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**Are UK law enforcement agencies sufficiently equipped to detect, investigate and prevent crimes of online child sexual exploitation within a cyber-enabled landscape, or do additional measures need to be taken?**

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# Abstract

Child sexual exploitation is a crime that law enforcement agencies have faced for a significant amount of time, however, since the rise of modern technology and social media this issue has seemingly become increasingly challenging to identify, investigate and prevent. This study sets out to explore the efficiency and effectiveness of law enforcement agencies’ ability to detect, investigate and prevent such crimes by assessing the strengths and weaknesses of the investigation processes within a cyber-enabled landscape. This research has been conducted to assess the threat to vulnerable children who operate online by exploring the efficiency of those who set out to combat such crimes. Existing literature has been evaluated and critiqued throughout this research and identified common themes of the history of child sexual exploitation and developments over time, the global investigative landscape and the current digital landscape. This study also highlights difficulties and barriers that commonly occur during the detection process of investigations, offering suggestions as to how they may be mitigated. Through an exploratory and qualitative approach, this paper solicits perspectives and opinions through semi-structured interviews with professionals who work within the field. The results indicated a number of issues and challenges, including technical challenges such as modern-style encryption, virtual private networks and Cloud data, and general challenges such as a lack of resources, manpower and inundated backlogs. It is concluded that the answer to the research question remains complex and cannot be definitively answered, however, shortcomings of LEAs efficiency to detect, investigate and prevent crimes of online child sexual exploitation within a cyber-enabled landscape were identified. Despite efforts to tackle this issue, there remain gaps in the efficiency of law enforcement agencies. The findings of this study also underpinned strengths that should continue to be upheld including working relationships with international agencies and bodies as well as high-quality tools and software packages.

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# Introduction

This research project is being conducted to ascertain whether law enforcement agencies are sufficiently equipped to investigate and prevent online child sexual exploitation within the ever-growing digital realm that may be allowing child predators to work expeditiously (Marcum, 2007). The term child sexual exploitation (CSE) refers to the sexual abuse of a child or young person under the age of 18, this abuse occurs when a person or collective takes advantage of a child to manipulate or deceive them into sexual activity (Banardo's, 2024). Child sexual abuse is a serious crime and will usually consist of exploitation such as grooming, trafficking and sexual assault (NSPCC, 2023). As well as perpetrators using methods of coercive control to exploit children, Meza et al. (2023) concluded that many will also exchange goods such as drugs, money and basic necessities to vulnerable children for sexual acts, this is supported by McCoy and Keen (2013) who conjectured that abused and exploited children often evolve from low-class backgrounds and unstable homes. In recent years CSE has been seen as a prominent issue that law enforcement has faced, with high-profile organised CSE in Rochdale, Derby and Oxford that have been subject to significant media attention (Hallett, 2016). However, since the revolutionisation of technology, online CSE has become a prominent issue throughout the globe (Steel et al., 2020).

Such technology has allowed potential offenders to increase their statistics of victims, as well as provide the opportunity for perpetrators to operate anonymously and enable the conveyance of sexual material of minors (UNODC, 2015). Online CSE is defined as offenders using technology and the internet to sexually abuse children or facilitate offline abuse, offences include grooming, usually carried out through social media, inciting children to perform sexual acts or the viewing of child sexual abuse material (CSAM) (UK Government, 2021). CSAM alludes to any representation of sexual conduct involving a minor whether this be through images, videos, live streaming or through the means of artificial intelligence (AI) (National Centre for Missing and Exploited Children, 2024; Drejer et al., 2023). Through means of the internet and social media, children are also at risk of being groomed leading to abuse in an in-person scenario (Tintori et al., 2023). Online grooming is a criminal offence which refers to an adult befriending a child with the intention to exploit them and often obtain sexual material, usually carried out through social media and video games (Machimbarrena et al., 2018; Childnet, 2024; Childline, 2019). The rise of the internet and sophisticated technology has seemingly opened doors for criminals to commit more offences such as grooming, stalking and online child exploitation (Batts et al., 2012). CSE has evolved exponentially through modern technology, which may be creating onerous challenges for investigators (Powell et al., 2014; Sunde & Sunde, 2021). This point is supported by O’Leary & D’Ovidio (2007) who state that the expeditious growth of the internet may be allowing for the easy access of child sexual abuse material (CSAM) by offenders. Since the mid-1990s law enforcement has been said to face many obstacles surrounding technological advancements and their threat to children via online crimes (Ilbiz & Kaunert, 2023), with 2,577 arrests being made over a year-long period in 2000 and 2001 for cybersex crimes of minors (Wolak et al., 2003). However, this figure is conspicuously lower than what the UK has seen in the last year, with the NSPCC (2023) reporting that almost 34,000 online child grooming cases have been reported since 2017, with an 82% increase since 2017 on sexual communication with a child offences. In addition to this, Insoll et al., (2022) conducted a study with 1546 individuals who were actively searching for CSAM material on the dark web and found that 42% of participants had sought direct contact with children online after viewing CSAM and that 58% were afraid their viewing of CSAM would lead them in attempting to contact children. Bullock (2019) discusses the legal and social implications of online CSE and stated that 80,000 people are estimated to be a threat to children, however, this figure is presumed to be an underestimate due to the number of young people who do not report such abuse. This research aims to explore the various challenges and barriers that law enforcement agencies (LEAs) may face when investigating and identifying crimes of online CSE focusing on the global and technical difficulties as well as the use of social media. According to Muir (2017), cybercrime is not something that the police can simply arrest their way out of, so other methods of conformance must be considered. This study will consider various factors that contribute to the efficiency of online CSE investigations including areas such as the current digital landscape of investigations, the history and developments of CSE and the globalisation of online CSE, considering the existing literature around the topic alongside results found within this study. The rationale for conducting this research project lies in the increasing need to assess the threat to vulnerable children online by exploring the efficiency of those who investigate and combat such crimes. Despite attempts by LEAs to stay abreast of this issue, there remains a gap in the existing literature directly related to exploring the efficiency of investigations and prevention of online CSE (Brennan et al., 2019).

## Aims and Objectives

Aim:

To explore the strengths and weaknesses of law enforcement agencies' capability to detect, investigate and prevent online child sexual exploitation within the current landscape considering additional measures that could be taken to improve their efficiency.

Objectives:

* Explore the current digital landscape of online CSE considering the efficiency of investigative methods and identifying techniques
* Explore the history of CSE that impacts the foundations of such investigations
* Explore online CSE on a global scale considering cultures and different laws and examining how this affects UK investigations
* Explore the use of social media and the rapid progression of technology and how this impacts online CSE

# Literature review

The purpose of this section is to assess and critique the existing literature surrounding the current scope of online CSE, exploring how effective law enforcement agencies are at detecting and combatting online CSE, focusing on the history of the topic and how it affects the current state of investigations and exploring the variety of methods, tools and intelligence used to investigate online CSE.

Child sexual abuse and exploitation have seemingly always been perpetuating issues that LEAs have faced long before the emersion of the internet (Broughton, 2009). This is validated by Ferarro and Casey (2004) who describe the history of CSE reaffirming the idea that it existed long before the internet and that before it, perpetrators would usually seek exposure to children through means such as employment and volunteering. The reckoning behind the motivations of those with a sexual interest in children is a subject of debate, with some studies concluding that perpetrators may suffer from impulsive behaviour and a deficit in self-control (Rosburg et al., 2018). Whereas other research considers that the issue stems from an offender possessing anti-social characteristics and sexual domain issues (Babchishin et al., 2018). In order for LEAs to begin to investigate and prevent such crimes from occurring it is first important to consider the drivers and motivators behind the offences. Keown et al. (2008) found that some child sexual offenders (CSOs) express abnormal cognitive distortions as a result of their offence-supportive beliefs, this study was conducted using CSO’s and instructed participants to complete word stems which would indicate whether their chosen letter string was offence supportive or not. It is important to note that the original hypothesis of this study was unsupported by the data however, there remained some evidence of offence-supportive behaviour. In addition to this, criminal profiling may be utilised in attempting to understand the underpinning of child abuser motives, as it is a process in which the essence of the crime is applied to create assumptions about the characteristics and behaviours of such offenders (Turvey, 2023). When assessing offender profiles of paedophiles and those who engage in paedophilia, research suggests that most are male and often shy and passive (Murray, 2000). Adverse experiences through an individuals’ childhood is also a common speculation when examining CSOs motivations, with Ricci and Clayton (2016) theorising that such experiences may interfere with positive outcomes when treatment is sought. This point is supported by Becerra-García et al. (2013) who also presumes a relationship between sexual offenders and their childhood experiences, yet this study failed to focus on CSOs specifically. Child exploitation has always seemingly been a difficult issue to tackle before the implementation of technology, Beckett and Pearce (2017) explore a potential rationale for the difficulties around the prevention of sexual violence drawing on *‘the culture of silence’* around taboo topics such as this, the researchers also decipher that younger victims may lack the intellectual and emotional capability to comprehend their abuse, as well as the implications of victim blaming. The UK Government (2019) describes an appropriate prevention strategy as a collaborative and multi-agency approach to the issue, alongside learning from the past and national issues while however, having a detailed knowledge of the local ongoing issues. Davies (2016) reports that successful multiagency collaboration embedded a victim-centred approach by developing relationships with vulnerable young people as well as using a bronze, silver and gold risk assessment system to establish who Is most susceptible to exploitation and abuse. Davies centres their report around Operation Erle and ongoing exploitation in Peterborough between 2010 and 2016, however, they highlight that the points raised may apply to the wider population of children at risk of exploitation. Multi-agency collaboration can involve a series of agencies working together to share information as well as support each other to arrive at suitable resolutions for complex and sensitive cases (NSPCC, 2023; Salmon, 2004). This point is endorsed by Baginsky and Driscoll (2022) who focus on the responsibility of schools within a multi-agency setting, drawing on the fact that staff are responsible for reporting anything that presents as a safeguarding issue and being diligent in looking for signs that a child is being abused or exploited. In the UK, early legislation attempted to tackle such issues, making it an offence for anyone to take, distribute or possess indecent images of children such as the Protection of Children Act (1989) which was further amended in 2004 following the case of Victoria Climbie, which sparked the necessity for a widening focus on the safeguards of children, promoting prevention tactics through multi-agency approaches (Pithouse, 2011). However, research by the Professional Development Group (2021) argued that minors are at risk of online exploitation as a result of outdated legislation.

When examining the implications of CSE it is important to consider the topic in a global context, according to Kendall and Funk (2012) international boundaries and communications between nations can cause difficulty when investigating crimes of CSE, as a result of cultural and international differences of what is considered a ‘child.’ For example, the country of Yemen set the age of maturity as fifteen or at the attainment of puberty resulting in children being defined as reaching the age of maturity as young as nine or ten (Human Rights Watch, 2011). According to Nair (2019), CSE is a prevalent issue in India, where in 2015 it was found that 90% of its children were at risk of sexual abuse, corroborated by Tameshnie (2022) who reaffirms the abuse faced by young people in India and poses the theory that this might be a result of practices within the ancient Hindu culture, despite such cultures being made illegal it is said that they still prevail throughout India. Shafe and Hutchinson (2014) explore the perspective that victims and perpetrators may not perceive certain behaviours associated with CSE as problematic as they may be considered normal within certain cultures. McAlpine et al., (2016) also highlight the risk of child exploitation and trafficking in countries that are facing conflict and humanitarian crises, this article acknowledges the lack of research on the trafficking of individuals affected by wars, but their findings reinstate the idea that sexual abuse is a rife issue in such countries. The United Nations (2023) demonstrate the obligations of governments to protect individuals’ human rights and protect them from harm and torture. This legislation goes hand in hand with The United Nations Convention on the Rights of the Child, which protects children's rights through international law, making governments duty-bound to allow children to reach their full potential and meet their basic needs (Unicef, 1990). This legislation acts as the Magna Cartafor the rights and protection of children and was the original bonding of international law (Netkova, 2021). However, Cooray et al. (2023) discuss the differentiation between countries’ attitudes and policies when it comes to online CSE and the potential difficulties law enforcement face when attempting to liaise with other countries to attempt to prosecute perpetrators. Studies have been conducted to evaluate global perspectives of child abuse and concluded that some countries may struggle to implement child protection protocols due to a lack of funding and suggest that children who are susceptible to financial hardship may experience neglect and abuse (International Society for Prevention of Child Abuse and Neglect, 2008). This data is derived from 73 different countries between 2015 and 2016 for the twelfth edition of World Perspectives, which acts as an aid to track progress in the field of child protection and identify areas that need improving (Dubowitz, 2017). A previous study by Khaleque (2015) carried out across five continents, found correlations between parental neglect and negative personality dispositions which can affect self-esteem and emotional intelligence, Kobulsky et al. (2020) further this study and found that slow movements of policies and legislation in some countries may obstruct prevention of child exploitation and maltreatment. Many countries participate in the International Criminal Court who investigate and have the power to try individuals charged with war crimes, genocide, and crimes against humanity (International Criminal Court, 2023). A potential perspective when considering the literature discussed is if a similar system should be utilised aiming to target online crimes against the most vulnerable. Cade (2012) discusses the impact that an international cyber court could have highlighting areas such as tackling cybercrime at an international level, extending jurisdictions and sharing of cybercrime codes. Europol is also an international agency that works with its member states to mitigate significant threats (Europol, 2022a). In terms of CSE, Europol has designated pages on its website seeking to identify potential victims by listing items associated with them in the hopes someone from the public may recognise them (Europol, 2022b). However, Ilbiz and Kaunert, (2023) address the public’s hesitation to report illegal content which can therefore create crowdsourcing issues. As well as this, LEAs may also benefit from working relationships with international bodies such as The National Crime Agency which aims to create a global response to tackle these issues (The National Crime Agency, 2024). According to Tolbaru (2024) the globalisation of child exploitation has ostensibly benefitted from the use of modern technology which has evidentially enlarged opportunities for offenders to lure children from all around the globe, intending to exploit them, such as through the use of social media. Pendergast (2023) claims that predators have easier access to target children through social media apps, with the ability to remain completely anonymous, this research paper discusses the impact of social media apps and games such as Roblox and TikTok and implies that children are susceptible to grooming and exploitation through the perpetrators offering money or in-game purchases. Due to repercussions of social media use consistent calls have been made to hold social media companies to account and make them duty-bound to share information regarding CSE to LEAs (Targetted News Services, 2023; NSPCC, 2021). Following on from this point, Fass, (2003) conducted a review on globalisation and children and discovered that the conflict of gender might be influential in the exploitation of children, noting that patriarchal institutions may influence the exploitation of girls and their standing in some societies, however, it is important to highlight that this research focused mainly on the industrial exploitation of children. In terms of sexual exploitation, research has demonstrated the impact of globalisation which has potentially resulted in the commercialisation of child abuse which is essentially allowing the bodies of children to be sold online for profit based on ethnicity, gender, and other protected characteristics (Leal & Lúcia, 2003; Rahpaymaelizehee et al., 2013). When discussing literature about the globalisation of CSE it is important to consider the police responses that occur in said countries, Wager et al. (2021) explore the police response in England and Wales and found that police tend to counter CSE using disruption methods such as; sexual harm prevention orders, non-molestation orders and emergency protection orders, as well as the use of intelligence markers and automatic number plate recognition (ANPR). The recently introduced Online Safety Act (2023) also makes technology companies obliged to promote online safety and tackle online illegal material. However, a report by HMICFRS (2023) raises concerns about the way that online CSE has been handled by forces in the UK finding that there are no mutually agreed minimum standards of practices across organisations as well as outdated guidance and a lack of collaboration with multi-agencies. These findings could be compared to reports of police response in Sweden, which found that Sweden has fully met the minimum standards to eliminate trafficking, which is heavily facilitated by the gender equality agency (US Department of State, 2021) this observation underscores the importance of acknowledging the UK’s shortcoming as opposed to other countries when examining its efficiency.

There are a variety of tools and techniques that law enforcement utilise to prevent and detect crimes of online CSE. By virtue of the current digital landscape, child sexual offenders can connect more easily than ever before, often exploiting the web to share images of CSAM with each other (O’Leary & D’Ovidio, 2007). Buford and Lua (2009) conducted a study on Gnutella, which was the first peer-to-peer file-sharing system of its kind, the researchers measured internet traffic over a year-long period focusing on already-known images of CSAM and acquiring the perpetrator's IP addresses. The study found that 244,920 US users had 120,418 mutual images, however, this figure is presumed to be an underestimate as the study was unable to identify potential CSAM images that were unknown to police (Wolak et al., 2014). PhotoDNA is a tool that may be deployed to attempt to uncover repeated illegal images of child sexual abuse, originally created by Microsoft, PhotoDNA creates a hash value of an illegal image so that when said image is crossmatched to a database it will match the previously identified image (Microsoft, 2023). Although PhotoDNA carries its limitations, in that its hashes cannot detect new and unspecified CSAM material (Steinebach, 2023), the robust software has been noted to have removed over ten million images of CSAM in 2016 (Farid, 2018). Investigators and other bodies also administer web crawlers, which are bots that circulate websites and browsers to collect data based on what information it has been set up to look for, this can be useful when attempting to define characteristics of websites that possess CSAM (Lee et al., 2020). Web crawlers work contrastingly to PhotoDNA in that they can discover CSE that is not yet known to law enforcement. Westlake et al. (2015) found that web crawlers carry a good amount of success providing that the correct search boundaries are applied to them it was however, noted that keywords applied to searches may provide uncertainty due to the rapid progression of the internet. Reflecting on the research discussed, it is compelling to consider how traditional policing methods may be applied to the realm of online crime, for example, police will often utilise the national intelligence model framework to make informed intelligence decisions and develop the intelligence available (National Centre for Policing Excellence, 2023). The police will also utilise covert methods to aid online investigations, covert internet investigators will use a variety of tools and techniques to gather data, often enlisting open-source intelligence (OSNIT) (National Police Chiefs' Council, 2020). Mitchell et al. (2010) performed research on undercover online investigations that spanned between 2000 and 2006 and discussed the implications of officers posing as minors to lure potential offenders. Mitchell et al. found that in 2006 an estimated 3137 arrests were made using this technique, however, limitations are acknowledged in this study such as potential bias from interviewees and limited data regarding cases that did not result in arrests. Holt et al. (2020) addressed challenges that are faced by LEAs when policing online CSE, drawing on shortages of resources and staff as well as ethical considerations and anonymisation. Holt et al. also examined the implications of the volume of data that devices can hold, creating laborious workloads for investigators, despite the researcher accepting limitations due to the limited scope of the study, this article still offers substantial recommendations on how to combat technical challenges faced by LEAs such as an increase in training to maintain competency. Following this point, Bond and Dogaru (2018) found that many professionals within the field of online CSE did not feel adequately equipped to work with vulnerable children who had been abused online and that those working in multi-agency settings were not able to recognise the signs that a child was being abused online, as opposed to in a real-life scenario. This point is supported by a report carried out by HMICFS (2022) that concluded that police forces were lacking in their ability to keep pace with modern technology and advancements within digital forensics. Cohen-Almagor (2013) elaborated on the challenges faced by LEAs, discussing barriers such as encryption and the dark web, many CSAM viewers use an internet browsing server named TOR, which allows access to the dark web, TOR browsers use cryptography as a way to protect the users’ identity and skew their location (Williams, 2023). An additional hurdle that LEAs allegedly face is the exponential rise of artificial intelligence (AI), since the development of this, the internet has seen AI-generated images depicting minors often performing sexual acts, this causes significant concerns and challenges as it may hinder victim identification processes (Harwell, 2023). Despite the ambiguity regarding AI and the threat that it poses to law enforcement, investigators are also able to use the technology to their advantage. For example, Sunde and Sunde (2021) conducted research where an AI-based police bot was conceptualised to observe chatroom conversations and identify any inappropriate behaviour, it was subsequently recommended as a prevention method by the researcher. This point is substantiated by Urbas (2021) who reviews the benefits of LEAs implementing AI, concluding that it benefits investigators in terms of decreasing their workload and condensing data to aid methods such as facial recognition and DNA analysis. While it is essential to apprehend individuals who commit online crimes against minors, striking a balance that considers privacy concerns can appear difficult, Troiano (2008) discusses this topic noting that there is a lack of guidance regarding these matters.

# Methodology

## Design

This research has sustained an exploratory and inductive approach using primary, qualitative research methods for data collection. Largan and Morris (2019) justify that qualitative research allows for the collection of quality data and credibility. In addition to this, Inductive research allowed the researcher to identify themes and observations that derive from the data collected without a preconceived hypothesis, which allowed a high-quality balanced argument to be derived (Woo et al., 2017; Jebb et al., 2017) The data within this research has been accumulated through semi-structured interviews with policing or third-sector staff who had experience in the detection and investigations of online child sexual exploitation. Exploratory research works proficiently with small-scale studies as it allows scope and parameters to be identified (Walliman, 2010). Stebbins (2001) proposed that exploratory research enables ideas and conclusions to be drawn from the data collected. Semi-structured interviews were conducted to allow codes and key themes to be derived from the data with the aim of a comprehensive understanding of the research area (Bickman and Rog, 2009). Semi-structured interviews were specifically chosen to allow the researcher to ask additional questions if the participant raised significant points that required further development (Kallio et al., 2016). As well as allowing thoughts and perspectives to be gathered beyond the existing structured questions (Ahlin, 2019). This method complements the research question well, demonstrating its utility in gathering thoughts and perspectives on online CSE and the processes that aid the detection and combatting of such crimes, due to the flexible nature of semi-structured interviews (Diefenbach, 2008; Mannan, 2020).

## Sample

The sample size for this research was six participants, according to Guest et al. (2006) between six and twelve interviews are reasonable when conducting a study to gather thoughts and perceptions. However, this point has been disputed by other researchers suggesting that qualitative research requires a minimum of twelve participants to reach data saturation (Vasileiou et al., 2018). Participants were selected using non-probability and purposeful sampling which was based on their experience of dealing with crimes of online CSE, and also their availability to participate during the given timeframe (Dudovskiy, 2022). Participants’ professional backgrounds were carefully considered before being invited to take part in the study and exchanges were made beforehand to ensure their suitability. Their willingness to participate fully was also considered to ensure that their responses would be articulate and expressive (Palinkas et al., 2015). Five out of six of the participants were employed in similar digital forensic roles within the police or private sector, which may have increased the risk of bias (Taherdoost, 2016). It was also ensured that participants’ experience of working with online CSE was based in the UK. The majority of participants were recruited through LinkedIn, however, one participant was derived through the use of snowball sampling, which was deemed appropriate as a current participant liaised with another who was interested in taking part in the project (Oregon State University, 2017).

|  |  |  |  |
| --- | --- | --- | --- |
| Participant Code | Location | Role | Years of experience |
| P1 | Staffordshire | Digital forensic analyst | 3 years |
| P2 | London | Charity data analyst | 2 years |
| P3 | Staffordshire | Digital forensic coordinator | 18 years |
| P4 | Manchester | Digital forensic team leader | 14 years |
| P5 | Staffordshire | Digital forensic technician | 1 year |
| P6 | Staffordshire | Digital forensic specialist | 5 years |

Figure 1: Table of participants’ locations, roles, and years of experience.

## Procedure

Participants were identified via LinkedIn and sent an email inviting them to participate in the study. Upon confirmation, the participants were presented with a participant information sheet, as seen in Appendix B, which they were encouraged to read and ask any related questions, alongside this the participants were also presented with a consent form, as seen in Appendix C, that they were required to sign and date before the interview took place. The researcher devised a list of base questions to facilitate the semi-structured interview process, as seen in Appendix D, these questions were formulated upon evaluation of the existing literature and post-development of the aims and objectives for this research project. The development of a semi-structured interview guide was paramount in ensuring the focus during conversations and ensured that if the discussion diverted course, it could be redirected to the topic (Adeoye‐Olatunde & Olenik, 2021). All semi-structured interviews were conducted through a video link on Microsoft Teams. The interviews were recorded on a mobile phone and subsequently transcribed fully and manually to facilitate the coding process (Flick et al., 2004).

## Materials and equipment

When participants were interviewed, a mobile phone was used to record the interviews to enable the transcription process. An interview guide was written up with a series of base questions, but improvisation was used for follow-up questions (Kallio et al., 2016). After transcription, the NVivo software was used to facilitate the coding process and group codes together.

## Treatment of data/analysis

After the semi-structured interviews were concluded, transcripts from each interview were typed out manually to allow analysis to be conducted. Any correspondence that may identify the participants was redacted from the data. After transcription, the data was analysed thematically. Thematic analysis was specifically chosen for this research due to its flexible and exploratory nature; this type of research is fundamental in identifying patterns and themes throughout several responses (Castleberry and Nolen, 2018; Braun and Clarke, 2006; Guest et al., 2011). The NVivo software was used to facilitate the thematic analysis process on the raw data. NVivo allows the structure to be maintained through the analysis phase, by allowing the researcher to create nodes that can be later grouped to create themes and subthemes, this can ease the process as opposed to manual analysis (Zamawe, 2015). Once themes and codes had been identified throughout the data, these were grouped into larger themes and subsequently split into sub-themes, secondary themes, and tertiary themes.

## Ethics

Ethical approval was sought from the university sub-committee and subsequently approved before any research was carried out, as seen in Appendix A. Ethical research principles were maintained throughout the course of this study. Upholding ethics throughout any type of research is essential to minimise risk and harm to participants and uphold the reputation of the researcher and their organisation (Artal & Rubenfeld, 2017; Farrimond, 2012). Interviewees were presented with a participant information sheet and given the chance to read through it and ask any questions, all participants also signed a consent form before the interviews took place. Once the interview finished, the audio recording was transcribed, and participants' names were replaced with codes. Sensitive or identifying information from the interviews that was deemed not suitable for dissemination, was omitted from the transcripts with the phrase ‘redacted’. All data collected, as part of the study, will be kept securely in electronic form on Staffordshire University's secure and encrypted OneDrive system for 10 years and will then be destroyed. The nature of this research made it vital to ensure that all processes were carried out to avoid any discomfort and uphold ethics (UCL, 2019).

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# Results

Through analysis of the interviews with six selected participants, three main themes were selected for further evaluation which were; foundations of investigations, global investigative landscape and digital landscape. After examination of the broader themes, sub-themes were also identified to allow the researcher to recognise which topic areas contribute to answering the research question, which can be seen in Figure 2.

A diagram of a company

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Figure 2: Thematic hierarchy of overall themes.

## Theme one: Foundations of Investigations

This theme identified the fundamental components that must be considered by LEAs when conducting investigations into online CSE including relevant legislation and policy that must be adhered to when investigating such crimes, as well as the essential training and skills that are required by those who engage with material, and also the history of online CSE that has resulting in the developments of not only criminality but how such crimes are detected and investigated.

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Figure 3: Thematic hierarchy of theme one

Sub-theme one: History of CSE and developments

Participants discussed developments within the criminality of CSE including the progression of technology and the implications of this on LEAs.

“*Over the last 14 years, the National Crime Agency has built a relationship with tech companies and everyone else, you can imagine Facebook, Snapchat, all those, and the intelligence now coming in is huge. It's probably 20 to 30 percent increase every year in the number of referrals that come to police.”* (P4).

*“The biggest challenge is probably how everything's changed, how people use tech, you know if you go previously it just used to be peer-to-peer file sharing or some websites, whereas now it's the social media.”* (P4).

*“I don't even think we have a way to go about VR-related things yet. That is coming up. At least I've not come across that yet.”* (P5).

One participant elaborated that crimes of exploitation and grooming that happen online may not be taken as seriously as those that happen on the streets or in real-life scenarios.

*“I think there's a misconception that if it's online, it's not as bad as if it's on the street…And we have teams that look at modern-day slavery, we have teams that look at child sexual exploitation on streets. When it's online, we don't seem to have the same from a law enforcement or an education or even like your multi-agency. It doesn't seem to have the same response.”* (P3).

As a result of the rapid progression and growth of technology thus resulting in more crimes of online CSE, some participants raised concerns around issues of capacity.

*“Capacity needs building really…if you've got a limited amount of resources in a police force and you want to build the capacity in one area, you've got to drop the capacity in the other area or you've got to get more money.”* (P4).

*“The crime rate is going up so quickly. So they're finding new ways of catching it that we struggle, like everywhere struggling. The police are so backlogged that they're having to outsource it to forensic companies, but then they're putting so much on these forensic companies that even they're getting backlogged as well.”* (P5).

Sub-theme two: Legislation and Policy

Throughout any investigations LEAS must follow law and legislation, maintaining professional standards and integrity. However, some participants highlighted issues regarding outdated legislation, where they have to adapt to and interpret older legislation to present time and current technology.

*“You’re looking at legislation is outdated. So, you know, this is where we're trying to bash it back up to Parliament. So going, you know, you've got some of these fantastic tools that are coming out but have been used in the wrong way. Then legislation needs to adapt to include that so we can police it.”* (P3).

*“I know the Home Office are looking at either whether they amend existing legislation, provide better guidance on existing legislation, or have to create new legislation, but definitely, because a lot of the time, police forces are having to try and interpret legislation from the 80s, to try and then deal with a problem of today.”* (P4).

Additionally, another participant discussed the potential limitations of legislation that appears tightly constrained.

*“Within a lot of the laws, it's like you can't change the data on things, and they don't want things done in a specific way. If it was, example, an Xbox, they'll ask us, can you get images? But a lot of the newer Xbox consoles, they don't work without the internet. Okay. So without the internet connection, we can't actually get anything from an Xbox.”* (P5).

However, participants discussed the vitality of acting proportionally and considered what is necessary and relevant when investigating online CSE.

*“It’s more strict with like victims but for suspects it’s like we’re looking for this, this and this within this timeframe and that’s like from a proportionality perspective it means that we’re not just going on a fishing expedition and that we’re only looking at what’s relevant.”* (P1).

*“We have to be justifiable, and it's got to all be proportionate and necessary of what data we're having.”* (P3).

Sub-theme three: Investigator Training and Skills

During the interviews, participants were asked to outline the training that they received before going into their current role, as well as what skills they believe an individual would require to go into such a role. Respondents’ answers varied however mentions were made referring to a need for digital forensic knowledge as well as competency and awareness of developments.

*“So it's all competency-based. So what you’d do is you’d do some practice cases, that- they’re not live devices, just like training ones.”* (P1).

*“So the training I went through was first aid training, safeguarding training, standard corporate organisation training- I think it’s called trauma-informed training.”* (P2).

*“The digital forensic skills, so go on the courses how to use the tools, how to find forensic artefacts, things like that.”* (P4)

*“You would need an understanding of- some sort of understanding of digital forensics, not like the specific techniques or even knowing the specific software, but understanding what it is and what you're going to expect to see.”* (P5)

## Theme two: Global Investigative Landscape

The second identified theme refers to the global landscape of online CSE and digital forensic investigation as a whole. Topics identified through this theme were collaboration, international boundaries and challenges and also the impact of social media on a global scale.

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Figure 4: Thematic hierarchy of theme two

Sub-theme one: Collaboration

Participants were asked about their opinions and experiences with collaborating with other LEAs and agencies on a global scale and acknowledged the work of agencies such as The National Crime Agency and The National Centre for Exploited and Missing Children.

*“I think it’s just lucky for us that charities like the Internet Watch Foundation are shutting stuff down so fast and like they’re really good for identifying people who are sharing this material online between each other.”* (P1)

*“A lot of intelligence comes through, I don't know if you've heard of NICMEC, National Centre for Missing and Exploited Children, so they're based in the States and they forward a lot of the intelligence to the National Crime Agency in the UK and they've got really good relationships with these companies.”* (P4).

*“It all comes from the NCA ultimately they're the ones that are doing the high level and you know Interpol, and all them sort of organizations they're the ones that are sharing that information as the point of contact for UK and you know overseas.”* (P6).

Sub-theme two: International Challenges

The interviewees deliberated about some of the international challenges that LEAs face when dealing with these offences and highlighted barriers such as engagement with other countries and cultural and law differences that may impact other countries’ willingness to cooperate.

“*We get a lot from the Philippines where there's child abuse and people pay to go onto live-streaming platforms.”* (P3).

*“Not every platform will engage with us. If they're in a Western kind of country, they will probably engage with us. But if you're looking at China, Russia, some of the South American countries, if that data is hosted there, they won't engage with us.”* (P3).

*“Then we start identifying accounts in other countries and it'll depend heavily then on what those countries are, where they are and what relationship law enforcement have got with them.”* (P4).

Another participant also highlighted the barrier of the UK not holding information on those who reside overseas.

*“Their information isn’t going to be as obvious, if at all, I mean why are we going to retain loads of information about people who don’t reside here.”* (P6).

Sub-theme three: Social Media

The topic of social media was also raised. Several participants raised apprehensions about the prevention of grooming and CSE on such platforms and the global connectivity that social media platforms have seemingly facilitated.

*“She was being groomed from the age of twelve of the earliest I was aware of so essentially meeting men through social media, Instagram specifically and then being groomed into sexual exploitation… unfortunately, there is a side to social media that literally facilitates it, so it acts as the medium between predators and vulnerable children who are susceptible to being exploited. Just because social media is just a pool of anyone and everyone, and it just makes it a lot easier for sexual predators of any kind to gain access to potential victims.”* (P2).

*“As children go through their developing years into teenage years, there's not much prevention… Facebook will say you've got to be 13 to go on there. But you know yourself, you can fake your age, can't you?”* (P3).

*“The amount of intelligence we get from that for younger and younger children, you know all the way down to the age of nine, you know sharing images on Snapchat, so social media plays a huge part and then depending who the social media company is, depend on how well they cooperate with law enforcement.”* (P4).

Participants were also asked if social media companies tend to cooperate with LEA, to which there was a mix of opinion.

*“With social media, we don't tend to actually even reach out to them because the likelihood is that they're going to say no.”* (P5).

*“They do like to help us, because they don’t want- I guess it’s their reputation as well as the police’s.”* (P6).

## Theme three: Digital Landscape

The final theme identified was the current digital landscape of online CSE investigations. Points were made regarding the various investigative techniques that LEAs use when detecting and investigating such crimes alongside technical challenges that may occur when doing so. The rise of artificial intelligence was also a subject raised and how this impacts criminality.



Figure 4: Thematic hierarchy of theme three

Sub-theme one: Artificial Intelligence

The participants discussed the utilisation of AI by LEAs and considered how the technology has aided investigators in their work by reducing workload through automatic grading of images and chat and imagery detection.

*“We use a tool called Semantics 21 that we use to grade the indecent images and that has an AI feature that auto categorises images for us, so as investigators were not having to trawl through all these horrendous images.”* (P1).

*“There's AI that they can use now to detect language and imagery.”* (P3).

*“You can run the AI over it first and it will filter those into images that are definitely not skin tone that you can get rid of straight away and it will have a go at identifying images of children.”* (P4).

However, it was also addressed that perpetrators can also utilise AI to enhance their criminality, which can create difficulties for investigators.

*“We've got sex offenders now who will use AI to create an artificial child abuse image… then they'll go in chat rooms as well with AI and have sex lives. They'll tell the AI to be an eight-year-old and start talking sexually.”* (P3)

*“Indecent images of children being generated through AI and we've also had cases of AI being used to generate sexualized images of children and females who exist in real life but then they're creating AI images of them… detecting the difference between an AI image and a generic image is going to be a challenge for us.”* (P4).

Sub-theme two: Investigative techniques

The interviewees were asked about the range of tools and techniques that are used in their line of work. Common answers included the use of hashing concerning the child abuse index database (CAID) and other tools that may be deployed to extract data and information.

*“So CAID, which is a child abuse database, we'll run across that using that technology, but it's keeping that updated.”* (P3).

*“We can use the tools like Semantics 21 to use the filters so we can look for GPS data and it's the metadata of the file, the photo or the video you're looking at, so you'll have your GPS, your EXIF data.”* (P6).

*“Our software can pull out most of the stuff without requiring a password if it's on the hard drive. So we can use like the cache and the deleted things and things are stored on there.”* (P5).

Sub-theme three: Technical Challenges

The participants discussed a range of technical challenges that they’re faced with during pursuing lines of enquiry. One prominent theme was encryption and how this can result in investigators not being able to access data from devices.

*“Encryption of trying to get data off devices, so whether that's just a pin on your phone or you can have apps which encrypt your data. Think of some of the proactive techniques we can use. If you've got end-to-end encryption, you can't see the data that's being passed.”* (P3).

*“They're implementing end-to-end encryption, so the NCA have been in the news complaining about that because it would take away some of our abilities to be able to check for images that are being shared.”* (P4).

Participants also elaborated on other challenges such as Cloud data and the capacity of such data.

*“Cloud data as well, just because a lot of the stuff that you see on your phone, it’s obviously not the full story, a lot of stuff is stored on the Cloud now, so it’s just getting access to that, the legalities of that as well.”* (P1).

*“Retention of data as well. Because by the time you've made a report and we've gone to investigate it, if it's cloud-based or even if it's locally based on your phone, because there's that much data now, people start wiping data.”* (P3).

*“Biggest thing I've been faced with was large data, the amounts of data people retain and it's like- I don't know where to put it, so much.”* (P6).

# Discussion

The purpose of this section is to assess the literature discussed throughout this project thus far in comparison to the results found from the individuals who participated in this study. The aims and objectives of this research project are intended to explore the digital, global, and investigative landscape of CSE accounting for factors such as social media, technology, globalisation and legislation. Throughout the literature, it became apparent that CSE has been a perpetuating issue that has placed a strain on LEAs for a long time, and since the development of enhanced technology that we see today, that strain has grown exponentially. Child sexual abuse has been an issue seen in all parts of the UK, high profile cases including Derby, Oxford and Rochdale (Hallett, 2016). In-person grooming and abuse were predominantly carried out by its perpetrators through the exchange of goods such as money, alcohol and often attention (Meza et al., 2023). However, the current digital landscape has paved the way for abusers to sexually exploit and groom children through the use of online platforms, digital images and live streams (Drejer et al., 2023). The research conducted in this study produced three main themes which were; foundations of investigations, global investigative landscape and digital landscape. Throughout these themes participants discussed the strengths and weaknesses associated with investigating and combatting online CSE, exploring developments in technology, difficulties gathering information from overseas and the use and abuse of factors such as social media and artificial intelligence.

The first theme evaluated surrounded the foundations of investigations. The participants discussed the implications of developments of criminality and investigative methods in the online CSE realm as well as the history of CSE that has resulted in the current landscape. Participant Four claimed that referrals from the National Crime Agency are increasing by twenty to thirty per cent each year. This statement highlights the importance of multi-agency collaboration through such investigations as well as learning from past investigations (Salmon, 2004). Operation Erle has received recognition as a model of good practice for the identification and investigation of online CSE, through the benefit of maintaining close relationships with external agencies, the operation maintained a victim-led approach where ten male defendants received a custodial sentence (Davies, 2016). However, Baginsky and Driscoll (2022) highlighted barriers that often occur when implementing multi-agency collaboration including poor supervision from schools and inadequate referrals. Participant Three also discussed the importance of maintaining a victim-led approach throughout investigations while also attempting to retrieve as much information from the victim as possible, the participant also noted that it is common for younger victims to be fearful of revealing information to LEAs as they may be victim to coercive control. This statement is supported by Beckett and Pearce (2017) who discussed perceptions and attitudes towards victims of CSE and the ramifications of victim blaming, the researchers found that survivors may lack the developmental and emotional capacity to articulate the entirety of the abuse they have faced as well as a lack of an understanding that they have been abused as some victims may believe that they have been a willing participant in such abuse, however, it is important to note that the way victims are perceived and their capacity is heavily reliant on the context of the abuse that they have endured. The participants also conveyed the implications of the progression of technology that has happened in recent years including the rise of social media. Participant Four expressed that children as young as nine are sharing inappropriate photos on platforms such as Snapchat. Similarly, Participant Two discussed examples of young people being groomed online on similar platforms and took the stance that social media facilitates this behaviour. Pendergast (2023) corroborated this point stipulating that modern-day predators have easier access to children and potentially a wider pool of victims to target through the assistance of such apps. It may be considered that popular platforms should have tighter restrictions in place to protect children from exploitation, participant two raised an interesting perception in that perhaps it should be flagged if a much older user of a platform attempts to communicate with a minor. Research conducted by Cano et al. (2014) explores the potential of enhanced online grooming detection that could be developed through the method of flagging and detecting predatory language and studying demographic attributes of both identified predators and victims, however, the researcher accepts that this proposal may be the subject of privacy concerns as well as false positives within data. Similarly, Participant Two also highlighted the same concerns regarding privacy and the importance of accuracy rates if something of this nature were to be introduced.

The current global landscape of online CSE investigations was also a prominent theme that occurred in both the literature and results. Participants discussed international challenges faced during investigations such as engagement with overseas countries and differences within cultures and also law and legislation. Participant Three addressed these issues, detailing that many countries won’t freely give UK LEAs data related to investigations which can as a result cause difficulty. Kendall and Funk (2012) emphasised the significance of communication and collaboration between international countries and accepted that cultural values and economic status can create barriers for LEAs. Dubowitz (2017) attempts to understand why countries’ perspectives and attitudes to CSE may vary; the researcher identified that countries that have lower income levels may be more susceptible to having a widespread issue of this crime which could be the result of limited resources. The National Crime Agency are the chair for the Virtual Global Taskforce, which is an international collective of law enforcement agencies that work together in aim to tackle CSE, the NCA claimed that a global response is needed to tackle this issue and that joint law enforcement action is the most effective way to combat such crime (National Crime Agency, 2024). This raises the question as to why some overseas territories opt to not cooperate with UK law enforcement where information is required. Participant Four addressed a potential explanation for this stating that there are some countries that the UK simply do not have a working relationship with. However, Shafe and Hutchinson (2014) offered an alternative explanation delving into the fact that due to different cultural practices, some offenders may not believe they are committing a crime as their behaviour may be deemed acceptable in their place of origin, this may also be a factor as to why some victims do not share their abuse with LEAs, as due to culture they may not feel as though they have been abused at all. This is corroborated by Tameshnie (2022) who conducted a study into exploitation in the name of God and culture and found that certain cultures find no issue with allowing young females to marry men much older than them and that young females are often used to aid sexual gratification and therefore exploited. It may be a credible viewpoint to consider that these attitudes and practises are still prominent within the digital age and perhaps may help in answering the question as to why some countries are more willing to assist LEAs than others. Other global challenges that participants raised regarded social media platforms. There was a mix of opinions from participants about the platforms’ willingness to engage with law enforcement, with Participant One and Six claiming that social media companies are usually willing to aid investigations but Participant Five claiming that they “*don't tend to actually even reach out to them because the likelihood is that they're going to say no*.” However, according to The Police Foundation (2014) social media can be beneficial to the police as a way to gather intelligence through open sources and seek engagement from the public, although this research is over ten years old and there have been various technological developments since it was conducted. Research throughout this paper has identified that the rapid progression of technology and the globalisation of such platforms has perhaps caused the rapid influx of reports of online CSE that is allegedly overwhelming criminal investigators, it is important to consider the impact of globalisation and what this could mean for the present and future of children’s safety online. Fass (2003) claims that children can become easy targets of the criminal market as a result of globalisation, where they are attracted to and recruited by predators, the researcher argues the globalisation model extends to consumption eluding that because there is a demand for CSAM, in which offenders receive a monetary reward, there is a supply and demand chain regarding CSE. It could be argued that this research is outdated, however Rahpaymaelizehee et al. (2013) substantiated these claims adding that globalisation through the internet creates dangers for vulnerable children due to the overconsumption of pornography on the web, as well as the lack of supervision and filtering of most children that use the internet. This could be a consequence of the use of the internet having become normalised, even by very young children as according to Participant Three, platforms and webpages are not putting enough restrictions in place to monitor the ages of children entering such websites, and claims that although sites such as Facebook have a thirteen and over age restriction in place, it is simple to bypass this. The NSPCC released a report in 2021 claiming that large social media platforms are failing to protect children online and should be held accountable (NSPCC, 2021).

The final theme in this section analyses the digital landscape of online CSE detection and prevention including the use of artificial intelligence, investigative techniques and technical challenges that may be faced. Throughout the interviews participants discussed how AI can create difficulties when investigating crimes of online CSE but also how LEAs may use the technology to their advantage. Participant One discussed the advantages of tools within detection software that utilise AI to aid in grading indecent images, proclaiming that it not only saves time during inquiries but also relieves investigators from having to identify thousands of indecent images. AI can also been used in the detection stage of an investigation, demonstrated by the creation of PrevBOT by Sunde and Sunde (2021) which allowed an AI embedded with machine learning to enter chatrooms and identify inappropriate chat exchanges, this method was subsequently recommended as a preventative method. Urbas (2021) also suggested that AI can be used as a force for good through the use of facial recognition and location detection, the researcher also analysed a similar preventative method labelled Sweetie 2.0 that allowed viewing of real-time live streaming performances involving minors. However, Participant Four raised the point that not all police forces employ AI in their detection and investigative methods and acknowledged that it is something that LEAs should be working towards. AI also has the potential to be used maliciously by those who sexually exploit children, Participant Three drew attention to the matter that culprits are creating AI imagery depicting underage children or AI-generated chat conversations with a bot depicting a minor, supported by Participant Four who accepted that it is becoming increasingly difficult to decipher between real and AI-generated imagery. Harwell (2023) claimed that thousands of AI-generated images depicting children had been found on the dark web and pointed out that this may cause a strain on victim identification and put into question the validity of CSAM material that Is identified, however, it may be contended that this study lacks empirical data and operates a limited scope. Aside from AI, there are other technical challenges that LEAs may face when investigating CSE such as encryption, VPNs and Cloud data. Participant One spoke about legal issues that may be faced when external data is stored on Cloud networks, similarly, Participants Three and Six acknowledged the barriers of such data explaining how it can be deleted from other devices even after seizure as well as the amount of storage that can be held on such platforms. As well as this, encryption was also a common challenge that was mentioned throughout participant interviews. Participant Three stated *“encryption of trying to get data off devices, so whether that's just a pin on your phone or you can have apps which encrypt your data. Think of some of the proactive techniques we can use. If you've got end-to-end encryption, you can't see the data that's being passed.”* This is supported by Participants Three and Six who also discuss the implications of encryption, elucidating the idea that some social media platforms that are bringing out end-to-end encryption are consequently creating difficulties in obtaining data. Cohen-Almagor (2013) also evaluates the impact of encryption and how it seemingly aids child abusers by providing a secure and unbreakable network for them to operate.

The findings within this study align closely with the literature’s depiction of the current landscape of online CSE identifying common issues and challenges that LEAs face and the uncertainty of the growth and progression of this issue, within a cyber-enabled landscape. However, it is important to consider how these issues can be mitigated to allow LEAs to fulfil their responsibilities. For example, Participant One expressed the view that additional covert investigators could be deployed to expedite the detection process, which was also a point supported by Mitchell et al. (2010) who explored the reasonings behind the increase of covert internet investigators between the years 2000 and 2006. However, this study differed from some participants’ views and suggested that LEAs are proficient in their skills and ability to use this method to detect online CSE, the researcher did however acknowledge the limitations within their estimates of crime known to LEAs. Despite this, it could be argued that developments within the detection process could ease the workload for investigators as a way of preventing the abuse before it occurs, nevertheless, the process is not straightforward within the current digital realm with Borj et al. (2022) reporting difficulties in detecting private communications via online platforms due to privacy features such as encryption. Therefore, one may ask the question of how LEAs can bypass such features to ultimately protect vulnerable children. A credible consideration may be to relook at the legislation surrounding these offences, as according to multiple participants, many officers have had to act on outdated legislation when prosecuting those who commit crimes of this nature, having to interpret said legislation to fit the current landscape of the crimes. Professional Development Group (2021) elaborate on this point arguing that children are being left vulnerable due to outdated laws and policies, calling for updates within the legislation and a cohesive response to the issue. It could also be valuable to examine the working practices regarding the collection of evidence during investigations and comprehend what may be causing the backlog of cases, which was an issue raised by participants. A report conducted by HMICFRS (2022) concluded that police forces are unable to keep pace with modern technology and that there were more than twenty-five thousand devices awaiting examination. Digital triaging is a method used to provide information in order to prioritise devices for a full examination, some forces have also implemented triage vans that can be sent out directly to crime scenes and enable rapid extraction of data potentially decreasing the number of devices awaiting examination (Jusas et al., 2017). This method could prove beneficial for additional police forces to employ to alleviate the backlogs that are occurring. Additionally, efforts should also be made to maintain the working relationship with external bodies such as the National Crime Agency and the Internet Watch Foundation as several participants concluded these relationships to be positive as means of gathering intelligence and information.

## Limitations

This research had several limitations that may affect the suitability of the results sustained. One limitation is that the number of participants interviewed was less than the originally anticipated number, it was hoped that between eight and twelve participants would be interviewed, however, due to difficulty accessing such participants, only six participants were interviewed concerning the study. Also, five out of six participants all had similar job roles, although this may be seen as a positive as these participants were directly involved in the detection and investigation of online CSE, it may have also introduced the risk of bias within participant answers.

There was also a limited timeframe to conduct the research associated with this project, with a longer timeframe it may have resulted in the ability of further analysis and the recruitment of additional participants.

# Conclusion

This study aimed to explore whether law enforcement agencies are sufficiently equipped to investigate and prevent crimes of online child sexual exploitation while specifically considering factors such as the digital landscape, the efficiency of investigative methods and identifying techniques, the history and developments of CSE as well as considering CSE on a global scale and the impact globalisation, social media and modern technology have on such crimes. This research sustained an exploratory and inductive approach utilising primary research and thematic analysis to address the research question. Throughout the analysis of the results and literature found throughout this research, it has been established that there are a vast amount of international, technical and general challenges that LEAs face when attempting to investigate and identify crimes of this nature. Throughout the discussed literature it is apparent that CSE has been a longstanding issue encountered by LEAs and that with the rise of technology and the factors that come with it, the issue has become increasingly more difficult to police and prevent in the current landscape. This study has added to the existing knowledge around online child exploitation and has provided elaboration on LEAs capability to investigate and identify such crimes. Currently, there is a lot of research regarding online CSE and its implications, however, there is limited research directly relating to LEA capability and efficiency in handling it. This research achieved its aim and objectives of exploring various factors that contribute to the effectiveness and efficiency of investigating these crimes, however, the question as to whether LEAs are sufficiently equipped to investigate and prevent online CSE remains complex and cannot be definitively answered with a binary response. The findings of this research predominantly align with the current research surrounding this topic concluding that the largest barriers that LEAs face are that of resources and manpower as well as the inevitable progression of technology, revolutionising encryption, artificial intelligence, social media and external storage platforms that can allow predators to operate under the radar and increase their risk of protection when divulging in such activities. Despite this, there were also positive findings identified that bring to light the proactive investigatory work carried out in this field such as collaboration, utilisation of modern technology, effective investigatory tools and efficient training packages for digital forensic staff. Hence, it could be contended that LEAs are effectively managing their duties under constrained resources, outdated legislation and uncertainty, however, with additional research within this field and additional resources, this could be improved. it is clear that closer attention needs to be paid to resource allocation and associated backlogs of cases to ensure that victims are receiving optimal care and perpetrators are deterred from continuous offending.

## 

## Recommendations

Based on the findings of this research the following recommendations are offered:

* Creation of an international cyber court similar to that of the international criminal court. Utilised to collaborate between international agencies more efficiently and hold perpetrators accountable on a worldwide scale.
* Further research specifically into the difficulties and barriers that prevent law enforcement agencies from efficiently and effectively detecting online child sexual exploitation, as well as research into the efficiency tools and techniques that are not available to the public.
* Further research into the working practices of digital forensic labs, exploring the potential for additional resources and workforce capacity.
* Continuously updated training packages for investigators and staff associated with the detection and prevention of online child sexual exploitation.
* Continuous assessments of the competency of police forces regarding the handling of online child sexual exploitation investigations and the utilisation of multi-agency collaboration.
* Updating past legislation to ensure that it accurately reflects the current digital landscape of investigations.

# Appendices

Appendix A:

Approved proportionate ethical review form

Research Ethics

*Proportionate Review Form*

The Proportionate Review process may be used where the proposed research raises only minimal ethical risk. This research must: focus on minimally sensitive topics; entail minimal intrusion or disruption to others; and involve participants who would not be considered vulnerable in the context of the research.

**PART A: TO BE COMPLETED BY RESEARCHER**

|  |  |
| --- | --- |
| Name of Researcher: | Aimee Leigh Marple |
| School | Justice, Security and Sustainability |

|  |  |  |  |
| --- | --- | --- | --- |
| **Student/Course Details (If Applicable)** | | | |
| Student ID Number: | | | 21016340 |
| Name of Supervisor(s)/Module Tutor: | | | Ian Ackerley |
| PhD/MPhil project: |  |  | |
| Taught Postgraduate Project/Assignment: |  | Award Title:  Module Title: | BSc (Hons) Policing and Criminal Investigation  Project in Policing and Criminal Investigation |
| Undergraduate Project/Assignment: |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Project Title: | Are law enforcement sufficiently equipped to address and prevent online child sexual exploitation within a cyber-enabled landscape, or do additional measures need to be taken? | | |
| Project Outline: | This research will be conducted to explore the effectiveness and impact of law enforcement efficiency, privacy laws and investigative techniques on tackling online child sexual exploitation in a cyber-enabled environment. Considering areas such as the dark web, use and abuse of social media, identifying techniques such as artificial intelligence, web crawlers and machine learning as well traditional policing methods, new and emerging methods and policy and practice. | | |
| Give a brief description of participants and procedure (methods, tests etc.) | This research will be conducted using qualitative primary methods utilising an exploratory approach. The participants will be contacted and asked if they are willing to take part. Interviewees are expected to be professionals who work within the digital investigation sector or policy maker such as police forces, CEOP and internet watch foundation, civil service, college of policing. The sample size is anticipated to be between 8-12. Interviews will be semi-structured with the aim of exploring some of the publicly known techniques used in the prevention and detection of online child sexual exploitation and examining how law, practice and policy regarding privacy enables or hinders such investigations. The research will incorporate the exploration of the use of traditional policing methods in a cyber enabled environment for example covert internet investigators as well as the utilisation of cyber dependent tactics such as artificial intelligence. The research will not discuss nor disclose policing techniques which are not already in the public domain. Interviews will be recorded using a Dictaphone and will be transcribed and coded to protect the participants identity. Results will be analysed using thematic analysis and potentially discourse analysis. It is anticipated that the coding will be carried out online, but this may change to manual. The codes and themes developed will be derived from the interviews carried out and analysis will be inductive, however new questions may be added if interesting information arises. | | |
| Expected Start Date: | 10th September 2023 | Expected End Date: | 31st May 2024 |

Relevant professional body ethical guidelines should be consulted when completing this form.

Please seek guidance from the School Ethics Coordinator if you are uncertain about any ethical issues arising from this application.

There is an obligation on the researcher and supervisor (where applicable) to bring to the attention of the School Ethics Coordinator any issues with ethical implications not identified by this form.

**Researcher Declaration**

|  |  |
| --- | --- |
| I consider that this project has no significant ethical implications requiring full ethical review |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **I confirm that:** | | | |
| 1. | The research will **not** involve members of vulnerable groups.  Vulnerable groups include but are not limited to: children and young people (under 18 years of age), those with a learning disability or cognitive impairment, patients, people in custody, people engaged in illegal activities (e.g. drug taking), or individuals in a dependent or unequal relationship. | |  |
| 2. | The research will **not** involve sensitive topics.  Sensitive topics include, but are not limited to: participants’ sexual behaviour, their illegal or political behaviour, their experience of violence, their abuse or exploitation, their mental health, their gender or ethnic status. The research must not involve groups where permission of a gatekeeper is normally required for initial access to members, for example, ethnic or cultural groups, native peoples or indigenous communities. | |  |
| 3. | The research will **not** deliberately mislead participants in any way. | |  |
| 4. | The research will **NOT** involve access to records of personal or confidential information, including genetic or other biological information, concerning identifiable individuals. | |  |
| 5. | The research will **not** induce psychological stress, anxiety or humiliation, cause more than minimal pain, or involve intrusive interventions.  This includes, but is not limited to: the administration of drugs or other substances, vigorous physical exercise, or techniques such as hypnotherapy which may cause participants to reveal information which could cause concern, in the course of their everyday life. | |  |
| 6. | The research **will** be conducted with participants’ full and informed consent at the time the study is carried out:   * The main procedure will be explained to participants in advance, so that they are informed about what to expect. * Participants will be told their involvement in the research is voluntary. * Written consent will be obtained from participants. *(This is not required for self-completion questionnaires as submission of the completed questionnaire implies consent to participate)*. * Participants will be informed about how they may withdraw from the research at any time and for any reason. * For questionnaires and interviews: Participants will be given the option of omitting questions they do not want to answer. * Participants will be told that their data will be treated with full confidentiality and that, if published, every effort will be made to ensure it will not be identifiable as theirs. * Participants will be given the opportunity to be debriefed i.e. to find out more about the study and its results. |  | YES    N/A |
| 7. | A risk assessment has been completed for this research project |  | YES    N/A |

If you are unable to confirm any of the above statements, please complete a **Full Ethical Review Form**. If the research will include participants that are **patients,** please complete the Independent Peer Review process.

|  |
| --- |
| 8. Information and Data  Please provide answers to the following questions regarding the handling and storage of information and data: |
| 1. How will research data be stored (manually or electronically)?   Interviews will be transcribed and coded, once transcripts have been created the original recordings will be deleted. Transcripts will be created electronically using Microsoft word and will be stored on the university secure and encrypted OneDrive system. Signed participant information sheets will be stored in the supervisors locked filing cabinet. |
| 1. How is protection given to the participants (e.g. by being made anonymous through coding and with a participant identifier code being kept separately and securely)?   Participant codes will be applied to transcripts to keep the participants anonymous the codes will consist of P1, P2 and so on. The list of these participant codes will be kept on the university's secure and encrypted OneDrive system. Anything identifying said in the transcripts will be removed. |
| 1. What assurance will be given to the participant about the confidentiality of this data and the security of its storage?   A participant information sheet which details information about the study, data and security and informs the participant they can withdraw at any point until the final analysis has been completed. This will be given to the participant before the interview begins. |
| 1. Is assurance given to the participant that they cannot be identified from any publication or dissemination of the results of the project?   Participant data will remain anonymous and confidential which will be explained in the participant information sheet. Assurance will be given to the participant that they are able to withdraw until the final analysis has been completed. |
| 1. Who will have access to this data, and for what purposes?   The researcher – Aimee Marple – for the purpose of analysing data and creating the report and the project supervisor - Ian Ackerley – for the purpose of overseeing the project. |
| 1. How will the data be stored, for how long, and how will it be discarded?   Data will be stored securely on Staffordshire Universities secure and encrypted OneDrive system by the project supervisor or university department for a minimum of ten years in compliance with the university guidelines and GDPR principles. After this time, the data will be destroyed. |

**Supporting Documentation**

|  |  |
| --- | --- |
| All key documents e.g. consent form, information sheet, questionnaire/interview schedule are appended to this application. |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Signature of Researcher: | A.Marple | Date: | 07/08/23 |

**NB:** If the research departs from the protocol which provides the basis for this proportionate review, then further review will be required and the applicant and supervisor(s) should consider whether or not the proportionate review remains appropriate. If it is no longer appropriate a full ethical review form **must** be submitted for consideration by the School Ethics Coordinator .

|  |
| --- |
| **Next Step:**  Students: Please submit this form (and supporting documentation) for consideration by your Supervisor/ Module Tutor.  Staff: Please submit this form to your Head of Department or a Senior Researcher in your School. Once they have reviewed the form, this should be forwarded to the Research Administrators in RIIS (ethics@staffs.ac.uk) who will arrange for it to be considered by an independent member of the School’s College of Reviewers . |

**PART B: TO BE COMPLETED BY SUPERVISOR/MODULE TUTOR (If student) OR Head of Department/ Senior Researcher (if staff)**

|  |  |
| --- | --- |
| I consider that this project has no significant ethical implications requiring full ethical review by the Faculty Research Ethics Committee. |  |
| I have checked and approved the key documents required for this proposal (e.g. consent form, information sheet, questionnaire, interview schedule). |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Signature of Supervisor/ Head of Department/ Senior Researcher: | A black background with a black square  Description automatically generated with medium confidence | Date: | 10/10/2023 |

|  |
| --- |
| **Next Step:** Please forward this form to the Research Administrators in RIIS (ethics@staffs.ac.uk) who will arrange for it to be considered by an independent member of the School’s College of Ethical Reviewers , having no direct connection with the researcher or his/her programme of study. |

**PART C: TO BE COMPLETED BY a member of the school’s College of ethical reviewers**

|  |  |
| --- | --- |
| This research proposal has been considered using agreed University Procedures and is now approved. |  |
| **Or** |  |
| This research proposal has not been approved due to the reasons given below. |  |
|  |  |
| **Recommendation (delete as appropriate)**: Approve/ Amendments required/ Reject |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Reviewer: |  | Date: |  |
| Signature: |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Signed (School Ethical Coordinator) |  | Date: |  |

Appendix B:

Participant information sheet



**Are law enforcement agencies sufficiently equipped to address and prevent online child sexual exploitation within a cyber-enabled landscape, or do additional measures need to be taken?**

The researcher, Aimee Marple, is an undergraduate student at Staffordshire University and, for their Independent Project module, they are conducting research into law enforcement agencies efficiency to prevent online child sexual exploitation within a cyber-enabled landscape. This research will take into account areas such as privacy laws, policy and practice, traditional policing methods and investigative techniques that are already known to the public, as well as factors that may enable these crimes such as the dark web, artificial intelligence and social media.

**Why you have been invited to take part?**

You have been invited to participate in this research to help develop an understanding of law enforcement agencies efficiency in detecting and combatting online child sexual exploitation. The interview aims to explore how well-equipped law enforcement are in tackling online child sexual exploitation. Considering law, practice, and policy and whether privacy enables or hinders such investigations. As well as the use of traditional policing methods in a cyber-enabled environment, for example, covert internet investigators, and also utilisation of cyber-dependent tactics such as artificial intelligence and the dark web. The research will not discuss nor disclose policing techniques which are not already in the public domain or any information about specific cases.

**What does participation entail?**

Participation in this research will involve a short semi-structured interview regarding your perception of law enforcement’s ability to detect and prevent online child sexual exploitation. The interview will last approximately 20-30 minutes and will be recorded using a Dictaphone and transcribed by the researcher post-interview.

**What are the risks associated with taking part in the research?**

There are no risks associated with taking part in this study. Any information collected within the study remains anonymous.

**What are the benefits of taking part in the research?**

There are no direct benefits to you from taking part in this study. You are being asked to help to better understand law enforcement's efficiency in detecting and combating online child sexual exploitation. As reiterated previously, you will not be mentioned in any reports as the data collected is anonymous.

**Are there any reasons why I might not be eligible to take part in the research?**

We require participants over the age of 18 years.

**How will any personal information used during the research be kept confidential?**

Your interview will be recorded via a Dictaphone and then transcribed, once this has been transcribed the original recording will be deleted. It is recommended that in the interview you avoid using names of any individuals (including your own) or specific sensitive details about on-going operations to help ensure anonymity. In the event of any sensitive information being obtained not deemed suitable for dissemination, this will be omitted from the transcripts and replaced by codes.

All information collected from the questionnaire will be kept strictly confidential. No personally identifiable information will be needed to complete the interview, and your answers will be anonymous. You will be asked for basic demographic information such as age, gender and ethnicity to allow the researcher to fully analyse the data. All data collected, as part of the study, will be kept securely in electronic form on Staffordshire University's secure and encrypted OneDrive system for 10 years and will then be destroyed and participant information sheets will be securely locked in the project supervisors filing cabinet.

**Right to decline or withdraw**

You are reminded that you are not under any obligation to take part in this study and hold the right to decline participation. You also hold the right to withdraw at any point during the interview and you will also be able to request the removal of all or part of your data from the research. Please be aware It will not be possible to withdraw anonymised participant information after the final analysis has been completed with is expected to be no later than the 14th of February (for which you will need to provide your code number listed on the top of this sheet, so that your data can be destroyed).

**GDPR Statement**

Your data will be processed in accordance with the General Data Protection Regulation 2016 (GDPR).  
The data controller for this project will be Staffordshire University. The university will process your personal data for the purpose of the research outlined above. The legal basis for processing your personal data for research purposes under the GDPR is a ‘task in the public interest’. You can provide your consent for the use of your personal data in this study by completing the consent form that has been provided to you.

You have the right to access information held about you. Your right of access can be exercised in accordance with the GDPR. You also have other rights including rights of correction, erasure, objection, and data portability. Questions, comments and requests about your personal data can also be sent to the Staffordshire University Data Protection Officer. If you wish to lodge a complaint with the Information Commissioner’s Office, please visit www.ico.org.uk.

**Contact**

If any questions or concerns should arise from this research, if you wish to raise a concern about the study, and in particular about the conduct of the study or the individuals involved or you require further information about the study, please do not hesitate to contact the researcher’s supervisor, Ian Ackerley on [ian.ackerley@staffs.ac.uk](mailto:ian.ackerley@staffs.ac.uk) or 01782 294441.

**Complaints:**

We hope you take part and find our study interesting. However, we realise problems may arise. If you have any concerns, please contact the supervisor listed above. We will do our best to answer any problems.

Appendix C:

Example participant consent form

ID: # Participant copy

**By taking part in the study, you are agreeing that you understand the information provided and agree to the following:**

I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

I understand that my involvement in the study will remain anonymous and once my responses have been submitted any identifiable information will be removed from the transcripts and not included in the project.

I understand that my participation will be anonymous and any details that might identify me will not be included in any reports or publications produced from the study.

I understand that I am free to not answer any questions and may stop the interview at any point.

I agree to the interview being audio recorded

I understand that any data I provide will be used to provide an overview of law enforcements agencies efficiency to detect and prevent online child sexual exploitation as part of the study.

I understand that my involvement in the study will remain anonymous and once my responses have been submitted any identifiable information will be replaced with a code. If you wish to remove your data at any point you would need to reference this unique code. I understand that it will not be possible to remove my data after the final analysis has been completed.

I agree to anonymised quotes being used within reports/other publications produced from the study

**By taking part in the interview after reading this information you are agreeing that you understand the information provided and agree to us analysing the answers you give.**

Thank you for taking the time to read this information.

**Participant:**

**Signed: ...................................... Date: .......................**

**Researcher:**

**Signed: ...................................... Date: .......................**

Appendix D:

Base question list used for participant interview

**Interview Questions**

1. What is your job title and role?

2. What is your experience in investigating crimes of online child sexual exploitation?

3. What kind of training did you undertake to enable you to combat this type of crime effectively and what kind of skill set does somebody need to have to carry out this kind of investigative work?

3a. How often is this training updated and what prompts the need for

updating training?

4. How would you describe the current landscape of detecting and combatting online child sexual exploitation, what steps would you usually take to do this?

5. What would you say the biggest challenges are in combatting this type of crime?

6. Can you describe any technological challenges that law enforcement faces as a whole when addressing these crimes?

7. In your experience and opinion how effective would you say the current tools and methods that law enforcement use are at detecting online child sexual exploitation?

8. How are the safeguards regarding an individual’s privacy incorporated into Child Sexual Exploitation investigations?

8a. How does this affect the investigation?

8b. Are there legal procedures that enable or hider such investigations?

9. Do you think law enforcement is keeping up to speed with the rapid progression of technology when it comes to these kinds of crimes?

10. Are there any legislative or policy changes that could be made that you think would increase the police’s ability to combat these crimes effectively?

11. What are your thoughts on balancing privacy concerns and the need to detect crimes of child sexual exploitation?

12. How well do you think that traditional policing methods have been applied to carry out digital investigations of this sort? Such as covert internet investigators, internet ‘patrolling’ e.g., regularly checking websites that are flagged up, gathering information on a suspect e.g., open source intelligence.

13. What would you say are the most appropriate and effective techniques in detecting and preventing this kind of crime?

14. How does the dark web impact the police’s ability to detect and combat this type of crime?

15. What role would you say social media plays in orchestrating but also addressing this type of crime?

16. What role does AI play in detecting this type of crime and what challenges do you face with this?

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