 2015) with many possibilities to improve communication and access information. There were created immense opportunities for wrongdoing. Teens and tweens have been leading this revolution with the use of social media platforms and apps, now constantly present in the dynamics of their lives (in more than nine-in-ten U.S. teenagers aged 13 to 17 according to the Pew Research Center, 2018). Taking advantage of digitalization, criminals also evolved their *modus operandi*, and improved their technical skills to reach minors. The current study deals with this threat alarming against the use of social networking sites and apps against children and adolescents.

Potential Risks to Become a Target

Despite many advantages of the digital technology, this increased connectivity also brings challenges, both for teens and adults, above all, to the parents. Rosen (2012) alerted about the consequences of being addicted to social networking, since teens could develop behavioral problems such as narcissism. Despite some minor explorations, few studies can be found on the actual psychological mechanisms underlying a problematic / dysfunctional / additive, use of the SNSs. Only recent research proves a parallelism between the consequences of drug abuse behavioral disorders, the decision-making process, and the excessive use of social media (Meshi et al., 2019); or a direct relationship between dysfunctional metacognitive beliefs (thoughts related to the lack of control, danger and cognitive confidence, and an excessive use of the SNSs (Balıkcı et al., 2020)(Aguirre & Gómez, 2020).

Pioneer research studies have targeted concrete platforms such as Facebook (Hormes et al., 2014) and established clear relationship between an addictive use of the Internet and a dysfunctional use of online social networking sites, both associated with low social competence and emotional dysregulation (ED) (Okpa et al., 2020). Such a use is in deficit of emotion regulation skills in children and adolescents, and has been observed to increase depression (Bernaras et al., 2019). Symptoms include sleeping disorders, eating disorders, deterioration of school grades, increasing conflicts with the family, as well as emotional, behavioral, and cognitive crises (Sugaya et al., 2019). These symptoms can be interpreted by parents to be part of the average typical experiences or changing moods of adolescence, instead of addiction or ED related, usually more difficult to regulate (Bailen et al., 2019).

This condition also applies to an excessive, pathological use of digital online games, or Internet gaming disorders (IGD) (Ridders et al., 2016; Wichstrøm et al., 2018). Most IGD adolescents spend hours in front of their screens staying indoors instead of exploring nature. They remain focused - yet alienated - on exploring virtual spheres, therefore disconnected from the physical reality. Even in some cases, online gaming replaces social life. Tweens and teens understand online established networks (our mistake to allow calling them “social”) as trustworthy and friendly, and the digital / virtual context, one in which to escape from daily affairs, entering an imaginary of positive, encouraging emotions (Duke & Osim, 2020; Hajjar, 2020). According to Petry et al. (2015), a diagnosis of IGD include nine variables: constant preoccupation with gaming, withdrawal when not playing, issues with tolerance, failing to reduce or stop gaming, giving up activities that are not related to the digital sphere, prioritizing gaming over solving other problems, lying about gaming, gaming to alienate moods, and risking real relationships. Again, parents tend to interpret these behaviors and reactions within the standard framework of going through the process of growing up (Ogundele, 2018), leaving the minors at mercy of the online experience.

Hence tweens and teens spend hours online, using not only SNSs but also different apps with chat rooms, playing online games with people they do not know, or making an avatar to start virtual relationships, getting themselves in high levels of dependency from the electronic devices that end up interfering with their real life (Caplan & High, 2011; Turel et al., 2011). Furthermore, teens who spend too much time online have reported the need to increase the number of “likes” in their publications (Sherman et al., 2016), revealing symptoms of anxiety under the pressure to post content on a regular basis, with an emphasis of having to do it with the purpose to get comments of approval by others (Sherman et al., 2017). At the same time, these minors report having experienced online harassment both from people they already knew and others they did not know, being both adults (grooming / online solicitation related) and other peers (cyberbullying related) (Jiang, 2018).

The Swift in The Criminological Profile

Founded in 2003 and considered the largest social networking site from 2005 to 2008 when it was overtaken by Facebook in 2009, MySpace has reported to have kicked off their website around 90,000 registered sex offenders. Despite this effort, some researchers suggested they could have created other profiles on any other social media platform (Smith & Cole, 2013). Ten years after this attempt, in December 2019, a 39-year-old man was arrested suspected for planning to abduct an 11-year-old girl who met playing an online 3D gaming app called “*Wildcraft*” (FSCO, 2019) where children over 9 years old can be part of a herd of wild animals such as wolf, fox, or lynx. The goal was to create and personalize each member of the family through a 3D simulator with which they explored the natural world, while defending the herd from lurking enemies. How can this be related to child sexual abuse and exploitation? Without identification of any kind (age, gender, real name), these online games make children more vulnerable than ever, for the “playground” and the “people” (peers? friends?) may not be what they seem.

Therefore, there is a criminal development parallel to the technological one, providing a whole new scenario of opportunities not only for criminals, but also for criminological research and police cooperation. Since the Internet is an open / public platform, one can find specialized forums and chat rooms to promote networking and underground markets for several criminal activities such as child prostitution, and child pornography (Beech et al., 2008; Stalans & Finn, 2016). Online sex crimes, or online child sexual exploitation and abuse (OCSEA) including an interaction through the Internet and SNSs may contain a *de facto* exchange of child pornography or exchanging information with other individual with similar sexual interests; but also locating potential victims for abuse; and further, once the potential victim is targeted, starting sexually related conversations (Kloess et al., 2014).

In 2016, the Spanish Law Enforcement Agency, Guardia Civil through the Department of Telematic Crimes of the Central Operating Unit (UCO), received information from the FBI’s Violent Crimes Against Children International Task Force (VCACITF), about an online platform for videoconferences used to distribute pornographic material featuring minors (mostly girls between the ages of 8 and 14). The investigation resulted in the closure of the platform in 2018, and the arrest of several adults who were using fictitious identities on different social media to recruit and capture their victims.

Child Sexual Abuse Material (CSAM) / Child Exploitation Material (CEM), used to be produced offline (Child Sexual Exploitation – CSE) and distributed online (chat rooms, SNSs, and games) but in the last years, there has been changes in the grooming patterns (Krone et al., 2017). Reminding one the most recognized comprehensive definition,

grooming – in an online or offline context – is not just a punctual act, but “a process by which a person prepares a child, significant others, and the environment for the abuse of this child. Specific goals include gaining access to the child, gaining the child’s compliance, and maintaining the child’s secrecy to avoid disclosure. This process serves to strengthen the offender’s abusive pattern, as it may be used as a means of justifying or denying their actions” (Craven et al., 2006:297).

There has been a swift towards a direct online solicitation of pictures and videos, not only to be sent after threatening and harassing the minors, but on the actual “live streaming” format (Baines, 2019), provided by SNSs and other digital platforms, making the abuse harder to be detected. Also, the online context provides more possibilities since the demand can be happening from one country but the actual abuse from another, and even the economic transaction sent to a third one. In 2017 the Portuguese Judicial Police arrested two men for sexually abusing children, leading to one-year inter-agency investigation including the FBI’s Internet Crime Complaint Center (IC3), the Austrian *Bundeskriminalamt*, the French *Gendarmerie*, the Italian *Polizia di Comunicazioni*, UK National Crime Agency and West Midlands Police, Australian Federal Police and Queensland Task Force Argos, Canada’s Toronto Police Service, and the Brazilian Federal Police. In January 2020, INTERPOL and EUROPOL finally published results, comprising the arrest and conviction of a man for sexually abusing children – at least seven victims identified – and posting the images of the abuses on his website; being both the perpetrator and the administrator of the web site used to share the contents.

Although this hypothesis requires further research, previous research reveals an escalation on traditional profiles (indirect consumer of CEM, *pedophile*; or direct perpetrator of CSE, *pederast*), towards a much sophisticated one including the production of CEM by actual perpetration of CSE within the OCSEA framework. This new role implies a great knowledge of IT skills (secure eraser programs, anonymizers, authentication protocols, programming, and encryption) and the Dark web, as well as the different SNSs and Apps to target, interact, and develop a trustworthy imaginary with potential victims (Policía Nacional, 2020).

The Escalation into Human Trafficking

Chan et al. (2016) pointed out online sex offenders using social media to identify potential victims. When these are minors – children, tweens, and teens – adults use avatars and software to appear as someone / something alike (Williams, Elliott, & Beech, 2013) a trustworthy appearance to start conversations and share personal information, pictures, activities, and locations... even turning on GPS locators with the excuse of technological difficulties to connect and keep in touch. Unfortunately, in this context, children, tweens and teens get exposed and then are forced into criminal dynamics without knowing. Recent data from police interventions reveal a new trend on the criminal use of SNSs, games, and Apps. As explained earlier these are used for grooming purposes (CEM, CSE) within the OCSEA framework. The escalation of this trend is related to the consequences for the victims, now also involving human trafficking. Although not well known, it is the third most prevalent criminal activity worldwide.

There are concrete examples of well-known games such as *Fortnite* (Johnston, 2019) targeting children and adolescents, where criminal meet their victims online through avatars, engage themselves in conversations (through chat rooms or concrete related Apps like *Discord*), to first develop trust, and then lure them to an ambush that will drive them into

human trafficking networks. In March 2020, the FBI's IC3 issued an alert reporting how human traffickers are using dating apps and websites to recruit sex trafficking victims. This research has proved these dating apps, meant for adults, to be also used by minors; and at the same time, the ones developed for minors, to be used by adults to detect vulnerable victims. Nowadays minors are using SNSs and chat rooms to express themselves, not only on good things happening to them, parties, and friends, but on their emotional distress, family situations, suicidal thoughts, feelings of loneliness, or self-harming behaviors. All this information is specially appreciated by "hunters".

Several people with different roles are found within the internal dynamics of these networks, all coordinated to trap their victims. The first to intervene are the "hunters" who are responsible for tracking SNSs, games and Apps in search of a profile of girls that can be attracted to the chat rooms. Once in the chat rooms, the "talkers" take over to establish trusting bonds, initiating conversations about school, family, sports and, finally, sex. During this manipulating process they devote the attention and compliments the girls seem to need in real life. These compliments take form in different games to lure the girls until they start removing their clothes, followed by exposing nudity and eventually culminating in their participation in sexual activities in front of the webcam. At that moment they are already trapped under the possibility for their images to be distributed online, becoming victims of online coercion and extortion known as *sextortion* (when an adult threatens and black mails a minor by sharing online sexual pictures or acts previously performed by the minor, to get more CEM). In this scald of trust and exposure, the "loopers" get involved identifying themselves with the victims to play previously recorded videos of other adolescents who perform sexual acts. These "loopers" pretend to be the teens in the videos, to convince the girls to get even more involved (GUARDIA CIVIL, 2019; FBI, 2020).

In some cases, the escalation continues until the criminals convince the girls to meet in real life. At this point, they get abducted by human traffickers who enslave them in their networks, tortured, drugged, raped, sold as sexual slaves, for child labor, or to the organ trafficking networks (extracting lungs, hearts, livers, corneas, and kidneys). According to the Global Report on Trafficking in Persons (UNODC, 2020), there has been a clear increase of 30% in the number of children being trafficked (expected to increase due to long-term effects of the COVID-19 pandemic) related to sexual exploitation, affecting many more girls than boys. Contrary to popular belief, both traffickers and victims can be associated to rural areas or suburbs, but also to a high social status or a low-income context. Due to the extremely controlled, fearful, and threatened experiences, victims are encountered in all socio-economic contexts through daily activities, however unnoticed of their dramatic, alienated situation.

This paper examines both the evolution and development of social networking sites (SNSs) and Apps, attempting to understand how they became digital tools of criminality. It investigates the dangers related to digital platforms for teens, tweens, minors, and adolescents, and highlights the criminal perspectives. The focus is on the new trends to online crime through social networking sites and apps. Specifically, the research presents the first phase (Dec.2015 – Dec.2021) of the empirical longitudinal research HUMANIZATECH (HTECH), which is an archive of data on the criminal use of SNSs and Apps against minors, collected from 174 police departments across the globe. The study underscores the need to tame the online sites, make a judicious use of the internet and monitor the teens and children while they use the Internet sites. It also spells out the need to educate the children and their parents about the potential criminal use of digital platforms.

Study Framework and Methodology: Humanizatech Project

When the International Observatory on Values and Education in Humanity was launched in 2015, the Pew Research Center estimated 92% of all teens (13–17 years) in the United States were online daily, with 71% of online teens using more than one social media platform. One of the first posts published presented the concerns of the FBI, warning on an epidemic increment of sexual abuse related crimes, but particularly of those targeting minors (under 18 according to the United Nations International Convention on the Rights of the Child - CRC). There was therefore a need to teach both children and their parents about the potential criminal use of digital platforms, but in general, how to live in this digitalized society (Ribble, 2009). This was the starting point for designing the HUMANIZATECH (HTECH) project. HTECH longitudinal research project contemplates mixed digital methods, implementing qualitative methodologies of non-participant observation, content analysis, social network analysis, and case studies (Caliandro, 2017; Marres, 2012). Data collection was based on content analysis techniques under a set of 31 categories from the keywords selected in English (Table 1), Spanish, and French in relation to the topics under study, using search engines and four digital monitoring tools for the news published on the Internet.

Table 1. Sample of 25 apps and 12 categories listed for the typology of crimes (case related) in English.

Apps	Sexting	Sextortion	Child porn	Sexual abuse	Grooming	Pedophiles	Rape	Bullying	Cyberbullying	Trafficking	Suicide	Self-harm
KIK	+	+				+						
SNAPCHAT	+		+	+			+					
CHAT ROULETTE	+				+							
OMEGLE		+			+							
SHAMCHAT			+									
OOVOO					+	+						
VENT											+	+
DISCORD				+						+		
DOWN	+				+							
YUBO		+			+	+						
SPOTAFRIEND					+	+						
MYLOL						+						
TIKTOK	+		+		+							
LIVE.LY						+						
HOT OR NOT				+	+		+					
SARAHAH								+	+		+	
MEET.ME					+			+				
SNOG.FM				+	+		+					
ASK.FM		+							+			
LIVE.ME	+				+				+			
TELLONYM	+							+				+
BIGO LIVE	+				+							
MONKEY	+					+						
HOLLA										+		

Source: Research data

The implied alerts were programmed on the following platforms: Google Alerts, Talkwalker Alerts, and SocialMention, from the beginning of the project, later including the BrandMention platform (from 2017). Simultaneously, the data validation process was activated through the content curation methodology (Johnston, 2017) based on the analysis of social networks. Thus, the veracity of the information published was verified to avoid misinformation or “fake news” (UNESCO, 2018), curating the contents specifically linked to the SNSs of the police departments mentioned in the alerts of the publications. Using the DIIGO tool (Digest of Internet Information, Groups and Other stuff), aggregation and distillation techniques were applied. The result produced a database with which 121 Facebook accounts (Appendix A) and 133 Twitter accounts (Appendix B) of police forces from different countries were monitored (until December 2020).

A total of 695 cases (5,36%; N = 12.960 publications) were reviewed, exposing 81 Apps and SNSs (starting in December 2015 with only 9) used against minors, both by adults and other minors. Unfortunately, these platforms also included those used by minors to interact and communicate, sharing their experiences and feelings in chats, photos, and videos (Elgersma, 2019). In fact, and because of the criminal use of the digital technology, police forces worldwide have had to learn about these new dynamics, also new to the criminological sphere, making their work much more difficult. Examples of criminological research developed may include online grooming behavior of child sex offenders (Whittle et al., 2013), and online child pornography (Bachishin et al., 2011; Beech et al., 2008). The new digital scenario reveals the importance of including social media data analysis and knowledge of computer algorithms as essential tools for police and law enforcement agencies (Chan & Bennett, 2016).

Results and findings

A major objective of HUMANIZATECH (HTECH) project was to increase the Parental responsibility and their awareness about the use of digital devices and related products by children. Some of these tasks including making a list of websites available and checking devices used by kids to beware the websites they visit, to install parental controls, or set screen time limits. According to Anderson (2019), 58% of parents say they sometimes check websites and messages, and 52% confirm having used some type of parental control. Despite these figures, the fact is we do not know to what extent these social networking sites and apps can hide criminals. Additionally, teens know about parental controls and screen time, sharing videos on platforms such as YouTube and Reddit on how to avoid or disable parental security measures.

From a clinical perspective family bonding, the influence of a good communication and parental involvement create a trustworthy environment within the family (Siegel, 2015), which plays a central role when implementing treatments and interventions with adolescents related to substance abuse in general (Velleman et al., 2005), as to IGD in particular (Schneider et al., 2017). Thus, we can conclude parents should also need to understand how these digital tools are used both by the criminals and by their children. Thus, improving the skills of the parents, preventive factors can be developed within the family. In the case of an abusive situation, protective factors will improve the child's mental and emotional recovery (Sánchez, 2016).

In December 2015, available online data published by a police department targeted just 9 apps being used to lure minors. After 6 years (December 2021), this longitudinal research was able to present 58 tools, indicating a 544% increase. To provide a deeper understanding of their use and risks, this research includes relevant external links for some of these tools. The links are used as secondary data and confirmed for the purpose of this publication in March 2022.

List of SNSs & APPS used for online crime

KIK - (Similar apps: *VIBER*, *WHATSAPP*, *TEXTNOW*) – Allows instant texting and sending pictures without being logged in the phone history. Anonymity makes it weak for parental control, and difficult for police intervention. Case research proves children are exposed to sex spammers and by pedophiles, commonly used for sexting and sextortion. <https://www.mcafee.com/blogs/consumer/family-safety/kik-messenger-dangerous-app-kids-love/?fbclid=IwAR3dyuP-G0H6TQkozleCKBShzEcNZWYkU2yXyJFxpK6Jo2cbJ10RcgPqrj0>

SNAPCHAT - (Similar apps: *BOO!* (formerly *BooMoji*), *WeChat*, *WIRE*, *LINE*) – Allows to share images or videos that will disappear after 10 seconds... but you can make screen shot of the picture and share. Case research proves used to send brutal gangland-style fighting videos with teens 12-16 and sexually inappropriate photos. Adults convicted for distributing child pornography and rape (ex: 10-year-old). Recent updates of the app include GPS function revealing the exact location of users via geolocation (2 meters' margin). <https://fortune.com/2017/11/08/snapchats-sextortion-pedophiles/>

CHAT ROULETTE and **OMEGLE** – Allows users to video chat with “fake strangers” using fake webcam software. Case: 50-year-old man using images from a 15-year-old boy asking for inappropriate pictures and about location.

OMEGLE: Allows anonymous video or chat and encourages to talk to strangers. In this case the chat log can be saved with a link that can shared. Added risk related to privacy, since the app can connect with a Facebook account. It is used by sexually disturbed adults. <https://www.waynedenner.com/blog/omegle-talk-to-strangers/>

CHAT ROULETTE (New **FACHAT** but paying to video) - Allows random and spontaneous webcam video. You never know who you'll be paired with, plus chats can be recorded without your notice, and shared later. Used for blackmailing and sextortion. <https://itstillworks.com/risks-chatroulette-4794.html>

SHAMCHAT (like **OMEGLE**) - “Don't Be Yourself” Allows users to assume different identity to interact with strangers. Known for pornographic conversations and other sexualized behavior.

OOVOO (Similar **OMEGLE**, **PALTALK**, **GroupMe**) - Allows video group chat, both enter and create chat rooms with friends and strangers. Around 150,000 users online at any given time. Case research proves the use for grooming and by pedophiles

TINDER and **BUMBLE** (Similar apps: **SKOUT**, **BLENDR**, **DOWN**) – They are primarily used for hooking up. There are many Kids on these apps with fake names and ages.

TINDER - Allows users to post pictures, and you get a “flag” if found attractive. If users match their profiles, it allows writing messages. <https://www.verywellfamily.com/what-every-parent-needs-to-know-about-tinder-2609052>

BUMBLE (like **TINDER**) - Allows women to initiate contact. Using “hearts” instead of “flags” the app suggests those nearby who have “hearted” you, allowing messaging for further contact.

DOWN (Prior **Bang with Friends from Facebook**) - Allows users to flirt and meet if they want to get “down”. Once there is a match, users can access each other's Facebook profiles. Case research proves sexting, unsafe sexual encounters, and sexually disturbed adults using it.

YUBO (formerly **YELLOW** / Similar **SPOTAFRIEND**) – Both known as “Tinder for kids” with several cases reported to police (most users 13-17 of age, but also 8-9-year-olds). Allows chat and video chat of young kids to pretend to be adults to hook up. The app matches by geographic proximity. Case research shows it is used by sexually disturbed adults. <https://www.dailymail.co.uk/news/article-5239253/Sex-predators-using-dangerous-new-Tinder-teens-app.html>

MYLOL (Like *YUBO*, similar *Crush Zone*; all “*Tinder for Kids*”) – described by Australian police as a 'playground for pedophiles. Considered #1 (2018–2019) teen dating site in the US, UK, Canada, and Australia.

<https://www.dailymail.co.uk/sciencetech/article-4196472/Paedophiles-luring-kids-nude-selfies-using-dating-app.html>

TIKTOK (renewed *MUSICAL.LY* / competitor *LASSO* from Facebook) — Allows texting and creating and sharing short videos. There are many reported cases where users have been exposed to inappropriate or pornographic hashtags (shown as popups). Additional risk an auto default “public” profile. Great use of hashtags and funny filters, therefore very popular with children under 10. Used for grooming, child pornography.

<https://www.bark.us/blog/predators-use-tiktok-kids/>

LIVE.LY – An add-on app to *Musical.ly*; therefore, also used by pedophiles... Although off-line in some countries, in others you can still download. We leave the info so you can check.

<https://offspring.lifehacker.com/what-parents-need-to-know-about-musical-ly-1827629231>

HOT OR NOT — Allow users to rate profiles based on attractiveness and connect through geographic proximity. Also allows random chat and encourage to meet in person. Case research proves used for sexual grooming. <http://bisconticomputers.com/cyber-safe/dangerous-apps-hot-or-not/>

MEET.ME (developed after *HOT or NOT*) – not only allows but further encourages dating by meeting in real life. Case research proves its use for bullying and by sexually disturbed adults. Similar *SNOG.FM* reported cases on grooming and rape (14-year-old). <https://www.thesun.co.uk/fabulous/10110446/apps-wishbone-meet-me-bullying-groomers/>

ASK.FM (Similar *KIWI*, *THIS CRUSH*) — Allows users interaction in an anonymous question answer forum. Even if users get blocked, they can still access the profiles and view all interactions made on the app. Case research proves to be used for cyberbullying and sextortion. <https://www.theglobeandmail.com/life/parenting/your-kid-is-on-askfm-be-afraid-very-afraid/article28308222/>

LIVE.ME — Allows sharing the exact location through GPS. The “coins” (virtual currency) users can gain have been used to "pay" minors for inappropriate photos. Case research shows this app used for sexual grooming and cyberbullying. <https://protectyoungeyes.com/apps/live-me-parental-controls/>

BIGO LIVE (Similar *LIVE.ME*) – Allows video livestreaming, posting comments and sharing “beans” (although costing real money). Very popular among teenagers in Singapore, India, China. Case research proves sexually explicit content and further links (“Bigo” keyword related) used for sexual grooming and requests for sexually suggestive photos and videos. <https://www.thesun.co.uk/news/7190302/inside-wildly-popular-app-bigo-live-where-kids-are-told-to-take-off-their-clothes-and-subjected-to-vile-child-porn-threats-and-bosses-do-nothing-to-stop-it/>

IMVU / *BITLIFE* / *ZEPETO* (Similar *Boo App* (formerly *Boomoji*) – Allows users to interact through the avatars they create and to buy (as *Bigo Live*) objects for them. Avatars are highly sexualized, and users interact establishing relationships, making them have virtual sex, take drugs, and even commit crimes.

MONKEY (HOLLA group) - Allows private messaging and 15 second live chat with random strangers (like *ChatRoulette*). When both agree to match, they can follow connection on Snapchat. Meant to 'fill the loneliness void in teenagers' proves to be used for sending sexual content and nudity. Classified as a pedophile ring app! <https://www.thatsnonsense.com/message-warns-of-mobile-app-monkey-with-purple-background/>

HOLLA (Similar Monkey, Chatous, LivU) - Allows users to instantly video connect worldwide with other users. Case research reveals this app the use by sex traffickers it to lure young girls.

MOCOSPACE: Allows games, chat, texting, and photos. Geared towards African American and Latino communities. Verified by law enforcement agencies to be popular amongst child predators. <https://unrealitymag.com/10-things-you-didnt-know-about-mocospace/>

GRINDR (Similar: ADAM4ADAM) - Allows to chat and share videos and it is intended to find nearby users with the GPS function. Specifically designed for gay and bisexual men. Case research proves used by pedophiles and sociopaths. <https://www.thesun.co.uk/news/2245695/stephen-port-grindr-serial-killer-victims-appeal/>

HABBO (Habbo Hotel) - Allows users to chat and participate in activities around this hotel. This social networking site aimed at teenagers is used for grooming. Case research proves use to send pornographic messages and for grooming (8-year-olds use it). Pedophiles being convicted for sexually abusing children.

TUMBLR - Allows users to share content in a blog and post images, GIFs, videos, music, and text. Banned several times due to child porn. <https://smartsocial.com/what-is-tumblr-parent-teacher-guide/>

4CHAN / 8CHAN - Allows users to post anonymous pics and comments. Case research proves used for exposing minors and police interventions on child pornography and pedophilia posts

FASTMEET (Similar Meet24 and Meet4U) - Allows users to chat online based on GPS location. Case research proves used by adults for contacting minors for sexual encounters. <https://www.scotsman.com/lifestyle/fastmeet-meet24-and-meet4u-the-dating-apps-banned-for-connecting-adults-with-children-1-4924123>

WATTPAD (Similar QUOTEV)- Allows to share writings, engage in roleplay and games. Case research proves used for bullying and grooming

VOXER: Allows to turn a smartphone into a walkie talkie, send texts, photos, or share location. Case research shows the use for cyberbullying and sexual assault to teenagers.

WHISPER - Allows to “share secrets” (and photos, videos, posts) anonymously since names are never used, but works location-based within 1-mile radius. Case research proves used for both cyber bullying and sexting. <https://eu.montgomeryadvertiser.com/story/news/crime/2018/11/19/whisper-app-montgomery-alabama-arrest-solicitation-child/2054335002/>

ZOOSK - CHAT AVENUE - OKCUPID - PLENTY OF FISH - TAGGED — Allows to share and connect on GPS (location based). Intended for adult dating, children and teenagers used them too, as well as sexually disturbed adults always active (estimated 750.000 at any given time) in search for victims.

DISCORD (chat rooms on Fortnite, Minecraft, Roblox, AvakinLife – World of Warcraft, etc.) – This app is not active by itself but used while playing online games, allowing players to interact (texting, sending photos, videos, and audio in online gaming communities) through their avatars. Case research proves the use for human trafficking. <https://www.wsj.com/articles/discord-where-teens-rule-and-parents-fear-to-tread-11560245402>

Presenting below the second list of this research with 23 more Apps being used for minor offences and currently under the radar of law enforcement agencies.

AMINO (Anonymity Online): Allows users to create different profiles and interact in chat (rooms / communities). Law enforcement agencies warning on pedophiles targeting minors. <https://www.newsweek.com/kids-amino-app-asks-girl-10-topless-photo-verify-her-age-1451644>

YIKYAK (from TWITTER) / *BURN BOOK* after movie “Mean Girls”) – Allows users to post comments that can be read by the nearest 500 people using the app (1-5mile radius) based on GPS. Case research proves its use for cyberbullying and threats of mass violence. Powerful tool used by pedophiles (Anonymous and GPS location).

BURNBOOK – Allows users – from a school community – to gossip sharing messages, texts, and photos. Users can search for school within 10 kilometers. Case research proves used for bullying and cyberbullying.

AFTER SCHOOL (Similar *YIKYAK*, *WHISPER*, *LIPSI*, *SAYAT.ME*) – Allow private videos, pictures, or messages within a school. Anyone in the school can see the messages, but users are completely anonymous. Case research proves the use for bullying and cyberbullying and fake profiles on Facebook to sign up. <https://foreverymom.com/family-parenting/after-school-app-jenny-rapson/>

VENT (Similar *AFTER SCHOOL*) – Allows users to share their feelings and emotions. Case research shows used to post messages related to self-harm behaviors and suicidal thoughts

SARAHAAH (Similar *LIPSI*, *SAYAT.ME*) – Allows users and non-registered users to send / receive anonymous messages through other social media platforms such as Snapchat. Case research proves used for cyberbullying and harassment, even suggesting suicide. Main users and abusers are girls aged 11 to 14. <https://www.bbc.com/news/blogs-trending-43174619>

PERISCOPE (linked with TWITTER) – Allows to live broadcast directly from the phone or tablet and viewers can send comments and “hearts” to interact. Case research proves used by teens posting pornographic, sexual or explicitly graphic content.

MEERKAT (similar *PERISCOPE*) not available for download since it was turned down due to criminal use by sexually disturbed adults and for cyberbullying. Under the same name there is an app about meals and movies.

SHOTS OF ME (OR JUST SHOTS) – Allows users to take and post selfies. Case research proves use to send inappropriate photos, cyberbullying and blackmail.

YOUNOW (NOW) – (essentially a live YouTube) – Allows live broadcasting having anonymous viewers into the girl’s bedroom (video chat) while in their underwear or pajamas – research shows – answering personal questions.

BURN NOTE (Similar *SNAPCHAT*) – allows texting and deletes messages when read. Can be sent to an email address or a phone contact without having installed the app. Case research shows concerns for bullying and cyberbullying.

BADOO – HILY – PURE – Allows to share and connect on GPS (location based). Intended for adult dating, children and teenagers used them too, as well as sexually disturbed adults always active (estimated 750.000 at any given time) in search for victims

SKOUT (Similar *HILY*) – Allows users to make new friends and connections location-based. Users under 17 are not able to share photos but case research proves kids have found their way to send them. <https://www.thesun.co.uk/tech/3967087/skout-mobile-app-police-warning-paedophiles/>

BLENDR (like *TINDER*)– Allows texting, photo and video sharing to rate the “hotness” of other users. It is all linked to GPS locations, and there is no age restriction so minors could be interacting with adults through the app.

TELLONYM (“tell-on-him”) can link to *Instagram*, *Snapchat*, or *Twitter*) – Allows anonymous users to give “honest” responses to posts. Research reveals inappropriate sexual content; bullying and self-harm cases related to the use of this app.

LIKEE (aims to topple *TIKTOK*): Allows creating and sharing short videos and texting. <https://protectyouneyes.com/apps/likee-parental-controls/>

VSCO (like *Instagram*): Allows photo sharing with no privacy and no control over followers. Teens and tweens are using it to share nudity and to show involvement in illegal activities.

VINE (by *TWITTER* now known as *BYTE*) – Allows users to post 6 second videos that loop repeatedly. Porn videos pop up into the feed, and last update includes messaging and geolocation. Like *SNAPCHAT* also used by teens sharing school fighting videos. Case research proves underage sexual encounters.

WISHBONE – Allows users (mainly teenage girls – *SLINGSHOT* mainly boys) to place questions and vote to compare. Also has private chat. Case research proves the use for bullying, and by adults to send inappropriate messages. <https://smartsocial.com/post/wishbone-slingshot-apps>

Conclusion, limitations and future research

Why do we use Internet, and which social media or apps? Do we understand the potential risks hidden behind the screens? Who are we sharing our lives with? These questions can make a difference between being trapped in the virtual world, chained by digital dynamics, instead of connected to our real live experience. One would never imagine some of the SNSs or Apps listed above would be dangerous for under-aged users, but there are new trends at the criminological arena, specially devoted to lure minors not even knowing they are being targeted.

The present police-based longitudinal research reveals the new trends related to the use of social networking sites and apps against children and adolescents. Perpetrators are becoming more sophisticated, acquiring broad knowledge of IT skills and the Dark web, using the different SNSs, Apps and games used by minors. Law enforcement agencies need broader resources to confront and counteract these new criminological trends, for criminals hide behind fake identities, facilitating an easy and friendly access to potential victims.

The potential victims present symptoms associated to an over exposure to the Internet with a dysfunctional use of social media and online games, hiding low social competence, covered with deficits in emotional regulation skills. They would experience emotional distress, family problems, suicidal thoughts, feelings of loneliness, or self-harming behaviors. In general, social media platforms, dating apps, online games, and chatrooms are monitored by criminals to detect vulnerable victims, not only for OCSEA but also for human trafficking. It is also important to understand and confront the dangers and risks of a constant exposure to the digital technology at the cognitive, social, and emotional spheres. Although there is evidence that parents are taking new responsibilities on the use children are doing of the digital tools, this research proves the need for understanding the actual criminal use of these tools, as means of prevention and protection. Hence the family plays a key role at the prevention and intervention levels, on risk awareness, protection measures, and the development of resilience.

Some of the advanced technology providers are related to the access we get to information. For the case of this research, online published materials were used, leaving a question on how improved the results would be, having actual access to all the cases filed in all law enforcement agencies (police departments). This rests upon legal cultures, but also digital ones. The first one relies upon jurisprudence related to data protection, confidentiality of the reports, and rights of the offenders which are different across countries. The second implies, as this research proved, insufficient funds and training that would improve online presence of the law enforcement agencies and their work.

Related to the methodology and the analysis, the tools were also made available public, and offered free of costs. The accuracy, consistency and time devoted to the gathering and analysis of data would also be improved with better (paid) versions, or more advanced software. Questions remain on the lack of concrete legislative action and governmental efforts to regulate the use of Apps and SNSs to minors. Some exceptions reveal few apps banned in countries such as India, China, and the USA, but a more global criterion could be established to determine effective intervention measures. These are urgent and required under the International Convention on the Rights of the Child. Meanwhile, victims arise.

As longitudinal research, HUMANIZATECH is meant to continue and improve. Questionnaires are being designed to provide comparative data directly from adolescent and adult users (parents and teachers). The follow-up will also provide a list of SNS and Apps that are safe to use, monitoring at the same time the ones that are under police radar for a criminal use against minors. Parallel socio-legal analysis could result on proposals to find a common international legal framework to improve inter-departmental cooperation and sharing of data.

Multi-disciplinary research is welcome since this research proves a convergence of criminal, legal, behavioral, and educational issues to understand the scope of the new trends to online crime, and how SNSs and Apps are used against children and adolescents. This would improve the strategies, not only for intervention, but also for prevention.

Acknowledgements

As a final remark, I would like to state that going through all the detailed information about victim's experiences, was sometimes very hard. In the front line against criminals there are agents, humans, people with families, who must get exposed to very disturbing images and videos (with victims as young as 3 and 6 years old) to do their job, with personal and emotional costs. I am therefore thanking and showing my deepest respect for the agents working on this field, and I hope this research contributes to raise awareness on the means and resources they need and deserve to improve the defense and protection against these crimes.

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Appendix A - Facebook accounts (121)

INTERNATIONAL	@Interpol
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EUROPEAN	@Europol
SPAIN	@GrupoDelitosTelematicos ; @PoliciaNacional
FRANCE	@PoliceNationale ; @prefecturedepolice ; @PoleJudiciairedelagendarmerienationale
ITALY	@commissariatodips
AUSTRIA	@Bundeskriminalamt
GERMANY	@bundeskriminalamt.bka ; @polizei_NRW_HA
NORWAY	@norway.police
ROMANIA	@www.politiaromana.ro
NETHERLANDS	@Politie
CANADA	@CanadianCentreForChildProtection ; @policiesureteduquebec ; @rcmpgrc ; @LethBridgePoliceService ; @edmontonpolicesservice ; @TorontoPolice
USA	@DOJ @OKCPD @MCSOaz @CBPgov @Precinct4 @CMPDnews @MiamiDadeCounty @CoralSpringsPolice @OHFCSO @wwwICEgov @PolkCountySheriff @MiramarPD @FortBendCountySheriffsOffice @LoudounSheriff @DaviePolice @HCSOTexas @SantaAnaPD @SarasotaCountySheriff @OceansidePD @VenturaCountySheriff @bossiersheriff @PimaSheriff @MontgomerySheriff @Houstonpolice @ClovisPoliceDepartmentCalifornia @SiliconValleyCrimeStoppers @TallyPD @PascoSheriff @WashingtonCountySheriffsOfficeMaryland @WillistonNDPD @rochesterpolicedept @BoisePoliceDepartment @Precinct1Constable @CityofSanMateoPolice @PAStatePolice @MariposacountySheriff @FBI @Georgia.Bureau.of.Investigation @NewJerseyStatePolice @ImpCoSheriff @NDICAC @LenexaPolice @YCSOSC @IRS @FairfaxCountyPD @CollierSheriff @princetonpolice @sandiegopolicedepartment @HanahanPolice @BlairstownPolice @NashCountySO @SpokanePD @PottCoSheriff @EugenePolice @MorganSheriff @lapdhq @TAMUPolice @StPetePD @Lakewoodpoliceenj @DavisSheriffut @WVCPolice @PinellasSheriff @flaglercounty.sheriffsOffice @LoganPoliceDept @PortStLuciePolice @RiversideCountySheriff @LosAngelesCountySheriffsDepartment @newjerseyicactaskforce @scherervillepolice @ecso.alabama
AUSTRALIA	@AusFedPolice ; @nswpoliceforce ; @QueenslandPolice
BRASIL	@policiafederal
HONGKONG	@HongKongPoliceForce
SINGAPORE	@SingaporePoliceforce
CAMBODIA	@cambodiapolice
MALAYSIA	@SuruhanjayaKomunikasiMultimediaMalaysia
PLILLIPINES	@pnp.pio
KOREA	@polinlove1
UK	@NCA @NorthantsPolice @metpoliceuk @Humberbeat @clickceop @avonandsomersetpolice @PoliceServiceNI @StaffordshirePolice @Westmidlandspolice @northumbriapolice @dorsetpolice @wiltshirepolice @Gloucestershire.constabulary @NSPCC @DevonAndCornwallPolice @swpolice @IvybridgePolice @GtrManchesterPolice @SWPCardiff @policescotland

Appendix B - Twitter accounts (133)

INTERNATIONAL	@INTERPOL_HQ ; @INTERPOL_Cyber
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EUROPEAN	@Europol
SPAIN	@GDTGuardiaCivil ; @SpanishPolice ; @policia
FRANCE	@PoliceNationale ; @Gendarmerie
ITALY	@_Carabinieri_ ; @poliziadistato
AUSTRIA	@BMI_OE
GERMANY	@polizei_nrw_ha ; @bka
NORWAY	@politietoslo ; @NorwayPolice1
NETHERLANDS	@Politie ; @DutchPolice
CANADA	@sureteduquebec ; @riprsl ; @lethpolice ; @rcmpgrcpolice ; @CdnChildProtect ; @edmontonpolice ; @ALERT_AB ; @TorontoPolice
USA	@FBI @ICEgov @TheJusticeDept @USAO_DC @CMPD @MiamiDadeCounty @OKCPD @CoralSpringsPD @PolkCoSheriff @MiramarPD @SheriffTNehts @PlantationPD @LoudounSheriff @DaviePolice @prefpolice @CBP @IRSnews @SarasotaSheriff @VENTURASHERIFF @NJSP @bossiersheriff @PimaSheriff @mcsoaz @ClovisPolice_CA @OHFCSO @washcomdsheiff @TallyPD @OlmstedSheriff @houstonpolice @Pct1Constable @BoisePD @OfficialECSCO @HarrisCountyDAO @HCSOTexas @RSO @SanMateoPD @MariposaSheriff @GBI_GA @PAStatePolice @PSLPolice @SVCrimeStoppers @UCSO @EugenePolice @SantaAnaPD @HPDNC @HanahanPolice @LenexaPolice @SpokanePD @PascoSheriff @Pct4Constable @FBIPortland @SonoraPolice @FlaglerSheriff @PrincetonPolice @BigBearSheriff @LAPDHQ @CollierSheriff @SanDiegoPD @StPetePD @WVCPD @NashCountySO @SycamorePolice @OlyPD @morgan_sheriff @TAMUPolice @YCSO_SC @PottCoSheriff @OceansidePD @Lakewood_PD @DavisSheriffUT @Logancitypolice @SheriffPinellas @FairfaxCountyPD @ImpCoSheriff @SchervervillePD @Columbus_NE_PD
AUSTRALIA	@nswpolice ; @AusFedPolice ; @QldPolice
BRASIL	@policiafederal
HONGKONG	@hkpoliceforce
SINGAPORE	@SingaporePolice
CAMBODIA	@GCNPNEWS
MALAYSIA	@SKMM_MCMC
PHILIPINES	@pnppio
KOREA	@polinlove
UK	@policescotland @NCA_UK @NSPCC @NorthantsPolice @ASPolice @SWPCardiff @dorsetpolice @metpoliceuk @CEOPUK @StaffsPolice @WMPolice @MPSWForest @northumbriapol @wiltshirepolice @Glos_Police @DC_Police @CyberSecInt @IvybridgePolice @swpolice @gmpolice @PoliceServiceNI @Humberbeat
INDIA	@azamgarhpolice