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Conceptual and measurement considerations for technology-facilitated child exploitation and abuse (TF-CSEA): Into the Light Index Conceptual Framework 2025

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1. Introduction

The fast-changing digital environment creates great opportunities for learning, social engagement, maintaining friendships, but also serious risks for children's wellbeing and rights (Livingstone, 2016; Smahel et al., 2025). The risks children face in the digital environment and their perception of them can vary and be influenced by different factors, including their socioeconomic status, fragmentation of caregiving, and previous experiences of abuse and neglect (ECPAT International, 2022). Those risks can also arise from initially harmless and positive interactions (ECPAT International, 2022) therefore, it is crucial to accurately evaluate and clearly define all forms of child sexual exposure facilitated by technology.

Technology-facilitated sexual exploitation and abuse (TF-CSEA) refers to a range of sexually harmful behaviours that occur online or through the use of other digital technologies, and include online solicitation, non-consensual image sharing, forced exposure to pornography, livestreaming of child sexual abuse, sexual extortion, increasingly identified in research and epidemiological reports (Bryce et al., 2023; WHO, 2022). The term is now well-established and consistently used in research as an umbrella construct for various forms of online and technology-facilitated abuse, in line with the latest terminology guidelines for the protection of children from sexual exploitation and abuse (ECPAT International, 2025). While there is a general agreement in terms of the use of this overarching construct across governmental and non-governmental organisations, consensus regarding specific forms of TF-CSEA and their definitions is still absent.

Inconsistent use of terms not only impacts their operationalisation but also hinders comparability and generalisability of the findings across studies at the international level. Specifically, using broader terms like 'online sexual abuse' or 'cyber-sexual violence' to cover distinct forms of technology-facilitated sexual victimisation, is less than informative and delay any targeted preventive initiatives. Despite the existence of terminology guidelines (ECPAT International 2016; 2025), legal definitions of sexual crimes against children, and a

wide range of specific constructs used by researchers and governmental agencies, there is limited compliance to either of them, which creates confusion and challenges for policy and legislation development. Ongoing debates surrounding specific forms of TF-CSEA and their classification are particularly apparent in the context of peer-to-peer abuse and over-criminalisation of online sexual behaviours (e.g., Bulger et al., 2017; Finkelhor et al., 2023, 2024). Those disagreements often go beyond the considerations of a position of vulnerability and lack of consent due to involvement of similar-age perpetrators as opposed to adults and draw parallels between conventional forms of child sexual abuse and technology-facilitated sexual victimisation.

Although there are some similarities in the patterns of harmful behaviours and risks in both the digital and physical environment, there are also distinct elements of TF-CSEA, including online anonymity, easy access, ubiquitous availability, the online disinhibition effect, that require moving beyond conventional approaches in addressing and defining them (Kardefelt-Winther & Maternowska, 2020; Smith, 2012; Suler, 2004). Moreover, developing technology-facilitated victimisation criteria that correspond to legal definitions in the country of study may limit their applicability at the international level (Averdijk et al., 2011). Placing emphasis on illegality of the sexual harms, as well as on an age gap between the victim and perpetrator in the definitions of TF-CSEA may also contribute to decrease capability of children to identify themselves as victims, and in turn, prevent disclosure. The existing models of child sexual abuse and exploitation steer away from incorporating age difference as a precondition to harmful sexual behaviours/acts being considered abusive or exploitative (Laird et al., 2023; Mathews, B., & Collin-Vézina, 2019), which can create more space to explore more broadly the dynamics, nature, and idiosyncrasies of both the offline and technology-facilitated sexual victimisation.

Lack of consensus around the terminology and typology of TF-CSEA can further impact their operationalisation and the development of reliable research measures. Despite increasing number of emerging new types of TF-CSEA, there is still limited availability of instruments

detailing specific categories of this form of child sexual violence. The 'gold standard' tools that capture the refined classification could bring some measure of uniformity and improve comparability and generalisability across future studies on the topic. However, this requires more specific and homogeneous approach to identifying TF-CSEA across various contexts for the purpose of a universal prevention (Benavente et al., 2024). A large proportion of the measures that are utilised in the field are designed for broader screening or incidence detection of child victimisation (e.g., ICAST, JVQ-R2) rather than specifically for TF-CSEA. To date, several large-scale multi-country initiatives including the Global Kids Online, EU Kids Online and Disrupting Harm Survey focused at assessing exclusively technology-facilitated risks and harms and developed comprehensive tools that can be applied across several sociocultural and regional contexts (Global Kids Online, 2020; Livingstone et al., 2011; UNICEF Office of Research-Innocenti, 2022). The feasibility of implementation and reproduction of research does not, however, necessarily indicate that the specific measures used have good psychometric properties. Therefore, it is also crucial to apply a more systematic approach to assessing validity of the tools within each context before large-scale implementation, to ensure consistent and accurate results.

1.1 Aims and objectives

Moving towards developing a minimum measurement standard in the fast-developing field of research on technology-facilitated child sexual victimisation is essential to accurately map the prevalence and types of TF-CSEA. The first step towards achieving this standardised approach is to reach a consensus on definitions of the TF-CSEA constructs that can further aid their consistent operationalisation and comparability across the cultures and contexts. A systematic transition towards unifying measurement and conceptualisation will improve data quality and reliability, and consequently, establish strong evidence foundations in the field. This paper aims to provide an overview of the main challenges in relation to measurement and terminology of TF-CSEA and offer potential solutions to overcome them in

future research. We also aim to support researchers in the field by describing our ongoing efforts to develop the conceptual and measurement frameworks, which constitute a baseline for further expert considerations and iterations. Those frameworks are intended for universal application across diverse domains, including academic research, legal systems, and pedagogical practice, and offer a holistic approach to children's rights and safeguarding.

1.2 Targeted audience

This white paper is primarily intended for researchers, policymakers, third sector organisations, and frontline practitioners working in child protection and online safety. However, the target audience and relevance of this report extends beyond academia and professional services, and it could be helpful for audiences new to the topic and for media communications that have a limited expertise in technology-facilitated CSEA. The proposed framework and considerations about the current state of TF-CSEA research and terminology help identify gaps in the existing literature and challenges in measuring the scale of the problem. Those can be resolved by interdisciplinary and cross-sectoral collaborations that would apply our conceptualisation universally or develop it further to bridge its use across various contexts and fields.

2. Challenges with TF-CSEA terminology and typology

2.1 Offline-online continuum

The diversity of outcomes and outcome measures used within TF-CSEA research limits the ability to draw strong, generalised conclusions and formulate actionable recommendations. Although the importance of measuring epidemiological differences specifically in sub-types of TF-CSEA has been recognised by researchers and practitioners, a continuum of exploitation and abuse between the online and offline environments is increasingly

highlighted, making it difficult to prioritise the harms that occur solely in the digital environment (van der Spuy et al., 2024). In our view, the specificity of technology-facilitated sexual victimisation needs to be acknowledged to produce clear and consistent terminology and avoid factoring in offline abuse and exploitation initiated via technological means as a condition for classifying the harms in the digital space as illegal and abusive. The fact that the offline acts of abuse can spread online and online abuse can lead to contact sexual abuse (Kardefelt-Winther & Maternowska, 2020; Stevenson et al., 2023), demonstrates escalation in the severity of abusive behaviours that should be considered as separate offences, for more effective prevention and policy responses. By not drawing a clear line between offline and technology-facilitated CSEA, we risk underestimating the impact and seriousness of the harms that occur in the digital environment and normalise certain behaviours by moving them beyond the scope of substantial risks.

2.2 Conceptualising TF-CSEA

Terminology of TF-CSEA undergoes constant reviews and refinements to reflect changes in the digital environment. To address the evolving nature of TF-CSEA, researchers often develop new constructs based on their own professional judgment and expertise, and/or most recent empirical evidence (e.g., Finkelhor et al., 2022; 2023). The new variables are often operationalised in relation to the 'umbrella' constructs such as 'online sexual victimisation' or 'online sexual abuse and exploitation', and most recently 'technology-facilitated CSEA'. These overarching terms are rather widely used and defined in research, across governmental and non-governmental agencies, however, more conceptual clarity of specific types of TF-CSEA is still needed.

New conceptual frameworks and guidelines, such as the International Classification of Violence against Children (ICVAC; UNICEF, 2023) and Terminology Guidelines for the Protection of Children from Sexual Exploitation and Sexual Abuse (ECPAT International 2016;

2025) have been launched to reflect updates and developments in the field and offer practical solutions for defining and categorising TF-CSEA. However, despite those continuous international efforts to harmonise TF-CSEA terminology and facilitate consensus across sectors and research, inconsistencies in the use of language and terms are still apparent.

According to recent systematic review on global prevalence of TF-CSEA (Fry et al., 2025), only one out of 86 surveys explicitly reported following official terminology guidelines (UNICEF Office of Research – Innocenti, 2022). A large proportion of surveys employed instrument items or descriptions of specific behaviours as outcomes instead of using well-established TF-CSEA terms (e.g., 'being forced/pressured to send sexually explicit images/videos' instead of 'online solicitation'). Interpretation of the constructs under investigation complicates further the lack of definitions provided and the interchangeable use of terms in relation to variables with different definitional elements (e.g., Greene-Colozzi et al., 2020). For example, online grooming and online solicitation were often found to be considered and assessed as the same type of behaviour (Krzeczkowska et al., n.d.). A clearer and precise specification of the acts that constitute TF-CSEA according to international terminology guidelines and across various contexts and cultures, could minimise the risk of construct and response bias, and allow to capture accurately the same types of harmful behaviours at the global scale.

3. Challenges with TF-CSEA measurement

3.1 Validity and reliability

Despite the proliferation of TF-CSEA, there is still a limited number of validated measures specifically designed to capture different forms of this type of child sexual victimisation (e.g., Questionnaire of Sexual Solicitation and Interactions with Adults by Gámez-Guadix et al., 2018; The Grooming Scale by Peris & Maganto, 2018). Existing tools disproportionally focus on contact-based sexual abuse outcomes, including individual items to measure selected forms of technology-facilitated exposure such as Internet sexual talk (Finkelhor et al., 2011)

and non-consensual sharing of sexual images (Mathews et al., 2023). Researchers also frequently adapt, compile or add questions to the existing tools such as the Juvenile Victimisation Questionnaire (JVQ; Finkelhor et al., 2005), the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003), and ISPCAN Child Abuse Screening Tools (ICAST; Dunne et al., 2009), often without implementing validation and psychometric assessment for contextual appropriateness (e.g., Choo et al., 2011; Kumar et al., 2019). As already established the ever-changing nature of TF-CSEA harms means that to capture the most current data requires a balancing of several factors, including the validation and assessment of any new questions. This may explain the inclusion of new questions or items in previously validated measures without the same level of assessment.

Substantial efforts to identify and assess various forms of TF-CSEA have been made by large initiatives including the Global Kids Online, the EU Kids Online and the Disrupting Harm Survey that specifically focused on online child safety and development of questionnaires with relevant dimensions (i.e., frequency of TF-CSEA episodes, perpetrator type). Those surveys were applied across several sociocultural and regional contexts, which shows their feasibility and the potential for implementation in other geographical locations that currently lack or have limited sources of evidence on TF-CSEA (e.g., Western Africa, Middle East). The Disrupting Harm survey was also evaluated in terms of the quality, validity and reliability of the nine questions used (Richards et al., 2024). The results of the factor analysis varied depending on whether two- or three-factor model was applied, showing either a strong psychometric validity and reliability (two-factor structure) or insufficient reliability and weak construct validity (Richards et al., 2024). These findings call for further development and improvement of the measure that could be achieved by adding more items to the instrument on specific types of TF-CSEA. It is also crucial to apply more systematic approach to assessing the tools within each context before large-scale implementation, to ensure consistent and accurate result, as reproduction of research itself does not indicate that the measure is valid and reliable.

3.2 Bias

Research on both offline and technology-facilitated child sexual victimisation faces a range of methodological and epistemological biases that can impact the accuracy and comparability of the findings. These biases often result from sampling selection, data collection tools, site and mode (e.g., self-administered, interviews, household-based, school-based), discrepancies in the use of definitions for harmful sexual acts and behaviours, the definition of a child and age of consent, respondent type (caregiver, child, adult recall) ethical restrictions, and sociocultural norms (Andrews et al., 2004; Barth et al., 2012; Bolen & Scannapieco, 1999; Haugaard & Emery, 1989; Wynkoop, Capps, & Priest, 1995).

Research in the field is predominantly based on surveys that rely on retrospective reports, which are susceptible to recall bias, especially when abuse occurred in the early childhood, or the memory of the incident was repressed by survivors/victims due to shame, fear of not being believed, or guilt (Friedman-Hauser & Katz, 2025; London et al., 2008). These factors can lead to underreporting, which is a major barrier to producing reliable prevalence estimates of CSEA. Although eliminating recall bias in research, especially on highly sensitive topics like TF-CSEA is not possible, it can be minimised by, for example, conducting a pilot study to ensure that the data collection mode (i.e., self-administered, interviews), measurement items, and setting (household, school) do not affect the responses. In addition, selecting a short recall period could mitigate the recall errors and improve reliability of the data, even if less information is obtained. A potential solution could be the use of multiple recall windows that are frequently applied in research on violence against children (e.g., Averdijk et al., 2011; Chan et al., 2013; Finkelhor et al. 2013; 2015; Makaruk et al., 2023). This approach allows capturing more incidents (e.g., recent, historical and infrequent events), cross-validating the consistency of reported data, and improving policy relevance (Massetti et al., 2020).

3.3 Representativeness and trajectories of TF-CSEA

Large-scale, representative surveys require considerable resource allocation and careful planning around design and implementation, but they allow us to obtain reliable results and generalise the findings across contexts (Babbie, 2020). The number of representative studies investigating TF-CSEA at the national or subnational level has gradually increased since 2010, indicating growing recognition of risks and harms that are facilitated by the use of technology (Fry et al., 2025). The emerging awareness and urgency to respond to this global health issue effectively mobilised researchers and interorganisational cooperation to better understand the prevalence and nature of sexual victimisation in the digital environment. The Disrupting Harm (UNICEF Office of Research-Innocenti, 2022) and Global Kids Online initiatives (e.g., Logar et al., 2016; Ravalli & Paoloni, 2016) are the most prominent examples of data collection efforts at the global scale, including countries and regions that lack or have limited sources of evidence on TF-CSEA (e.g., Eastern & Southern Africa, Southeast Asia).

However, the number of existing representative studies that specifically aimed to measure TF-CSEA is still very limited and are exploratory in nature (Fry et al., 2025). The inconsistent use of terminology and measurement shows that the field is at the nascent stage and needs more structured and methodical approach to fully understand the scale of TF-CSEA and to address its complexity. Evaluation of the multidimensional dynamic and trajectories of this global health issue with a well-defined framework and routine data collection at the national level is still to come. Existing evidence can provide an indication of evolving and growing threats and place them geographically, but it does not allow to facilitate targeted and strategic approach to prevention of the crisis. Population-based longitudinal surveys with annual follow-up are crucial to establish baseline of TF-CSEA prevalence and, importantly, monitor the patterns and rates of change over time. This systematic approach to data collection can improve our better understanding of the technology-facilitated sexual victimisation of children, maintain attention to the risk of this type of exposure and expand policy responses and effective prevention initiatives.

4. Conceptual frameworks of TF-CSEA

Early conceptualisations and research of technology-facilitated risks in children and adolescents focused heavily on exposure to pornography and internet addiction. Over time, however, as the digital engagement and exposure increased and evolved in its complexity, more comprehensive frameworks have been developed to fully capture technological variations and children's engagement with them. One of the first substantial efforts to conceptualise and empirically investigate technology-facilitated risks, was the EU Kids Online 3Cs – content, contact, and conduct - approach based on a large-scale, multi-country project (Livingstone & Haddon, 2009). Considering technology-facilitated sexual risks, the framework recognised exposure to: a) 'pornographic/harmful content' where child is a recipient of mass-distributed sexual materials; b) sexual interactions driven by adult strangers with a child defined as a participant in those interactions; and c) creating and uploading sexually-explicit materials by a child in the context of peer-to-peer interactions. Additionally, the researchers stressed the importance of addressing differences across contextual differences (i.e., market, cultural, educational, and political/legal contexts) and child-centric perspective to better understand the typology of online harms. This categorisation substantially advanced the conceptual considerations towards providing more clarity and flexibility crucial for global application and effective policy and child protection responses.

4.1 The 2024 Childlight Index conceptual framework and approach

In 2024, Childlight launched Into the Light Index that aimed to better understand global prevalence and nature of various forms of technology-facilitated victimisation and perpetration (Childlight, 2024). Indicator 1 focused on technology-facilitated victimisation was based on a comprehensive systematic review and meta-analysis of studies representative at the national and subnational level. In the systematic review, we used a

specific search strategy including the intersection of terms indicating both offline and online sexual victimisation in order to capture studies with outcomes that were previously not defined as technology-facilitated sexual harms. This approach was applied in order to maximise efficiency and minimise error when conducting this large review.

In the process of extracting the identified sources, we found several conceptual and typological inconsistencies, which constituted a main challenge in terms of synthesising and analysing the findings at the later stage. A large proportion of surveys employed items from the instruments used or concise descriptions of specific harmful behaviours as outcomes instead of implementing existing TF-CSEA terminology (e.g., 'someone threatened to show a sexual image of you to another person or post it online', instead of 'sexual extortion'). Moreover, less than a half of the studies aimed specifically to measure TF-CSEA and only 33 out of 123 studies offered a definition of those outcomes, which required additional efforts to categorise them in a more unified way.

Initially, all the classifications and definitions (if provided) of TF-CSEA subtypes in the included studies were examined and compared with the existing conceptual guidelines to identify terminological and typological overlaps and discrepancies. This helped us navigate through the conceptual inconsistencies and align the reported outcomes with the existing well-defined constructs. Informed by the existing research on TF-CSEA, terminology guidelines, and conceptual frameworks (e.g., E-Safety Commissioner, 2021; Finkelhor et al., 2022; Laird et al., 2022; Livingstone & Haddon, 2009), we iteratively developed a conceptual framework for four broader TF-CSEA subtypes (see Table 1). This proposed grouping was necessary to ensure some degree of consistency and uniformity but also clustered a range of TF-CSEA types that were often presented as individual outcomes in previous research (e.g., online grooming, online solicitation, online sexual harassment, unwanted sexting). However, considering that many of the terms have been used interchangeably or questions used applied to different forms of technology-facilitated harms, broader categorisation allowed us to address the definitional variance.

Table 1 ***Four broad subgroups of TF-CSEA.***

Aggregated Subgroup	Examples of composite TF-CSEA subtypes	Description
Online solicitation	Online grooming, online solicitation, online sexual harassment, pressure to obtain images, voluntarily provided images in a statutorily impermissible relationship, unwanted/non-consensual/pressured sexting, unwanted sexual talk (Sub-type informed by Finkelhor et al., 2022)	This subtype covers a range of unwanted/pressured sexual interactions and activities. Those may include casual sexual inquiries via mobile phone or Internet, as well as long-lasting sexual conversations that can lead to exchange of sexual pictures or videos. It is important to note, that all different types of online solicitation often come from peers as well as adult perpetrators.
Non-consensual taking, sharing and exposure to sexual images and videos	Non-consensual images or videos taking and distributing by an adult or another young child or young person; Forced/unwanted exposure to pornographic content (adult content or CSAM (Child Sexual Abuse Material)) (Sub-type informed by E-Safety Commissioner, 2021 and Finkelhor et al., 2022)	Non-consensual image or video taking refers to having sexual images taken when a child was unconscious, intoxicated, distracted, or unable to consent. It could also include so-called deepfake images in which a child's head or likeness was imposed on a sexual image of someone else. This subgroup also includes an unwanted exposure of a child to pornographic materials (e.g., forcing a child to watch nude videos or pictures or sending a child a link to pornographic websites). Please note that unwanted exposure to sexual content occurs frequently while surfing or scrolling through social media. This type of exposure may not be precursors to a request for reciprocity.
Online sexual exploitation	Commercial sexual talk, commercial sexual images, or other commercial sexual activity, sexual coercion (Sub-type informed by Finkelhor et al., 2022 and Laird et al., 2022)	Sex acts are exchanged for the child or young person's unmet needs, via the provision of monetary or non-monetary resources (e.g., food, clothes, shelter, affection, protection, belonging, gifts and/or anything else of perceived value to the young person or child) on or offline.
Sexual extortion	Sextortion, Sexual Extortion, Sexual blackmail (Sub-type informed by E-Safety Commissioner, 2021)	Sexual extortion is a form of blackmail that involves threatening to share an individual's intimate image or video online unless they comply with certain demands such as to obtain money or gift cards/other items of monetary worth, additional pictures, or other sexual activities.

Source: https://www.childlight.org/uploads/publications/technical-note-1.pdf

Although online sexual exploitation is often used as an overarching term for various forms of online harms, including live streaming of child sexual abuse or sexual extortion, in our framework we defined the construct to cover any form of coerced sexual interactions/acts in exchange for monetary or non-monetary resources, consistent with the existing research (Laird et al., 2022 and Finkelhor et al., 2022). Similarly, given the recent evidence that specifically identified sexual extortion as a distinct form of technology-facilitated victimisation (e.g., Finkelhor et al., 2022; Patchin et al., 2020; Save the Children, 2012, 2019, 2022), we listed it on its own highlighting the importance of monitoring this harmful behaviour that has been increasingly exposed (Europol, 2017; International Centre for Missing & Exploited Children, 2022).

4.2 Recent evidence on TF-CSEA conceptualisation

4.2.2 International Classification of Violence against Children (ICVAC)

In 2023, UNICEF launched the International Classification of Violence against Children (ICVAC), a conceptual and statistical framework that was designed in response to a need for internationally agreed concepts and definitions to increase global capacity to consistently classify statistical data on violence against children, irrespective of differences in legislations across countries (UNICEF, 2023).

The ICVAC builds on and expands previous conceptual frameworks, such as the International Classification of Crime for Statistical Purposes (ICCS) by adapting existing definitions to reflect the unique nature and scope of violence against children (UNODC, 2015). The

classification incorporates three core elements - type of violence, relationship between the victim and the perpetrator, and setting – to strengthen the accuracy and precision of prevalence estimates.

In the section on sexual violence against a child, the ICVAC explicitly includes specific types of TF-CSEA, such as live streaming of child sexual abuse, sexual extortion, unwanted sexting, cyber-grooming, non-consensual image-taking of the sexual organs of or sexual activities with a child, along the offline sexual violence acts. All those are listed as illustrative examples under the main category of 'non-contact sexual violence against children' (UNICEF, 2023; p. 31). This framework is an important advancement in terms of promoting standardisation and comparability of terminology, including the technology-facilitated violence. However, more detailed sub-categorisation of TF-CSEA and more extensive guidance specifically focused on violence in the digital environment are needed to capture the emerging forms of TF-CSEA and emphasise the discrepancies between them more clearly.

4.2.3 The Global Kids Online conceptual framework

The Global Kids Online network, a collaborative initiative between The School of Economics and Political Science, the UNICEF Office of Research-Innocenti, and EU Kids Online, was developed to produce cross-country comparable and reliable evidence of both risks and opportunities that children encounter in the digital environment (Global Kids Online, 2019). To navigate through the differences across various cultural and national contexts in understanding of online risks, the network initially adapted the 3 Cs – content, contact, conduct- model developed for the EU Kids Online initiative (Livingstone & Haddon, 2019). This framework enabled the generation of more coherent and research-driven typology, comparability of data, and account for diverse, dynamic, and often overlapping risks children face.

The 3Cs categorisation of online risks has been recently revised to recognise systemic and commercial risks embedded in the design and governance of digital platforms (Livingstone & Stoilova, 2021; Stoilova et al., 2023). A fourth category (fourth 'C') - contract risk - was introduced to the original model, expanding interpersonal (e.g., grooming, sexual extortion, generating of sharing of child sexual abuse material, non-consensual sexual messaging, sexual harassment) and content-related online risks (e.g., exposure to pornographic or sexualised content) of harms that children may experience when they are exploited by potentially harmful contracts made between other parties (e.g., live streaming of child sexual abuse). Although the 4Cs framework does not aim to create a new classification of TF-CSEA, it remains an operationally useful model for understanding and conceptualising technology-facilitated risks.

4.2.4 A technologised neo-ecological perspective and analytical framework

New, emerging 'Extended Reality' (XR) technologies particularly require revisiting existing theoretical frameworks in the context of the current digital ecosystem, as they may bring forward new or old -yet more far-reaching than before- risks and threats against children. Recently, a technologised, neo-ecological perspective and analytical framework was developed to address multifaceted impacts of cyberspace on the child's developmental context (Gaitis et al., 2025). The new framework adapted Bronfenbrenner's (1979) ecological systems theory by positioning the child in the centre of five environmental systems (i.e., microsystem, mesosystem, exosystem, macrosystem, chronosystem) that interrelate and influence child's developmental processes. In addition, it introduced the technology component- cyberspace- as an omnipresent factor affecting and interacting with all layers of the child's environment, including family, peers, communities, and the whole socio-ecological system.

This model allows to analyse impacts of various forms of technology-facilitated risk and harms by factoring in specific characteristics of technologies used to target child's online safety. Multidimensional personal and societal implications of the misuse of digital world can be mapped and reveal patterns of harmful behaviours, as well as systemic, cultural and structural discrepancies in responding to them. To harness the complexity of technology-facilitated violence, it is crucial to analyse its effects across all the levels of the child's environment and place it accurately on the current or emerging technological landscape.

4.3 The Proposed 2025 Index TF-CSEA conceptual framework

The initial framework developed for the previous edition of the Index (Fry et al., 2024) was carefully revised and new categorisation proposed. Several iterations of the conceptual framework were developed, and the final five broad subtypes defined, based on the existing terminology guidelines, empirical research and with consideration of selected international and national policies and legislations (see Table 2). The examples of legal and policy definitions for technology-facilitated offences cover a range of behaviours, across various countries and often include age of consent (e.g., under 16) as a precondition for the act to be classified as criminal. In our proposed conceptual framework, the discrepancies are addressed by applying a uniform and universalist approach to the definition of a child (anyone under the age of 18 years) and the perpetrator (i.e., not limiting the categorisation to a specific age difference or child-adult harmful interactions).

Table 2 ***Proposed five subtypes of TF-CSEA in the context of selected policies and legislation.***

Subtype of TF-CSEA	Definitions of TF-CSEA in Policy and Legislation
Online solicitation	• Making sexually explicit material available to a child (Section 171.1; Criminal Code; R.S.C., 1985, c. C-46). Sexually explicit material in this case refers to 'written material whose dominant characteristic is the description, for a sexual purpose, of explicit sexual activity with a person', even in the absence of the following physical contact or in person meeting. It applies to any person that commits the offence. • Luring a child by a means of telecommunication (Section 172.1)
	• Intentionally sending images or videos of genitals or sexual acts: a) to cause alarm, distress or humiliation; b) for the purpose of obtaining sexual gratification (Section 66A; Sexual Offences Act 2003, c.42). • A person aged 18 and over intentionally engage in sexual communication with a child (under 16) to obtain sexual gratification or encourage a child to make a communication sexual (Section 15A)
	• "the intentional proposal, through information and communication technologies, of an adult to meet a child [...], for the purpose of committing any of the offences [...] against him or her, where this proposal has been followed by material acts leading to such a meeting" (Council of Europe, The Lanzarote Convention, 2007).
	• "the act of intentionally communicating, soliciting, grooming, or making any arrangement through an information and communications technology system for the purpose of committing a sexual offence against a child, as defined in domestic law […]" (UNGA, 2024)
Child Sexual Abuse Material (CSAM)/Image-based sexual abuse (IBSA)	• "Every person who transmits, makes available, distributes, sells, advertises, imports, exports or possesses for the purpose of transmission, making available, distribution, sale, advertising or exportation any child pornography is guilty of an indictable offence." (Section 163.1; Criminal Code; R.S.C., 1985, c. C-46).
	• Intentionally sharing an image or video, which shows or appears to show another person in an intimate state: a) to cause alarm, distress or humiliation; b) for the purpose of obtaining sexual gratification (Section 66B; Sexual Offences Act 2003, c.42).
	• "the use of children in pornographic activities, performances and materials" (Article 27; ACRWC 1990)

Exposure to unwanted sexual content	• Making sexually explicit material available to a child (Section 171.1; Criminal Code; R.S.C., 1985, c. C-46). Sexually explicit material refers to 'a photographic, film, video or other visual representation, whether or not it was made by electronic or mechanical means'. It applies to any person that commits the offence.
	• Forcing a child to watch pornographic video/images for perpetrators' own sexual gratification is considered an offence (Section 12; Sexual Offences Act 2003, c.42). This applies to children and young people under 18 who commit the offence.
Online sexual exploitation	• Monetary or non-monetary considerations or benefits offered in exchange for sexually abusive or exploitative act (e.g., live-streaming of child exploitation) (Republic Act No. 11930).
Sexual extortion	• Threatening to share an image or video, which shows or appears to show another person in an intimate state (Section 66B; Sexual Offences Act 2003, c.42).

Sources:

Sexual Offences Act 2003 (UK Government); Criminal Code (Government of Canada); Republic of the Phillippines (2022). RA 11930: Anti-Online Sexual Abuse and Exploitation of Children; ACRWC (1990). Article 27; UNGA. (2024, December). United Nations Convention against Cybercrime. Article 15; The Council of Europe (2007). Convention on the protection of children against sexual exploitation and sexual abuse (Lanzarote Convention); UNGA (2024, December). United Nations Convention against Cybercrime. Article 15.

A key change that was implemented to the 2024 framework involved separating forced/unwanted exposure to sexually explicit materials/pornography from non-consensual taking and sharing of sexual images and videos (see Table 3). They were initially aggregated into a broader subtype based on some shared characteristics, including the image/video component and the use of various digital technologies, not exclusively Internet platforms, to inflict the harm upon children. Non-consensual taking of sexual images/videos and forced exposure to pornography could also take place in both online and offline environment. However, despite those overlapping characteristics, they fall under distinct categories based on the legally and non-legally binding sources (E-Safety Commissioner, 2021; Government of Canada, 1985; UK Government, 2023). Non-consensual production, distribution and misuse of sexually explicit materials of a child is also conceptualised and operationalised in research and terminology guidelines as a distinct construct referred to as child sexual abuse material

(CSAM)/ child sexual exploitation material (CSEM) (ECPAT International, 2025) or image-based sexual abuse (Finkelhor et al., 2023).

Online solicitation subtype remains unchanged and covers a wide range of terms that are either used interchangeably despite different definitional elements (e.g., online grooming, online sexual harassment, online solicitation) or are linked to other abusive behaviours that are included in this subgroup (e.g., unwanted/pressured sexting that could be considered as an online extension of sexual harassment) (Cooper et al., 2016; Greene-Colozzi et al., 2020). According to several international instruments and criminal codes, online sexual solicitation is considered a form of sexual abuse and a criminal offence (Council of Europe, 2007, Government of Canada, 1985; UK Government, 2023; UNGA, 2024), often regardless whether the online interactions result in a meeting or committing a sexual offence. Solely an intentional proposal to meet the child for sexual purposes or online soliciting a child to provide sexually explicit images of themselves classify as an offence.

Table 3 ***Five broad subgroups of TF-CSEA.***

Aggregated Subgroup	Examples of composite TF-CSEA subtypes	Description
Online solicitation	Online grooming, online solicitation, online sexual harassment, unwanted sexual talk, pressure to obtain images, voluntarily provided images in a statutorily impermissible relationship, unwanted/non-consensual/pressured sexting (sending and receiving sexual messages, images, and videos), unwanted sexual talk and sexual activities on webcam (Sub-type informed by Finkelhor et al., 2022; ECPAT International, 2025).	This subtype covers a range of unwanted/pressured sexual interactions. Those may include casual sexual inquiries via mobile phone or Internet, as well as long-lasting sexual conversations that can lead to exchange of sexual pictures/videos, or exposure of intimate body parts/engaging in cybersex (no money exchange or threats involved). It is important to note that all different types of online solicitation may come from peers as well as adult perpetrators. This subgroup includes receiving unwanted sexually explicit text messages, emails, photos and videos, sent by peers or adults.
Child Sexual Abuse Material (CSAM)/ Image-based sexual abuse (IBSA)	Non-consensual making, taking and distributing of images or videos by an adult or another child (Sub-type informed by E-Safety Commissioner, 2021; ECPAT International, 2025; European Commission, 2024)	Child Sexual Abuse Material refers to having sexual images taken when a child was unconscious, intoxicated, distracted, or unable to consent. This subtype also includes non-consensual sharing of images/videos of a child via mobile phone or Internet. It could also include: a) deepfakes in which a child's head or likeness was imposed on a sexual image of someone else; b) AI-generated CSAM; and c) avatars as digital representation of real children abused or exploited in a virtual reality. This type of

		exposure may not be a precursor-to a request for reciprocity.
Exposure to unwanted sexual content	Forced/unwanted exposure to pornographic content (adult content or CSAM (Child Sexual Abuse Material) (Sub-type informed by E-Safety Commissioner, 2021)	This subgroup includes an unwanted exposure of a child to pornographic materials (e.g., forcing a child to watch nude videos or pictures or sending a child a link to pornographic websites). Please note that unwanted exposure to sexual content occurs frequently while surfing or scrolling through social media. This type of exposure may not be precursors to a request for reciprocity.
Online sexual exploitation	Commercial sexual talk, commercial sexual images, or other commercial sexual activity, live streaming of child sexual abuse (Sub-type informed by ECPAT International, 2025; Finkelhor et al., 2022; Laird et al., 2022)	Sex acts are exchanged for the child or young person's unmet needs, via the provision of monetary or non-monetary resources (e.g., food, clothes, shelter, affection, protection, belonging, gifts and/or anything else of perceived value to the young person or child) on or offline.
Sexual extortion	sextortion, sexual extortion, sexual blackmail, sexual coercion (Sub-type informed by E-Safety Commissioner, 2021; ECPAT International, 2025)	Sexual extortion is a form of blackmail that involves threatening to share an individual's intimate image or video online unless they comply with certain demands such as to obtain money or gift cards/other items of monetary worth, additional pictures, or other sexual activities. This subtype also includes sexual acts on webcam coerced by perpetrator.

Source: https://www.childlight.org/into-the-light

Although the existing nationally-representative surveys on TF-CSEA have not yet addressed child abuse and exploitation perpetrated using Artificial Intelligence (AI) or other extended reality (XR) technologies (Fry et al., 2025), we included those harms in the Child Sexual Abuse Material subgroup to future proof the categorisation. Considering fast-paced development of technologies and the increased use of generative AI to produce synthetic sexualised content involving children, may warrant the recognition of this type of abuse as a distinct and emergent subtype of TF-CSEA.

5. Conceptual and measurement intersectional model of TF-CSEA

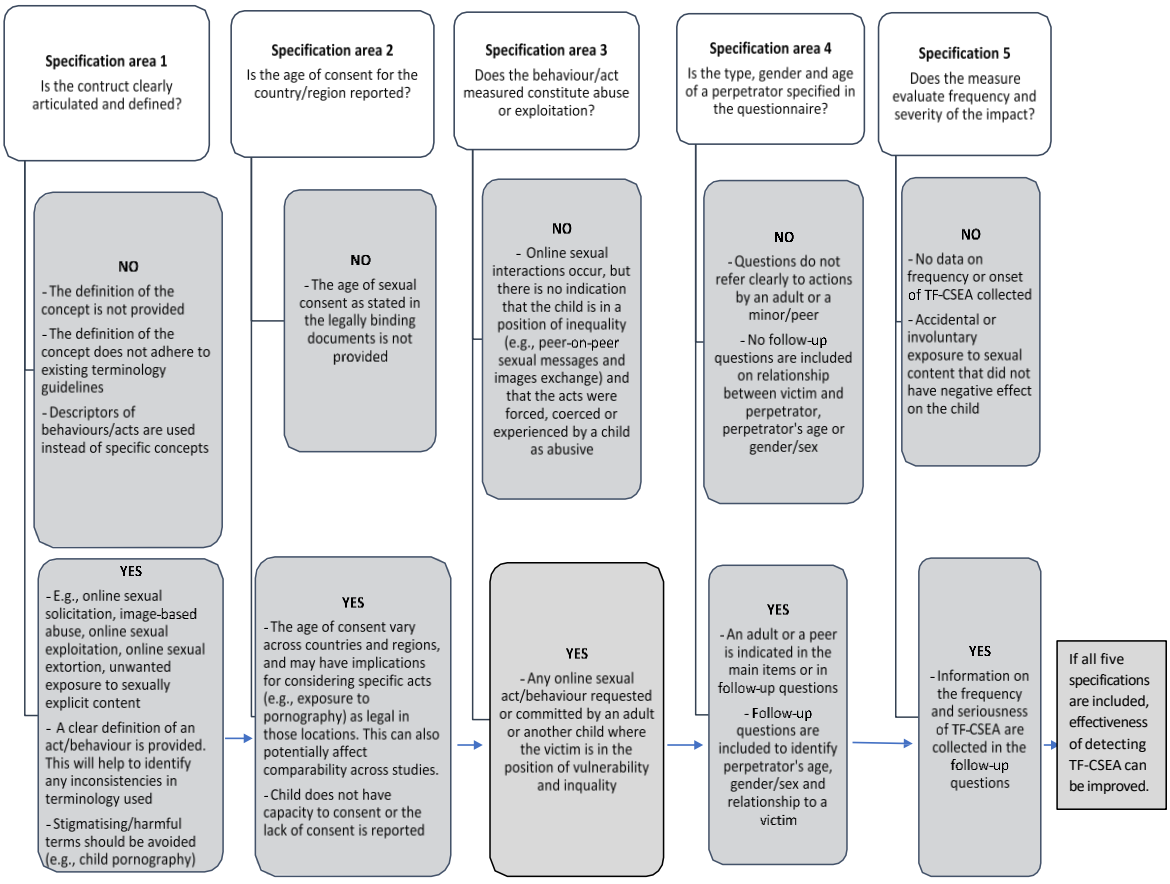
Developing and systematically implementing a unified conceptualisation, precise definitions and standardised measures of TF-CSEA is crucial for effective research that is a foundation of evidence-based policy and legal responses. Therefore, adaptable baseline model that incorporates all the components, recognises their intersectionality, as well as remains dynamic and responsive to emerging types of TF-CSEA can help navigate the complexity of the methodological issues empirical work in the field currently faces.

As demonstrated in our systematic review on global prevalence of TF-CSEA, there were substantial inconsistencies across the included studies in terms of the terminology, definitions and instruments used (Fry et al., 2024). Despite availability of terminology guidelines (E-Safety Commissioner, 2021; ECPAT International, 2016; UNICEF, 2023) and validated TF-CSEA measures (e.g., JVQ-R2, Finkelhor et al. 2011; Questionnaire of Sexual Solicitation and Interactions with Adults, Gámez-Guadix et al., 2017; The Grooming Scale, Peris & Maganto, 2018) that provide a useful reference, researchers either developed their own outcomes and measures or used constructs derived from other sources relying on judgment of experts in the field. It should be emphasised that it is not our intention to criticise those approaches and efforts; rather, we aim to explore and better understand the current state of the research in the field and contribute to its development.

Childlight's ongoing efforts to update the existing evidence base of TF-CSEA research and iterations of the conceptual framework, led us to designing a preliminary conceptual and measurement intersectional model of TF-CSEA (see Figure 1). This model was developed to initiate a discussion about further steps towards improving consistency and clarity of terminology used, development of new validated measures, and consequently increasing effectiveness in detecting different types of TF-CSEA. Although it may assist and guide researchers in their work and contribute to development of rigorous research design and methods, this model is not a solution for all the complexities and variance of TF-CSEA.

Figure 1

Conceptual and measurement intersectional model



Source: Krzeczkowska, A., Steele B., & Fry, D. (n.d.). Measuring technology-facilitated child sexual exploitation and abuse (TF-CSEA) in quantitative studies: A systematic review.

The model introduces five key components that are essential to consider in both conceptualisation and operationalisation of TF-CSEA in order to improve the effectiveness of the outcome detection and assessment. *The first specification area* highlights the importance of the use of precise terminology and definitions in research on TF-CSEA, as recommended by the up-to-date terminology guidelines. This implies adhering to the generally agreed meaning of the constructs and avoiding previously commonly used terms like 'webcam child sex tourism' or 'child pornography', to minimise the risk of stigmatising and/or harming children (ECPAT, 2025). A coherent approach in reporting the outcomes should also be employed, refraining from using descriptions of behaviours instead of specific TF-CSEA terminology, which can prevent arbitrary interpretations and categorisations of TF-CSEA in future prevalence studies.

Specification area 2 of the model focuses on definitional discrepancies of 'a child' and 'the age of sexual consent' that vary across countries and legal contexts (e.g., European Commission, 2024; The Council of Europe, 2021; The Lanzarote Convention, 2007). Thus, depending on the aim of the research and the scope of its applicability, these can be defined based on either the national or international laws. However, for the purpose of improved comparability across studies globally and identifying the nature and magnitude of the risks for various age ranges, we recommend moving towards a unified definition of a child as any person under the age of 18 (The Council of Europe, 2021; The Lanzarote Convention, 2007), and go beyond considerations of the legal age of consent as determined by individual countries. Particularly in the digital environment, children have limited or no capacity to distinguish with whom they are interacting and provide true consent, and therefore, should all be protected. Most importantly, regardless of their age and stage of the psychosocial development, it must not be assumed that any children consent to their own abuse and exploitation.

Specification area 3 refers to an ongoing debate whether certain harmful sexual behaviours or acts constitute abuse or exploitation (e.g., Finkelhor et al., 2024; Laird et al., 2023;

Mathews & Collin-Vezina, 2019). Our findings indicate that online child sexual exploitation involves monetary or non-monetary offer or exchange for sexual acts or sexually explicit materials of a child. These acts could be perpetrated or facilitated by both adults and peers and are considered exploitative regardless of consent or who initiated them (Laird et al., 2023; Simon et al., 2020). In terms of technology-facilitated sexual abuse, we recommend that acts like online sexual solicitation, online grooming, or online sexual harassment are classified as forms of abuse, even if they are perpetrated by another child or are not considered as criminal offences. These harmful online sexual interactions are initiated and carried out for the purpose of sexual gratification of the perpetrator and committing sexual offences against a child (UNGA, 2024). Therefore, the mere act of requesting for sexual information, conversations, or images with the intent to harm the child and commit a sexual offence should be considered abusive, especially if children experienced them as such.

Specification area 4. The diminished capacity to identify perpetrators in the online environment results in limited data on their characteristics such as age, gender, or relationship with the victim. Incorporating follow-up questions on the child's subjective perception of the perpetrators and their behaviourally specific tactics, would allow more accurate identification and potentially capturing several episodes of victimisations and different perpetrators.

Specification area 5. Comprehensive screening tools of TF-CSEA that produce both past year and lifetime prevalence estimates are more likely to capture more incidences of TF-CSEA and generate more accurate estimates. In addition, detailed frequency of occurrence (e.g., using Likert scale), age of the onset, and severity of the victimisation (i.e., perceived emotional and psychological impacts) should be incorporated into an assessment.

6. Summary and conclusions

This white paper outlined the key challenges that can be identified in the research on TF-CSEA, including methodological, terminological and definitional inconsistencies. It also offered some suggestions that could contribute to unified conceptualisation and standardisation of methods used. In addition, existing conceptual frameworks and an example of a conceptual and measurement intersectional model to guide categorisation of empirical methods and terminology were introduced to emphasise the need for continuous work on refining the approach to research in the field.

We argue that joint efforts at the international level are critical to improve the quality and robustness of evidence on TF-CSEA. Fragmentation of data and lack of agreement on classifications of TF-CSEA outcomes prevent identifying and drawing strong conclusions regarding the scale of the problem and hinder comparability of the findings across studies and contexts. To improve data quality and reliability and produce more accurate prevalence estimates of TF-CSEA, standardised instruments should be developed and consistently utilised. They should be, if possible, specifically designed (e.g., ICAST; Dunne et al., 2009; Zolotor et al., 2009) and validated for different groups of respondents, to ensure they are appropriate for use across various contexts and cultures. In addition, the research community may also consider multi-site/institutional collaborative studies with agreed unified protocols so that larger datasets can be pooled and merged for analyses.

All those efforts can lead to creating integrative or intersectional models for structured research process and informed perspective on technology-facilitated child sexual victimisation. The informed perspective can be further enhanced by individual contributions and active involvement of victim-survivors in co-producing the screening tools and refining terminology. Consultations with children and young people may allow to avoid adverse impacts of research procedures on participants, prevent using stigmatising or age-inappropriate language, and finally identify erroneous assumptions on what is or not

perceived by them as harmful or abusive (van der Spuy et al., 2024). Moreover, understanding drivers, underlying dynamics, and impacts of TF-CSEA can provide further insights into complexity of those harms and accurate classification.

Finally, this paper provides a first step towards better understanding the complexity of technology-enabled harms and the extent this complexity is currently addressed in classification frameworks, terminology guidelines, and legally and non-legally binding instruments. Compliance with either legal or various expert-generated definitions of TF-CSEA can be problematic in terms of cross-country transferability (legal constructs) and granularity in terminology (expert-generated concepts), which can result in prioritising certain risks while neglecting others. As a useful point of reference, we recommend using in the future prevalence studies regularly updated ECPAT Terminology Guidelines for the Protection of Children from Sexual Exploitation and Sexual Abuse, which include internationally agreed concepts and definitions of TF-CSEA (ECPAT International, 2025). Complying with those guidelines offers an opportunity to finally produce globally comparable data that can shed light on risks children face in the digital environment and lead to adequate and effective responses not only in the local contexts, but also at the international level.

Strong evidence is necessary to provide the basis and direction for developing new policies and laws, to ensure attention is paid to research findings, and to advance the system for child protection. Technology-facilitated sexual crimes against children evolve quickly and new forms of abuse constantly emerge, which means that it is time to agree on measurable outcomes and specify indicators that will allow this progress to be tracked and stay ahead by planning high-quality prevention.

Consultation process

This White Paper which forms the basis of our technical note for the TF-CSEA estimates in the Into the Light 2025 index underwent a two-week consultation across several key stakeholder and expertise groups including academics, policymakers and key framers of TF-CSEA and included the following:

a. Childlight Senior Leadership Team,
b. Childlight Research Team,
c. Childlight Index Technical Sub-Committee,
d. Comment from regulators involved in framing TF-CSEA for policy (Ofcom, Coimisiún na Meán, E-Safety Commission)
e. Comment from national and regional bodies focused specifically on CSEA in the 2025 Index regions through Childlight's Index Impact and Communications Working Group (includes one expert representative from each of the 44 countries included in the 2025 index as well as key regional bodies for Western Europe and South Asia including Council of Europe and UNICEF ROSA)

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