"We're utterly ill-prepared to deal with something like this": Teachers' Perspectives on Student Generation of Synthetic Nonconsensual Explicit Imagery

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Abstract

Synthetic nonconsensual explicit imagery, also referred to as "deepfake nudes", is becoming faster and easier to generate. In the last year, synthetic nonconsensual explicit imagery was reported in at least ten US middle and high schools, generated by students of other students. Teachers are at the front lines of this new form of image abuse and have a valuable perspective on threat models in this context. We interviewed 17 US teachers to understand their opinions and concerns about synthetic nonconsensual explicit imagery in schools. No teachers knew of it happening at their schools, but most expected it to be a growing issue. Teachers proposed many interventions, such as improving reporting mechanisms, focusing on consent in sex education, and updating technology policies. However, teachers disagreed about appropriate consequences for students who create such images. We unpack our findings relative to differing models of justice, sexual violence, and sociopolitical challenges within schools.

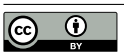
CCS Concepts

• **Security and privacy** → **Social aspects of security and privacy**; • **Human-centered computing** → **Empirical studies in HCI**; • **Social and professional topics** → *Children.*

Keywords

Synthetic nonconsensual explicit imagery, deepfakes, students, teachers, abuse

ACM Reference Format:
Miranda Wei, Christina Yeung, Franziska Roesner, and Tadayoshi Kohno. 2025. "We're utterly ill-prepared to deal with something like this": Teachers' Perspectives on Student Generation of Synthetic Nonconsensual Explicit Imagery. In *CHI Conference on Human Factors in Computing Systems (CHI '25), April 26–May 01, 2025, Yokohama, Japan.* ACM, New York, NY, USA, 18 pages. https://doi.org/10.1145/3706598.3713226



CHI '25, Yokohama, Japan

ACM ISBN 979-8-4007-1394-1/25/04
https://doi.org/10.1145/3706598.3713226

Warning: This paper includes text description and quotes about image-based sexual abuse and child abuse.

1 Introduction

Synthetic nonconsensual explicit imagery (SNCEI) is easier and faster to generate than ever before. Creation of realistic pictures or video is possible with a single image and knowledge of a website or app that provides cheap or free "nudify-as-a-service" operations, using AI to digitally "remove" clothing or to swap faces onto nude bodies. Prior research has investigated the specialized communities that discuss advanced machine learning techniques to develop the underlying AI models capable of generating explicit content [79, 86], but users no longer need to engage with those communities to create SNCEI. Lowering the technical barriers means that today, creating SNCEI has grown beyond highly technical communities, and instead is now readily available to a much broader online audience.

In late 2023 and early 2024, journalists began reporting that students in middle and high schools used "nudify" services to generate images. In one of the first criminal cases of its kind in the US, two boys in Florida were charged for creating AI-generated nude images of their classmates [35]. Students have allegedly used similar platforms to create SNCEI of their classmates in at least 9 other US middle and high schools, including in California, Ohio, Alabama, Florida, and Washington [13, 20, 31, 34–36, 44, 50, 73, 75], as well as in schools in Spain and South Korea [76, 80]. The creators of the synthetic images were one or more boys who made images of their classmates who were girls without their knowledge or consent, where some of the victim-survivors depicted were as young as 12 years old. Demonstrating how simple it has become to find these "undress" services, some creators had discovered the tools on social media, including TikTok and Instagram [13].

There has been a notable lack of consensus on how schools should respond to students creating SNCEI. Though many of the 10 US schools suspended or expelled the students who created the images, in at least one case, school officials delayed reporting

to law enforcement, citing confusion about their role as mandatory reporters and whether synthetic imagery fell into the same domain [13]. In another, a school superintendent said that their "hands were tied" in terms of the actions the school could take as it did not happen directly on school grounds, and that it therefore should have been considered a case between the relevant guardians and law enforcement [73] However, involving law enforcement in and of itself is an unclear solution. Regulation of SNCEI is an evolving area: though there are some proposed bills that have been brought in 2024, there are currently no federal laws in the US that directly address scenarios where youth create SNCEI.

Synthetic images are only going to become more common. Taking a proactive approach, we interviewed US middle and high school teachers — people with high levels of interaction with and deep knowledge of students — to understand teachers' knowledge and perspectives about student-generated synthetic nonconsensual synthetic explicit imagery (SNCEI). Specifically, we asked:

RQ1: Threat models. What motivations do teachers expect their students to have for creating SNCEI? Who do they think may become a perpetrator or victim-survivor? How easy do they think it is to learn about and use these technologies?

RQ2: Interventions. What kinds of interventions do teachers anticipate would be effective? How do schools currently handle incidents related to student safety? What resources would teachers want regarding SNCEI in the future?

RQ3: Broader sociopolitical context. How are teachers' opinions about SNCEI informed by the broader sociopolitical context in the US, including about justice, gender, sexual health, machine learning, and more?

We found that teachers broadly have heard about SNCEI, although no teacher mentioned it happening at their own school. Most teachers remarked that it could be possible, and one even suspected it was already happening, but they just did not know about it. Notably, teachers' understanding of how SNCEI would appear in schools revealed awareness of dynamics of gender-based violence, particularly that girls would be the most affected, although boys and girls could have motivations for creating. Teachers had significant concerns about the potential for SNCEI to worsen existing cyberbullying or sexual harassment, intuiting that new technologies would exacerbate existing avenues of interpersonal harm.

Most teachers emphasized, however, that kids may not understand the consequences of their actions and are still learning how to build healthy relationships. Teachers saw multiple opportunities for improved education as promising avenues for addressing the impending issues of SNCEI, including around sexual health, use of social media and technology, and emotional and social development. We discuss these opportunities, and others, for curtailing the harms of synthetic content.

2 Related Work

Our investigation of synthetic nonconsensual explicit imagery generation by students is situated within the broader landscape of image-based sexual abuse, as a form of technology-facilitated gender-based violence [38, 55]. We describe how our work builds on prior work within the computer security, privacy, and online safety literature, including on youth digital safety.

2.1 Image-Based Sexual Abuse

In 2017, McGlynn and Rackley conceptualized image-based sexual abuse (IBSA) as an umbrella term for a range of harms relating to the nonconsensual creation or distribution of private sexual images. They proposed image-based sexual abuse as a term that better situates harms like nonconsensual sharing of intimate images ("revenge porn") or upskirting as forms of sexual violence and thus part of a broader approach to respond to sexual violence [52, 54]. In subsequent years, research continued to explore more manifestations of IBSA, e.g., threats to distribute and financial sextortion [19, 37, 39, 60], as well as measure rates of victimization and perpetration [23, 39, 71].

While people who experience IBSA do not all experience the same consequences, these consequences frequently include serious emotional, social, financial, and physical impacts [4, 37, 53]. A study investigating the experiences of 75 victim-survivors of IBSA in the UK, Australia and New Zealand developed five phenomenological themes in victim-survivors' accounts of harm: immense *social rupture* that altered their sense of self and relationships with others, perceived *constancy* and *existential threat* of the harm, as well as consequential *isolation* and *constrained liberty* that radically changed their experience of the world [53]. In intimate relationships, abusers may use IBSA specifically as a tactic for gaining power and control, e.g., as part of emotional abuse or using coercion and threats [24].

Recourse for survivors of IBSA varies highly by location, identity, and other factors. Legal scholars have called for nonconsensual sharing of intimate images ("revenge porn") to be criminalized, given the grave harms that chill self-expression and devastating privacy invasions [15]. In the decade since, legal advocacy in the US have contributed to 49 states, DC, and two territories passing laws against nonconsensual distribution of intimate images [12], though these are only one of many forms of IBSA. Further, social stigma may lead people who experience IBSA to only seek informal help [84], or inhibit them from seeking help at all. Computing researchers are also exploring technical recourse for combating IBSA, e.g., proactive protection strategies [66], conceptual frameworks to identify intervention opportunities [67], ML-assisted detection [69]. We situate our work among this growing body of work on IBSA by affirming the broader understanding that abuse of intimate and sexual images is an extremely urgent and grave issue with significant variance by sociotechnical, political, and cultural dimensions depending on the specifics of each case.

Synthetic nonconsensual explicit imagery (SNCEI). Synthetic nonconsensual explicit imagery (SNCEI) is a specific form of IBSA where the images used for abuse are synthetically created, whether through photoshopping [55] or generative AI tools [28, 79, 81]. Though image manipulation tools have existed for decades [25], using technology to nonconsensually create sexually explicit images drew public attention in 2017 when a Reddit user named "deepfakes" posted SNCEI (videos) of celebrities. In subsequent months, tens of thousands of users joined `r/deepfake`, a subcommunity dedicated to creating and sharing similar content. Reddit and other major social platforms have largely banned SNCEI [40], though

it is still being produced on specialized forums [79, 86]. However, industry reports in the last two years increasingly highlight that AI-generated images are no longer restricted to niche underground forums, and are also widely available as part of a monetized online business model [30, 48].

A 2019 report found that essentially all SNCEI found online was sexually explicit and depicted ciswomen; similarly, a 2023 report confirmed these trends and that the number of deepfake videos online had increased 550% since 2019 [41]. People in the US have a strong opposition to the creation of SNCEI [46], though were less opposed to the seeking out or sharing of such content [10], aligning with research on perspectives in 10 countries that showed viewing of SNCEI of celebrities was more common than of non-celebrities [81]. Scholars have drawn attention to the uniquely harmful exploitations of deepfake technology, particularly for non-consensual creation of sexual content of women, and called for additional regulation [14, 46, 47].

In this paper, we focus specifically on SNCEI in school contexts, motivated by news reporting in late 2023 and early 2024 that identified SNCEI in schools as a newly prevalent concern. Most prior research focuses on SNCEI *by and of adults* in intimate partner relationships or online [24, 47, 53, 79, 84], but youth creation of SNCEI poses unique legal and social considerations. Laws are actively evolving about treating SNCEI that depicts people under 18 as child abuse or child sexual abuse material (CSAM) [59], though the FBI has issued an alert that it is [58]. The social context of a school is unlike most adult environments; students are required to attend and teachers have classroom authority. Further, teachers often have specialized training and are highly committed to student well-being, creating a unique opportunity to explore interventions that would be impossible for SNCEI in non-school contexts.

Terminology. Carceral responses to sexual violence tends to use "perpetrator" or "offender" to describe a person enacting violence, and "victim", "survivor", or "victim-survivor" to describe a person affected by the violence [83]. However, some advocacy organizations highlight that these terms reduce people's personhood to an identity related to one event, de-emphasizing their agency [17] and obscuring that someone who perpetrated violence often experienced violence themselves (e.g., substantial IBSA "victim-perpetrator" overlap [77]). These terms also carry stigma and make people resistant to taking accountability [17, 82]. Given that perpetrator and victim-survivor are terms that are most commonly used in the security and privacy research community, we alternate between both sets of terms, i.e., perpetrator or creator of SNCEI; victim-survivor or subject of SNCEI.

2.2 Youth and Online Safety

Researchers in security, privacy, safety, and HCI have studied the digital safety of youth through multiple experiences of risk, including IBSA but also online (non-sexual) harassment, information breaches, financial fraud, misinformation [29, 87]. Researchers have looked proactively to understand the strategies taken by youth or adults who support youth [29], as well as the how youth respond to sexual risk experiences in private Instagram conversations [2, 3, 21, 70]. Experience of risk is not uniform: LGBTQ+ youth experience more high-risk online interactions than heterosexual youth [78]. In order to navigate such risks, youth often turn to their peers to learn more about safe sexting or other online safety risks [33, 42]. However, participatory approaches to online safety by working with youth, such as collaborative family-cenetered design for online safety [1] or co-management of online apps between parents and teenagers [1] emphasize that youth safety does not only fall to youth, but is instead a communal endeavor [11, 65].

Researchers in human-computer interaction have also studied the broader field of cyberbullying, including large-scale literature reviews to document its scale and history [43], youth peer help-seeking strategies [42], and bystander mitigation strategies on social media platforms [22]. Our work differs from prior research on cyberbullying as we focus on the potential impact of SNCEI, which involves gender or sexual abuse not found in all conversations about cyberbullying.

While SNCEI is not new, the use of modern generative AI tools to create it only become widely accessible in the past few years. How youth might learn about new online safety risks is an important area of research, particularly regarding IBSA risks. In this work, we explore not only how youth may experience these risks, but also how youth are the perpetrators of this risk to other youth [63].

Policy and regulation about SNCEI and CSAM. Based on a report from August 2024, there are federal bills being reviewed to create civil penalties for creating synthetic images of someone against their will [56]. In particular, one bipartisan-supported proposed legislation called the "Tools to Address Known Exploitation by Immobilizing Technological Deepfakes on Websites and Networks (TAKE IT DOWN) Act" seeks to criminalize the intentional creation of SNCEI, and also mandates that social media platforms must remove content within 48 hours after being reported.

Additionally, 29 states have passed bills that explicitly discuss the creation of SNCEI [56]. Of these current bills, 18 address SNCEI as child sexual abuse material (CSAM), i.e., sexual content created about youth (individuals below the age of 18), by expanding "child pornography" laws to include digitally generated content. Other states take a different approach by amending "revenge pornography" laws to include SNCEI. Federal agencies, such as the FBI have also released statements clarifying that all CSAM, regardless of whether or not it was synthetically created, would be illegal to hold, create or distribute [58]. However, policies are still developing, and it is not yet clear how laws surrounding SNCEI and CSAM would be applied or enforced in school contexts [62].

3 Methods

We interviewed 17 middle and high school teachers in the US to understand their opinions and concerns about synthetic nonconsensual explicit imagery (SNCEI). Given that SNCEI is an emerging issue, we took an *proactive* approach in this study; we wanted to understand how teachers expect that incidents will arise, as well as how they predict students and schools will respond. SNCEI incidents are possible in any school, so many teachers who encounter SNCEI may be encountering this issue for the first time.

3.1 Recruiting and Participants

We mainly recruited on Prolific, a crowdworking platform shown to be preferable to Amazon Mechanical Turk in terms of comprehension, attention, and honesty of participants [61]. We also shared the opportunity to participate with eligible individuals in our personal networks and on social media (see recruitment flyer in Appendix Figure 1). All interested in participating were directed to a 3-minute screener survey to confirm their eligibility: located in the US, currently a teacher at a US middle or high school, and have at least two years of teaching experience. The screener survey also collected basic demographic information about the participant (age, gender, state), which were not used for recruitment criteria but were retained to report the diversity of our sample. Of the 375 survey responses we received, we incrementally invited eligible participants to schedule a 60-minute online interview until we anticipated that our data collection and analysis would reach conceptual depth, i.e., demonstrate a *wide*, *complex*, and *valid* range of concepts, with appropriate *subtlety* to meaning and *resonance* with the existing literature [7, 57]. Interviews were conducted in July and August 2024 and participants received $40. Details about our participants are shown in Table 1.

Of the 17 teachers interviewed, 5 were recruited through our personal networks and 12 through Prolific, representing 10 distinct states: FL (3), TX (3), GA (2), NY (2), WA (2), AZ, MA, MS, NH, TN. Participants' age ranged from 22 to 56, with an average age of 38; 12 were women, 4 were men, and 1 was a non-binary transmasculine[1] person. Most of the participants had between 11-20 years of experience working with youth (7 participants) and the 17 participants covered 11 different teaching subjects, including English (4), Substitutes covering all subjects (3), Math (2), Chemistry, Freshman Seminar, German, History, Music, Science and Biology, Special education, and Speech Pathology. 12 participants provided the approximate size of the student body served by their school, ranging from an alternative school that had between 5 to 100 students at a time, up to 2,500 students. Participants described their respective student body as predominantly Black or Latino (6), from lower income families (5), socioeconomically diverse or a mix of backgrounds (4), or from wealthy backgrounds (2).

3.2 Interview Procedures

We developed our semi-structured interview script based on our research questions and refined the script through four pilot interviews. After reviewing our consent form, we began the interview by asking about teachers' role in their school and general characteristics about the school, and then about their awareness of SNCEI, in schools or more broadly. Next, we asked about teachers' opinions about which types of students might create SNCEI, their potential motivations, as well as who might be likely to be victim-survivors. After we had discussed various elements of their imagined threat models, we then shared a summary of the cases reported in local or national news about SNCEI in US schools. These selected cases reflected the focus of our study being on students creating SNCEI of other students. We solicited their impressions about these cases and whether something similar would be possible in their own schools.

In the second half of the interview, we explored potential interventions – what kinds of support they would like to see at an individual, school or administrative, and policy level. Finally, we concluded with some high-level questions about their fears and hopes for the future. We also shared our knowledge about terminology and provided an opportunity for participants to ask us questions. The full interview protocol is in Appendix A.2.

3.3 Analysis Approach

We transcribed all interviews for qualitative analysis, which combined descriptive and interpretative approaches to thematic analysis (TA) [8]. Some of our research questions involved specific questions about teachers' imagined threat model of SNCEI generation, including potential motivations, perpetrators, and victim-survivors. For these, our analysis was more akin to codebook TA, as the interview script was more structured and participant responses were more predictable and descriptive. However, other parts of our interviewing and analysis relied more heavily on researcher interpretation, such as how teachers evaluated different interventions, which sociopolitical factors influenced their perspectives, and broader views of justice, education, and technology. For these, our analysis was more akin to a reflexive TA [6, 8, 9], where analysis occurred recursively through sustained engagement with the dataset. We use the six phases of reflexive thematic analysis [6, 8, 9] to describe the steps of our coding below, given that we conducted both types of analysis concurrently, i.e., codebook TA and reflexive TA.

To code the interviews, the lead researcher first reviewed all transcripts, including rewatching video recordings to minimize the risk of misinterpretation based on transcribed text (TA phase 1). Then, this researcher coded five interviews to develop a preliminary codebook as well as preliminary themes, which were discussed with the other members of the research team (TA phases 2-3). After initial discussion, the lead researcher continued to code all remaining interviews, iteratively updating the codeboook as necessary (TA phases 2-3). After coding all interviews, the other members of the research team reviewed the codebook again, suggesting new codes or merging multiple codes as necessary, and refining the codes and themes (TA phases 4-5). The final codebook had 119 codes, organized into 13 groups. To ensure analysis quality, a second coder independently coded 4 interviews with the original codebook and added two codes, which were then propagated to the remainder of the interviews. The second coder then reviewed all codes made by the lead researcher and made changes as necessary.

3.4 Ethics

Our study was reviewed and approved by our institution's IRB. Given the sensitivity of this topic, at the beginning of this project, we also consulted experts at our institution on child abuse and child sexual abuse material (CSAM), human subjects research, interpersonal abuse, and counseling in education contexts. Throughout the research project, we carefully addressed ethical considerations related to mandatory reporting, participant anonymity, and participant and researcher well-being.

[1]Transmasculine, sometimes abbreviated to transmasc, describes a transgender person who was assigned female at birth and whose gender is in some way aligned with masculinity.

As employees of a public institution with mandatory reporting requirements for child abuse, we were especially cautious about how this could impact participant anonymity. Whether SNCEI is considered child abuse is an evolving legal area, and we recognized that making a report could introduce additional legal and personal risks to participants as well as their students. We disclosed our status as mandatory reporters to all participants, including the types of information that we would have to report if they disclosed abuse; we did not have to make any reports during the course of this research. Other measures we took to preserve participant anonymity included obtaining a waiver of documenting consent (we still obtained consent, but did not document it in a form that might otherwise de-anonymize participants) from our IRB, as well as a Certificate of Confidentiality[2] from the NIH.

All participants were informed about the nature of the study through a consent form (in text and verbally) before starting the interview, including the topics that would be discussed, and could skip any question(s). We took additional measures to support the well-being of researchers in this research, including: weekly individual and group check-ins, meeting with trauma-informed experts, having access to therapists, and taking regular breaks. Before beginning the study, we drafted a document for researcher safety guidelines, which we periodically reviewed to ensure that we stayed attuned to the well-being of the researchers.

Positionality statement. The way we discuss and perceive technology, justice, and education in this work is informed by our particular social, cultural, political, and historical context. We are researchers who have predominantly lived and worked in the US, have English as a first language, and have attended US middle or high schools, though these periods were many years or decades ago. Though all co-authors have held or currently hold a role with some teaching responsibilities, most of these experiences are at the post-secondary level. Our motivation in conducting this research is to explore the landscape and different options for mitigating the harms of SNCEI, and particularly non-punitive approaches.

3.5 Limitations

As with all interview studies, our research was limited by who was motivated to participate in our study, as well as what participants were comfortable disclosing to us. In particular, we did not collect the names of participants' schools, and made it clear that we were only interested in their perspectives as a teacher, not on behalf of their school or school district. However, our participants may have been more tech-savvy than all teachers, as our participants voluntarily participated in a study about SNCEI (see definition of SNCEI in recruitment flyer in Appendix Figure 1). We made clear at multiple points that there were no right or wrong answers to any questions, and were only interested in their opinions and perceptions. Additionally, who chose to participate may have been influenced by our recruitment material and process, which disclosed our institution and the feminine names of the two interviewers.

[2]NIH Certificates of Confidentiality (CoC) protect the privacy of participants enrolled in health-related research that use sensitive information, including in response to legal demands. See: https://www.era.nih.gov/erahelp/Coc_Ext/Content/A-Introduction/Introduction.htm

Our recruitment criteria did not include having experience with handling SNCEI incidents given ethical considerations and potential risks to participants (see Section 3.4). Thus, this study is not suited to describe prevalence of SNCEI in schools nor the opinions of teachers who have dealt with SNCEI incidents. However, SNCEI is an emerging issue that many teachers will likely have to face for the first time, which is why we proactively study threat models and potential interventions. Studying abuse proactively, i.e., before it occurs, contributes a distinct yet valuable perspective compared to studies of abuse after it occurs.

Our use of the term "deepfake nudes" may have influenced the connotations that some participants brought to our interviews. However, these are the most commonly used terms in media, so we used them because we were interested in how participants would most likely discuss them in their schools or with their colleagues and students. When participants used different terms, we followed suit in the interviews to use whichever terms came most naturally to them. Though in theory "deepfake nudes" could be created consensually, our study was focused on nonconsensual cases, aligned with the terminology that public media tends to use when reporting about SNCEI. We also included a debrief at the end to explain why academics argue against using "pornography" to refer to nonconsensual content [52, 54], and informed participants that alternative words like "AI-generated" or "synthetic" are also common.

4 Results

4.1 Technology and Support Resources at School

To provide some context about the school environment, we briefly describe technology use and support resources mentioned by participants about their schools. Out of 17, nine teachers described that their schools provided computing devices to each student (e.g., Chromebook or iPad). While teachers generally believed that school-provided technology was necessary for student learning, they were supportive of limitations that would reduce classroom distractions or opportunities for harm. Nine mentioned that their school provided WiFi with limitations, including blocking specific websites (mentioned 6 times), flagging content by keywords (3 mentions), or monitoring network traffic (3 mentions). Further, some teachers reported that there were existing school resources or policies that they would refer to if SNCEI incidents arose, but these varied greatly by school. For instance, some mentioned consulting school guidance counselors, code of conducts, policies that outlined the acceptable image sharing practices, or student digital safety courses; others mentioned they did not have these resources. The differences between each participants' school highlight one set of challenges in responding to SNCEI incidents: that each school will have different capacities and constraints to navigate, which may limit the effectiveness of generalized recommendations or interventions.

4.2 Perceptions of SNCEI

In this section, we describe what participants heard about SNCEI, and their opinions about its presence in schools.

Heard about SNCEI from news or social media. All of our participants had heard about SNCEI in some capacity. Multiple participants heard about SNCEI in the news, particularly as used

Table 1: Demographics and experiences of the 17 teachers interviewed for this study. Columns marked with * show abbreviated responses from participants, in their own words. N/A indicates that teachers did not give that information during the interview.

P#	Gender	Age	Years of Experience	How often heard of "deepfake nudes" or "AI porn"	Current Role Working with Youth*	# of Students in School	Student Characteristics and/or Background*
P1	Non-binary transmasc	22	4-5	Once or twice in the last 6 months	Math (9th - 12th grade)	N/A	Title 1 school, predominantly Black students
P2	Woman	30	11-20	Many times in the last 6 months	Freshman Seminar, high school basketball, volleyball and track coach	1,500	A lot of BIPOC students, many lower income families
P3	Woman	35	4-5	Once or twice in the last 6 months	English/Reading (9th & 11th grade)	N/A	Mix of Spanish speaking students, Latino, Black, and White students
P4	Woman	29	6-10	Not at all	Chemistry (9th - 12th grade), science department chair, environmental and crochet club sponsor	N/A	Predominantly Black school (~75%), White, Hispanic, Pacific Islander, Asian
P5	Woman	40	11-20	Once or twice in the last 6 months	High school substitute teacher	N/A	Predominantly Latino school, lower to middle class (~50%), increasing number of students who are learning English as a second language
P6	Woman	32	6-10	Not at all	Speech language pathologist with students aged 5 - 21	50	Legally blind, multiply disabled, different backgrounds
P7	Woman	56	6-10	Once or twice in the last 6 months	Substitute teacher (6th - 12th grade), all subjects	N/A	Students from wealthy backgrounds
P8	Woman	44	11-20	Once or twice in the last 6 months	Substitute teacher (6th - 8th grade), cooking club, STEM activities, walking club	300	Lower income, busy parents, some parents may be divorced
P9	Woman	33	2-3	Once or twice in the last 6 months	Math (11th - 12th grade), gaming club, crochet club	130	Title 1 school, lower income, 40% of students are bi or multiracial, significant number of Black, Latino, Pacific Islander students, large number of students (~50%) on queer or neurodivergent spectrum
P10	Man	42	21+	Once or twice in the last 6 months	Music theory and piano (9th - 12th grade)	2,500	Majority Black students, Hispanic students, minority White students
P11	Woman	42	11-20	Once or twice in the last 6 months	English Language and Arts (5th - 8th grade)	200	Title 1 school, lower income, 85% Black, also have Asian students, minority White students
P12	Man	33	6-10	Once or twice in the last 6 months	IB History, honors apUS history (11th - 12th grade), social studies honor society sponsor, founding member of social/emotional program for our IB students	2,000	Predominantly Black students (~65-75%), Hispanic students, White, minority Asian
P13	Woman	46	21+	Once or twice in the last 6 months	Science and biology (7th - 12th grade)	Varies, from ~5 or 6, to a max of 100	80% children of color, not much support at home
P14	Man	39	11-20	Many times in the last 6 months	English (8th grade), LEGO Club, National Junior Honor Society chapter, and the Gender-Sexuality Alliance (NJHS).	800 - 850	60% White, 40% not White, fair mix of immigrant and non-immigrant students, many English language learner students come from Dominican Republic, Puerto Rico, wide range of socioeconomic backgrounds
P15	Woman	38	6-10	Once or twice in the last 6 months	English (11th - 12th grade)	2,500	Socioeconomically diverse; 50% at risk, some college-bound
P16	Woman	44	11-20	Once or twice in the last 6 months	Special education (6th - 12th grade)	1,000	Lower income, students with special needs, some have ADHD, some students come from multiple households
P17	Man	40	11-20	Once or twice in the last 6 months	German (6th - 7th grade)	1,400	Higher than average socioeconomic status, about 90% Caucasian, as well as some African American, Asian, and Hispanic students

against celebrities (e.g., Taylor Swift, Alexandria Ocasio-Cortez), or raising awareness about specific harm scenarios (e.g., financial sextortion, child sexual abuse material). Participants largely discussed students creating SNCEI of other students, though a few mentioned that students could also create SNCEI of teachers by mentioning a report of such in a recent New York Times article [74]. While no participants reported knowledge of actual cases at their own schools, and most had not heard about news stories about it happening in schools, some participants reported it coming up in school trainings. One participant also mentioned hearing about it in a social media group where a mom was warning others because girls at her daughter's high school had created SNCEI of other girls. Some participants had familiarity with the broader use of generative AI, such as for political misinformation or academic dishonesty.

Participants did not mention hearing about SNCEI from family, friends, or students, though one had a conversation with a student about political deepfakes. A few had also discussed SNCEI with colleagues, and P13 shared the outcome of one such discussion: "our concern is that they could happen eventually. I think it's something that we'll have to face... this could happen here and it was a consensus, I guess between all of us, that yeah, that could."

Concerning, unsurprising, and likely already prevalent in schools. During our interviews, we shared a summary of news reports we had found about nine[3] cases of SNCEI in schools across the US, which was met by some teachers with notable concern, especially at the youth of the students involved. Remarking on age, P15 shared: "It's making me really sad. It's upsetting... I think that it's really hard to be a kid." Teachers immediately grasped the consequences, and P6 was very empathetic to victim-survivors in particular, reflecting: "I can't imagine being in a classroom and being that person that a nude was created of and feeling like everybody has seen you naked even though it's not what you might look like naked. I just feel for those people, it must be so awful." Other teachers were also concerned about what this would mean for people who had created SNCEI, and whether this would set them on a concerning path as an adult.

However, many teachers' reactions also conveyed a resigned lack of surprise and that the summary of cases matched their expectations almost exactly. Teachers particularly mentioned that the genders of the perpetrators (boys) and victim-survivors (girls), as well as the ages (middle and high school aged), aligned with their experiences. P3 was not surprised that some students who created were in middle school: "middle schoolers today are scary, very scary... a lot of them have no feelings. They just do whatever, they don't think about anything outside of the action they want to commit in that moment."

When asked if similar situations could happen at their schools, most teachers responded yes. P15 shared that this was because it aligned with existing dynamics of harm: "I've seen bullying and I've seen cyberbullying. I've seen slut shaming, just in different forms, and now that the tools are available, I just don't see any reason why students wouldn't use those tools." Given that teachers were not aware of actual cases at their schools, multiple teachers hypothesized that it was actually happening but administrators or teachers were simply unaware, i.e., that "if the students are smart enough to create those kind of images then they're smart enough to hide it" (P17). Other teachers thought it was possible, but would be (or they hoped it would be) restricted to only a few students.

[3]At the time of the interviews, we had collected nine cases, but by the time of writing the paper, one additional case had been reported.

4.3 Teachers' Perceptions of SNCEI Threat Models

In this section, we describe teachers' perceptions about the process of creating or viewing SNCEI. We also summarize the possible scenarios in which teachers thought SNCEI could occur, exploring potential (and possibly overlapping) motivations, as well as possible or likely perpetrators and victim-survivors.

Perpetrator capabilities: Creation and viewing are trivial tasks. Teachers largely assumed that creating and viewing SNCEI would be simple, easy, and quick. When asked what someone would need (aside from a phone, laptop, or tablet and an internet connection) to create SNCEI, participants guessed that it would be only take one or a few photos and some type of specialized software, such as a "more upscale version of Photoshop" (P4). Reflecting on how widely accessible other generative AI or face filtering tools were, many teachers thought that finding SNCEI tools would be relatively easy in a browser or smartphone app, though it might take more time or technical skill to make it look realistic. Most estimates of how long it would take to create ranged from a few seconds to minutes, with the longest estimate being two days. A few teachers mentioned that how-to guides would probably be readily accessible on major social media platforms.

In terms of viewing, teachers almost unanimously described that if students were to view SNCEI, it most likely be because it was shared with them, though some also guessed it would be easy to find through an online search or social media. Teachers described technosocial cultures of sharing that would escalate the spread of images, as multiple teachers predicted that the first thing that a student would do upon seeing SNCEI would be to share it with others. P13 recounted students' approach to media:

> "Share it with the whole world. Whoever they can get to look at it. These kids, in general when it comes to videos of any capacity, it's the number of likes, the number of followers... they thrive off of that." (P13)

Teachers attributed this to "students [being] very attuned to what other students are thinking or doing" (P7). And despite attempts to restrict the sharing of SNCEI, sharing could quickly get out of hand: "you assume your friend will keep a secret. But then that friend has a friend and they assume that they'll keep a secret. And that's how it eventually gets out" (P10). P9 remarked that one student might be in up to 70 group chats at once, so keeping secrets could be extremely difficult.

Only a few teachers discussed consequences for students who decided to share or distribute images that students did not originally create. P16 thought that students caught sharing SNCEI images ought to be educated on the impact to victim-survivors to evoke empathy, and prevent sharing in the future. One teacher (P11) believed that consequences for sharing SNCEI images might be more severe than if a student was caught sharing non-digitally altered inappropriate images, as they thought that it implied a

level of intention that was otherwise not present. Finally, a couple teachers believed that legal punishment through law enforcement would punish students for sharing SNCEI images (P1, P3).

Motivations: SNCEI for cyberbullying. Though SNCEI is by definition explicit, teachers often distinguished between motivations of a creator that were *not* sexualized (like cyberbullying described here) and those that were (like the sexual and gender abuse described below). Most participants described cyberbullying motivations as a prominent scenario for SNCEI, e.g., "trying to troll another student" (P8), "when they get angry... bringing up a lot of the tea on each other" (P4), or otherwise expressing anger by trying to hurt another student or damage their reputation. SNCEI would likely be perceived as a more serious form of bullying, and could be reserved for situations where someone was already being bullied but if "it wasn't getting to them the way they wanted to, creating a deepfake nude... [would go] that extra mile in order to hurt someone's reputation" (P13). In a number of situations, teachers described bullies feeling some kind of hurt themselves, which they then projected onto others: "they want somebody else to feel the way that they felt... the person that they feel deserves it" (P16).

While teachers generally described that students would bully others by generating SNCEI of the target of the bullying, one teacher also mentioned that cyberbullying could also be carried out by *falsely* accusing someone of generating SNCEI.

Gendered differences in SNCEI for cyberbullying: Some teachers noted that anyone could be mean or want to cause harm, while others believed that boys were much more likely to be the creators of SNCEI. P17 attributed this to seeing SNCEI as "an act of aggression, and for the most part, cisheterosexual men tend to be the most aggressive, when it comes to... getting their way."

Some teachers also mentioned students, likely boys, creating SNCEI to appear cool, funny, or otherwise try to gain social status at the expense of others. Students could use a synthetic image to falsely claim they had a sexual encounter with someone else or to show off the fact that they could create SNCEI. P12 noted that the intent would be to "make laughs, just to make themselves the star of the show for a day," although this would probably be ineffective because "when those videos come out, nobody's talking about who created it. They're talking about who's in it." These motivations were not mentioned with respect to girls creating images, who teachers described as were more likely to create for cyberbullying in case of a friendship falling out.

While some teachers acknowledged that boys *could* be the subject of SNCEI, they generally believed that girls or other marginalized students would be the subject. No participants mentioned nonbinary students in their threat model, either for creating or having images created of them. One teacher remarked that girls "have the most body parts to cover" (P3), aligning with another teacher who believed subjects might include "hijabi students, because they already have that mystery to the kids of what's underneath there, they might do something like that to stir up controversy" (P4).

Motivations: SNCEI for gender and sexual abuse. Teachers also described a range of gender and sexual abuse scenarios where the harms were rooted in systems of unequal power between (cis)women and (cis)men, including nonconsensual sexual behavior.[4] A particularly volatile and likely time for creating SNCEI was the moment of a relationship breakup. After a breakup, students could be so angry that "it becomes kind of a free-for-all" and prior respect or trust was abandoned (P13). These motivations were also described as "revenge" due to perceived rejections: because of a "spurned love" (P15) or because "[someone] went out with her and she wouldn't have sex" (P7). Teachers remarked that "revenge porn"[5] was a known issue among adults, so it made sense that students would also have similar motivations.

Some scenarios of gender and sexual abuse that teachers speculated about did not involve a creator of SNCEI actively seeking to do harm. Students might also be motivated to create it because of a crush or fantasy, and might think that SNCEI for such purposes is "less exploiting because it's not really [that person]... Deepfakes for them might not see as crossing the line of consent" (P4). However, teachers repeatedly mentioned that despite students' intentions to keep things secret, youth sharing practices (described above) would make doing so nearly impossible.

Two teachers also mentioned SNCEI in the context of two other types of image-based sexual abuse. P13 imagined SNCEI could be generated to blackmail, i.e., non-financial sextortion, and to manipulate a partner: "I made this of you, and look at it. And now you're gonna need to do what I want you to do – be my girlfriend, be my boyfriend, whatever, or I will send it out to the world." P2 imagined that SNCEI might be created by a friend intending to help someone in a pressurized sexting situation who would not feel comfortable sending a genuine explicit image.

Gendered differences in SNCEI for gender and sexual abuse: Teachers again largely agreed that boys would be more likely to be creators of SNCEI, and girls to be the subject of it. Boys who spent too much time in "weird" (P1) or "unsavory" (P14) online spaces were considered to have patterns of problematic behaviors and be particularly prone to create SNCEI; this imagined type of student was also described as "sad" (P5), a "loner" (P8), "broken" (P10), "socially isolated" (P15), and "insecure" (P16). Teachers named specific misogynistic people or online spaces that would also motivate boys to engage in slut-shaming, particularly targeted at sexually active, popular, or attractive girls. The misogynistic motivations to target girls led teachers to nearly unanimously concur that girls would be the victim-survivors of SNCEI. P14 noted that "my girls are pretty socially aware, and are by and large feminists", which had created a culture among girls to be more protective of each other, though P9 noted that they could imagine girls creating SNCEI because "there's still intense social pressures at that age and I don't think they've internalized enough yet how harmful it is to not support other women."

Multiple teachers remarked on societal expectations that boys think often of sex and are rewarded for being sexual or "more pressing" (P10), and even if "boys might be secretly upset about [being the subject of SNCEI]... it could be spun [as a positive for them]" (P11). On the other hand, teachers noted girls faced stigma for even

[4]No participants mentioned transgender people as creators or subjects of SNCEI in our study, so our results focus on cisheteronormative relations, though we note gender and sexual abuse also cause harm in contexts that are not cisheteronormative.
[5]We note that "revenge" is a false justification for abusive behavior and that "porn" should describe consensual sexual imagery [52, 54].

being associated with sex. P8 thought girls would be extremely unlikely to create SNCEI because "they would feel probably grossed out by it and repulsed and just not want anything to do with it."

Teachers also pointed out that boys were more likely to work together for cyberbullying, and individually for gender and sexual abuse motivations, since students might recognize that creating SNCEI for sexual gratification would be stigmatized.

Motivations: SNCEI for curiosity. Much less common than for cyberbullying or gender and sexual abuse, teachers suspected students might be motivated to create SNCEI out of curiosity about technology or to alleviate boredom. Some students might have "so much free time" (P7), or feel bored because classes were either not challenging enough or too challenging.

Finally, two teachers mentioned that students could be motivated to create SNCEI for profit. P1 based this guess on existing markets: "if there's a market for feet pics, I'm sure there's a market for deepfake porn, maybe even deepfake feet pic porn."

4.4 Potential Interventions

In this section, we describe the range of potential interventions that teachers suggested, in four broad and overlapping categories: reporting and school policies, proactive measures, incident response measures, and interventions beyond schools.

Reporting and school policies. Teachers described that one of the first actions they would take, if they heard about students creating SNCEI, would be to report it to their administrators, law enforcement, and/or social services agencies. The distinctions between these three groups — the first being employed by a school, the second and third being employed by the state — were not always clear, but teachers generally erred on the side of reporting to as many relevant parties as they could think of. Depending on the structure of their school, teachers listed a range of supervisors or staff within their school that they would inform, including principals, assistant principals, guidance counselors, school psychologists, and a diocese contact (in the case of a Catholic school). Many teachers described reporting to law enforcement and social services[6] as part of their duties as a mandatory reporter. If a teacher's school had an assigned sworn law enforcement officer, i.e., a school resource officer[7] (SRO), teachers described reporting to them, while other teachers merely mentioned "getting police involved." Teachers took reporting responsibilities seriously, seeing themselves as first responders: "in my capacity as a teacher, it's not my job to investigate. It's my job to report" (P13). Some also saw reporting as the fastest way to intervene, saying that "something like that could make a child commit suicide and you want to stop that in this tracks" (P3).

Separate from teachers reporting SNCEI incidents, our participants also mentioned developing a robust system for students to report SNCEI. Some teachers considered themselves or guidance counselors on campus as safe resources for students to report concerns. This included reassuring students that their reports would only be communicated with appropriate parties. Teachers also recognized that students might feel more secure about reporting cases of SNCEI if the school had policies in place that kept their identities anonymous. P16 described this by saying, "Even though [the students] are comfortable with me, they don't tell me everything. I think having an anonymous place for them to go, maybe, to report that, it's very important for them. Not to be looked at as a tattletale or a rat between their peers."

Some teachers expressed concerns about what would happen after reporting. One teacher said they would only report to an SRO "who actually did their work because not all of them do" (P7). Each school's administration will inevitably have different procedures, and though some teachers described having positive relationships with their colleagues and supervisors, others were less positive. One teacher remarked that their school administrators might regard SNCEI as a "sweep under the rug issue", as "[administrators] would get the police involved eventually, but they're not the best at following through on things" (P12). Another teacher's faith in their administration handling SNCEI was low because they had found out about a "grossly mishandled" recent case of sexual assault. Many teachers said that after reporting, they might be asked to contribute to a written report, but then the incident would be out of their hands entirely. Teachers saw administrators as responsible for informing parents and guardians, though in a few cases teachers might also be asked to join those meetings.

Teachers named that existing school or school district policies about (cyber)bullying, harassment, threats, or pornography might be relevant for SNCEI, though the confidence they had in the policies varied. In a number of cases, these policies were shared with students in a code of conduct or handbook, potentially that they and their parents or guardians were required to sign. However, these policies were not always be followed — "we're supposed to [be zero tolerance] with bullying, but I feel like it still happens" (P8) — or even remembered: "I think there is a cyberbullying policy, but if I'm having trouble coming up with what it is, I guarantee you the kids have no idea what it is" (P12). Combining this less-than-solid faith in existing policies with the novelty of SNCEI tools, teachers expressed a need for expanding current policies or developing new policies entirely: "I would be surprised if schools had policies in place at all to handle something like that" (P9). P7 explained that there should be a standardized policy about what reporting processes and consequences would apply in a case of SNCEI for all schools in a given district, or even potentially at a state level. Another benefit of creating new policies outlining consequences could be a deterrent effect.

Proactive educational measures against SNCEI. Teachers suggested a variety of measures that could be taken proactively against SNCEI. This included providing sex education where students would have a safe space to talk about sex, sexuality, and consent. In particular, teachers emphasized the importance of discussing consent with students, and connected SNCEI with how it violated an individual's ability to consent to images being made.

> "This is a form of getting consent from another person, and it's kind of like breaking that trust you have with that person. You are destroying an image of a person that gets spread around whether it was intended to harm them or not." (P4)

[6]Depending on the state, these agencies may have different names, such as child protective services (CPS) or department of children and families (DCF).
[7]https://cops.usdoj.gov/supportingsafeschools

However, in order for sex education to be effective, teachers thought that it should be a mandatory part of students' curriculum. P4 observed that if it was not, students might not have as much time to internalize the meaning of consent, saying: "Because even though we talk about it [consent] during sex ed, a lot of my kids disappeared when they found out we're doing sex ed. They skipped."

Teachers also discussed providing digital safety education as a way for students to protect themselves from becoming victims of SNCEI. Strategies ranged from educating students on the types of information they put on the internet (P2, P8), to the longevity of posting content online and the difficulty of removing content once it exists on the web (P11, P13). P2 acknowledged how teenagers might experience social pressures to share images, and brought up how SNCEI perpetrators could create explicit images of students using seemingly "innocuous" pictures, saying:

> "I would just let them [students] know like, you always using Snapchat y'all are getting to this age where people are gonna start asking for pictures, and you're gonna feel compelled to do that, and knowing that even if you send them a picture where you are dressed regularly, or whatever. Somebody can still take your face and put it on someone else's body and send it out there."

Teachers also believed that teaching students about how the consequences of their actions, should they create SNCEI, would be an effective deterrent. P3 summarized this:

> "I would have a conversation just let them [students] know about the repercussions because if no one tells them that there are repercussions for it, then they'll just keep doing it."

Other teachers thought that framing the creation of SNCEI as an activity that fell outside accepted social norms would discourage students from doing so. When asked how they might talk to students about SNCEI, teachers used adjectives such as "bad" (P13), "wrong" (P3, P4), and "negative" (P1) as ways to discourage students from creating it. For instance, P4 simply said, "some kids just need to be told: this is wrong, this is right, don't do this."

Nevertheless, teachers acknowledged that SNCEI might happen at their school, and wanted to be able to provide guidance to students to help them understand what to do in the aftermath. This included providing reporting resources, raising awareness among students by having open conversations with students (P5, P6, P13) and guardians (P6), and prominently posting contact information to school support groups (P6). P6 also mentioned a website called *Teachers Pay Teachers* as a way for teachers to create and share educational materials about SNCEI that could be used by peers.

Incident response measures. Beyond or after reporting, teachers discussed what types of punishments schools might impose on perpetrators in the immediate aftermath, as well as the role of mental health support networks for longer-term behavioral change.

Punitive measures: The overwhelming majority of teachers thought that students who created SNCEI would face disciplinary action — 16 of 17 teachers thought that their schools would either expel, or suspend, or send students to alternative schools.[8] Teachers had varying opinions on what punitive measures would achieve: some thought that suspending students would be a clear way of communicating to students that schools perceived SNCEI as a serious infraction of rules. Using similar reasoning, participants talked about how the punishment itself would be used to deter perpetrators from engaging in harmful behavior in the future, where P11 said that students "should be aware that there's consequences, to try to cut that behavior off before it gets too far in the future where it spirals out of control", and P3 described sending students to alternative school as a way of telling perpetrators that "if they were an adult, this is the closest to jail that you can get."

Other teachers thought that expelling the perpetrator or sending them to an alternative school was a strategy to separate them from victim-survivors. P14 explained, "You can't have a successful school if there are students in it who were made to feel unsafe by the behavior of other kids." This separation could also be achieved without suspension or expulsion: one teacher mentioned a "stay-away order" that acted as an official notice to keep students separate, saying that it acted as a "report that pops up in the system that these two can't be in a room together" (P15), as well as other in-school contexts, such as lunches (P7).

Punishment-focused consequences also included removing the perpetrator's access to technology on campus. This ranged from students who would be "checking [their] phone in as soon as [they] get to school" (P2), to removing their ability to use school-provided laptops: "sometimes we take their Chromebooks away, and we freeze their accounts for a while" (P11).

Recruiting therapists, counselors, and psychologists: Beyond having clear consequences in place, teachers also wanted schools to have a support network that could address students' mental health needs: for victim-survivors, perpetrators, and any other affected students. Teachers emphasized that this type of support would ideally come from staff or outside resources, such as therapists and psychologists who would be "specialized" and "well-trained" (P14).

In addition to thinking about mental health for victim-survivors, some discussed the importance of long-term rehabilitation of perpetrators, calling mental health counseling one of the "biggest things" (P13) that needed to happen in the direct aftermath, and hoping that they would be able to "find out what's really going on internally to make them do something like that" (P3). By identifying the underlying reasoning and motivation of the student, teachers and mental health experts could address not only the behaviors, but also their root causes and help the student avoid future harmful behaviors that went beyond a singular incident:

> "It needs to be child psych, a therapist involved to discover the why, so that way, we can help them have their whole behavior change, and not just target this one particular situation that you just happened to get caught at." (P10)

Evidence management: In the aftermath of an incident, teachers discussed balancing preserving enough evidence to support victim-survivors, with deleting the images and stopping the sharing and

[8] Alternative schools are disciplinary programs where students are removed from their classrooms, and sent elsewhere to receive their education. Typically, they must stay at their alternative placement for a predetermined length of time before being allowed to return.

spread of harmful content. In support of preserving the images that perpetrators created, teachers were concerned that "if there's not enough evidence or documentation, then nothing happens" (P15), and that in order to do so, one of the first things they might do would be to prevent students from deleting the proof from their phones in order to show authorities (P8). Further, evidence might be used to support investigations, and identify the individual responsible for creating them, as well as anybody who shared them. On the other hand, other teachers believed that the best course of action was to remove evidence from not only the perpetrators' device, but also of any other students' who might have viewed the images, such as P16 who said "I think that making sure that all the material is erased. From the computer, and to whoever it's been shared with."

Interventions beyond the school: Technology. Teachers also discussed possible technical solutions that generative AI companies could integrate to prevent abuse. When discussing what AI companies could do to prevent SNCEI, teachers suggested methods that would limit youths' access to the tools, such as age restrictions or requiring valid forms of payment, indicating that there are "kids that aren't going to able to afford that 20 bucks, and that should eliminate the risk altogether" (P8).

In addition to preventing access, teachers thought that AI platforms should have built-in techniques for detecting and reporting inappropriate content, saying "any software that has artificial intelligence that can pick up that it's a child's face or body we're using and just shut it down before it can even be made" (P8). Others agreed that platforms were in unique positions, and could prevent people from even attempting to create face or body swapped images, or help investigations to identify the creator.

Lastly, teachers hoped that platforms would have clear indications that distinguished generated images from genuine pictures of people through mechanisms similar to fact-checking information found on social media pages. While teachers had many hopes for platforms' role in preventing SNCEI, we note that these solutions are less straightforward in practice, as we discuss in Section 5.

Interventions beyond the school: Policy. Beyond school policies, teachers wanted clear legislation on local and national levels. When considering SNCEI, teachers likened it to existing laws, such as "child pornography" and "revenge pornography," but was uncertain whether or not the synthetic nature of SNCEI meant it fell under the same policies, asking "Is this even considered pornography, even if it's a deepfake?" (P13). As such, many teachers hoped that creating clear legal policies would deter SNCEI, but acknowledged that getting consensus from all states to create a national policy might face political opposition or First Amendment concerns. In general, however, teachers were optimistic that creating laws around AI would promote ethical uses and prevent abuse.

4.5 Broader Sociopolitical Context

In Section 4.4, we described specific interpersonal and institutional actions that teachers thought should or would happen if they found out about a student creating SNCEI. However, many teachers also referred—either implicitly or explicitly—to societal discourses about punishment and justice, child development, and educational institutions that informed their opinions about SNCEI. In this section, we describe areas of consensus or tension in specific teachers' opinions, relative to a broader sociopolitical context.

Differing conceptions of punishment and justice. Some teachers saw punishment as the only way to teach students about appropriate behavior or convey consequences. P8 suggested to "ban them from sports and dances, possibly for the rest of the school year, so they can feel as alienated as they made the person that they did this to" and P7 similarly remarked, "I would send them to some crappy school." Teachers spoke about wanting to dissuade students from taking harmful actions by outlining legal and carceral consequences, such as being registered as a sex offender, having distribution of "child pornography"[9] on your record, or being "labeled a pedophile" (P7). In short, these teachers saw the threat of prison as an effective form of deterrence, to "scare them into [doing the right thing]" (P8).

However, other teachers described why punishment would be ineffective. Students may see out-of-school suspension like a "vacation" and in-school suspension as a "fun" way to get attention from teachers (P8). P10, who had a master's degree in education, summarized that "all the graduate research has shown that suspensions don't help. They just don't." Expulsion was not seen as much better. P16 disliked expulsion because "you're really just taking away what [students] really need, which is school." Though expulsion might remove a student from the place of harm and convey the message that they should not have created SNCEI, P10 predicted that "they're going to try something else in another context, because you haven't gotten to the root of the problem."

Skeptics of punishment also questioned whether the it was actually to motivate behavior change, or if it was only out of desire for retribution: "victims don't want rehabilitation [for a perpetrator]. They want the person to be punished." (P10) Rather than focusing on punishment, these other teachers discussed ways to get kids to understand the harms of their actions, either to themselves or subjects of SNCEI images. Four teachers each proposed using a conversational approach to asking questions that would get their students to put themselves in the shoes of others. For example, teachers said they would find news stories about SNCEI and ask, "How do you think the victim felt about this? How do you imagine that it impacted their life going forward?" (P15) or "What if that was your parent, what if that was your sister?" (P9). These approaches were favored as a way to help students grow and teach empathy.

This empathetic and pedagogically focused approach aligned particularly with the three teachers who detailed that restorative justice approaches were already being used for responding to conflicts between students in their schools. Restorative justice is a framework and ideology for repairing harm in relationships, often focused on community accountability [18, 45]. For example, P15 described restorative justice approaches as "a good move away from just simply punitive approaches to discipline which tend to alienate kids and oftentimes aren't applied fairly depending on the implicit biases of the administrator." However, teachers cautioned that students had to take this opportunity seriously: to genuinely see restorative justice meetings as a place for repair and healing. If students who had caused harm did not buy into the process and

[9] Advocacy organizations use child sexual abuse material instead of "child pornography" to more accurately describe the abusive nature of this content. [68]

merely saw it as "a system they can continually abuse" (P9) to avoid consequences, restorative justice was doomed to fail. Two of the three teachers who had experience with restorative justice in their schools were dubious about using restorative justice in the aftermath of a case of SNCEI, based on the reasoning that undoing the harm of SNCEI would be impossible and meetings would be re-traumatizing for the subject of the imagery. Ultimately, these teachers shared the notion that consequences were necessary to motivate behavior change:

> "Some of my kids hit police department, and then they finally get their first real consequence and then it packs them for the rest of their life. I could see slaps on the hand, slap on the hand, slap on the hand, talking to, discussion, and then a kid does a deepfake and is arrested and is like, well, I didn't know. And that's our failing for not having had any kind of stop along the way where they started to realize, I'm really pushing it too far." (P9)

In this way, teachers' varying perspectives on consequences — whether in a punitive or restorative justice framework — underlie not only how they might respond if a student created SNCEI, but also how to structure the broader systems of their schools.

Child development. Throughout the interviews, teachers frequently highlighted that students were still learning about life, themselves, and others. A common refrain was that kids "just don't think" and do not understand consequences: "for your average American student at this [age], I can almost guarantee they're not thinking one or two steps ahead" (P12). Particularly when it came to consequences relating to the internet, teachers reported that students were "under the impression that what they do online has no repercussions" (P1) and would do things online that they would not do in-person. Teachers described how this could manifest in students appearing to lack empathy. P17 described this specifically for groups of boys: "If they don't have somebody giving them, honestly, lessons on empathy and just self-awareness and being reflective about things, then they run wild with a lot of ideas."

In the context of romantic or sexual relationships, students' social and emotional development meant they were learning about consent and how to engage in safe and kind ways. Beyond the range of topics covered in sex education courses, teachers also mentioned cultural influences on how students saw intimate relationships. On one hand, exposure to social media meant students were "far more aware of what abusive and toxic relationships look like" (P9), but growing up in the US meant "sex can feel more hush-hush... compared to Europe where sex is more open, and it's talked about, and it's not as big of a deal" (P14). School was seen as a place for students to develop relationships with others, figure out what they wanted, and have new experiences. However, some teachers discussed this going too far, and described a culture that encouraged sending explicit imagery. P14 hoped that schools could play a role in "having kids feel like they have enough self-worth and ownership of their body to comfortably decline and not feel like they're sacrificing something or giving some part of themselves to someone to impress them, or to build a relationship with someone." Ultimately, teachers saw the role of schools is to provide education in age-appropriate ways, informing their perspectives on consequences.

Institutional pressures. During interviews, some teachers alluded to how their schools were already strapped for resources and staff, influencing their ability to engage with preparing for or responding to SNCEI. Prioritizing between numerous issues at school was a challenge, as P2 described: "our counselors are so busy, and so many kids are going through something." Yet teachers were acutely aware that taking swift action was crucial because "other things will come up... it's just gonna keep being put to the side, it's just gonna become another folder on somebody's desk, and it may or may not get tended to" (P12). Institutional deficits could also be worsened by subpar leadership:"[handling cyberbullying] all depends on the school principal" (P7).

School policies about online incidents or off-campus incidents may have also reflected these institutional pressures. Typically, teachers described that their schools did not have any jurisdiction for issues outside of school, although some teachers wished that more could be done, recognizing that outside conflicts still affected students during school. However, one teacher noted that their school administrators did address outside issues, including cyberbullying, "if it happens to be targeting a particular individual and their safety in particular" (P12).

Particularly when asked about whether they would talk to their students about SNCEI, teachers often mentioned ways that they were aware of the precarity of their employment. While some teachers said that they would talk to students about SNCEI — one teacher commented that they regarded the interview content was so interesting that they were going to bring it up in class the next day — others expressed concern. Among other reasons, P1 remarked, "I'm too worried about the concept of stirring the pot and creating any extra issues" and stated they would not bring up SNCEI. P5 saw SNCEI as outside the bounds of their work: "Your job as a teacher is, they want to try to keep your focus on what you teach, not on the personal lives of the students." Teachers also mentioned the politics of their state, e.g., being a conservative state with restrictions on discussing sex education, or their own gender, e.g., having discomfort discussing sensitive issues as a male teacher. The stability and confidence to which teachers had in their positions seemed to relate to the capacity they had to imagine different systems, and how much belief they had that they could act effectively in a situation involving SNCEI. Some teachers were additionally concerned about discussing SNCEI with their students, saying "the more you talk about it, the more it's out there, the more that certain students might have that idea now" (P12), while another teacher described the risk of encountering the "Streisand effect" (P14) where students might contrarily amplify actions that teachers wanted to prevent.

5 Discussion

Within the last two years, SNCEI has expanded beyond niche communities using specialized machine learning tools to create SNCEI of celebrities, now having reached US middle and high school students casually creating SNCEI of their classmates.

New technology, similar interpersonal harm. In this research, we interviewed teachers to shed light on their concerns for the imminent future of SNCEI in schools. New technologies tend to

come with the hope of a better future; generative AI technologies were ostensibly intended to unlock a new era of human creativity. However, early reports show that youth in the US are not (only) using these generative AI technologies for ends beneficial to society. Synthesizing the SNCEI threat models that teachers described in this work, we describe how students' use of generative AI tools are likely to exacerbate existing interpersonal harms: cyberbullying and gender and sexual abuse. In the words of P14: "there are just bad actors and creeps who do things that they shouldn't, and that's kind of been true of human history before the advent of technology like the internet." Thus, technical interventions to mitigate SNCEI are urgently needed and can have significant value, but they are also inherently limited as only one of many approaches to mitigate harm. Still, given that interpersonal harm is a particularly entrenched problem in schools, the novel technical aspect of SNCEI may prove useful in drawing much needed resources — social, technical, or otherwise — to supporting teachers and schools in addressing them.

We're all in this together. Stepping back, teachers and school contexts are only one part of a larger system where interpersonal harms manifest. While the school context introduces unique challenges, e.g., that students tend to be young and are still learning about themselves and the world, it also offers unique opportunities. Middle and high schools can be places to introduce prosocial values and educational opportunities not feasible later in life. Schools are a nexus of cultural forces, from those within the purview of individuals to communities and broader society. Building on our key findings, we now discuss challenges and opportunities to address the harms of SNCEI sociotechnically, using a multi-pronged framework of individual, community and societal interventions.

5.1 Individual interventions

Teachers and school staff. Teachers are deeply passionate about supporting their students and are in classrooms with students every day. Resources and professional development courses about SNCEI for teachers could be a well-positioned intervention to provide immediate impact. Such resources could include prevalence statistics, technical descriptions of SNCEI tools, and ways to respond if teachers do suspect SNCEI.

Support for teachers regarding SNCEI can learn from existing efforts to respond to cyberbullying and gender and sexual abuse. About 1 in 6 high schoolers in the US reported cyberbullying in the last year, and 1 in 9 reported sexual violence [16]; to tackle these pervasive and serious issues, many efforts are being developed and evaluated in research outside of the computing literature [11]. Future work could, for example, compare warning signs of cyberbullying to warning signs of SNCEI specifically, updating existing trainings for teachers as appropriate.

Additionally, future work could also explore how to support or provide resources for school staff responsible for WiFi, student laptops and tablets, or other technical systems. Similarly, teachers often mentioned that they would turn to school counselors, psychologists, or social workers if they heard about SNCEI. While teachers usually have the most direct face time with students, all of these other school staff also play important roles in establishing schools as safe learning environments.

Parents, guardians, and caregivers. Though we did not interview parents, guardians, or caregivers in our study, teachers mentioned that these adults could either reinforce positive lessons from school or be adverse forces in students' lives. Future work could explore the perspectives of these adults about SNCEI, as well as how to communicate strategies for them to support youth who may be involved in incidents.

Students. During our interviews, some teachers also relayed anecdotes about specific students who were positive influences at their schools. Given the deeply interpersonal and social nature of SNCEI dynamics explored in this work, peer-led outreach programs may be especially impactful in mitigating harm. Such programs could encourage students to share relevant information about SNCEI with each other and provide mutual support.

5.2 Community interventions

Setting prosocial norms in schools. School staff and school district administrators have meaningful ability to set the priorities and policies that govern school activities. In this way, such people could play an invaluable role in proactively developing mitigation strategies for SNCEI. The use of generative AI technologies for SNCEI reiterates the importance of school content that facilitates social and emotional learning, sex education, and online safety. During interviews, P15 spoke about how establishing a strong sense of community and belonging would be the most powerful against SNCEI:

> "I think that the best preventative is fostering a school culture where bullying and disrespectful behavior are not tolerated and not sanctioned. Trying to foster a culture where students have a sense of belonging... I want for students to feel that they have some kind of a sense of belonging within the classroom and students feel the need to watch out for each other." (P15)

Teachers in our interviews acknowledged the value of school environments for socializing students to being more thoughtful and empathetic, as well as building self-awareness and relationship skills. Teachers also believed that these skills would help students, and the future adults that they will grow to be, to not create SNCEI or inform adults if they did find out about SNCEI. Further, given the gendered and sexualized nature of the harms of IBSA, ensuring that students learn about the importance of sexual consent through sex education courses could also mitigate SNCEI creation.

Incorporating discussion of SNCEI within existing courses about social and emotional learning, sex education, or online safety would have the additional benefit of not drawing too much attention to the new capabilities of generative AI technologies. Teachers were worried about a possible "Streisand effect", i.e., that bringing up SNCEI to warn students not to create it would actually backfire and draw attention to tools that students otherwise did not know were available. With the proper framing within broader sex education or online safety content, SNCEI could be contextualized as a

one instance of a broader context of serious harm, and reduce the attractive novel quality of a new technology.

Policies to facilitate accountability and repair. Finally, schools could continue to develop alternative justice models for facilitating accountability and repair in situations of harm, including for SNCEI. Restorative and transformative justice are alternative justice frameworks that have been practiced as grassroots community efforts to address societal harms [18, 64], including but not limited to domestic and sexual violence. Restorative justice practices had already begun to be a part of some of the schools that teachers worked at, though teachers expressed skepticism about whether a restorative justice approach would effectively address SNCEI, which they feared was too serious of an issue. However, some of the origins of restorative and transformative justice include Black and Indigenous communities that intended to address sexual and domestic violence [45]. While restorative justice focuses more on interpersonal relationships and transformative justice focus more on societal systems, both intend to find ways to respond to violence and harm without causing more violence and harm [45]. Challenges may arise in applying restorative justice frameworks in schools due to incomplete community buy-in to the process or imperfect attempts that dissuade individuals from investing in alternatives. However, we found that teachers' calls for nuanced and empathetic interventions for students who cause harm were well-aligned with restorative justice principles, for example, distinguishing between punishments ("inflicting cruelty, pain, and suffering") and consequences ("being uncomfortable and losing some privileges") [45]. Therefore, much future work can be done to explore applying restorative and transformative approaches to addressing SNCEI in schools, including by drawing on existing toolkits [18, 64] and abolitionist teaching [51].

5.3 Societal interventions

During our interviews with teachers, many had hopes that solutions to preventing SNCEI at schools would come from either technical or legal domains. However, we note that both technical and legal solutions are still currently being developed, and face multiple challenges, such as how to balance policies that allow for the consensual (synthetic) sexual content while inhibiting actors who seek to create abusive material.

Technical solutions: self-regulation and deplatforming. When discussing generative AI platforms, most teachers had mental models of companies who acted in good faith and had incentives to prevent abuse. While there has been movement from larger entities to reduce image-based sexual abuse [85], many abusive platforms operate using the "nudify-as-a-service" model, whose singular purpose is to create explicit images. Soliciting voluntary cooperation from these parties may not be as straightforward as other companies have a more vested stake in maintaining their reputation. Technical studies to investigate such tools and groups that use them could shed light on effective ways to inhibit harmful outcomes.

Assuming that a hypothetical solution leads to deplatforming websites, it is still unclear who decides what content would be permissible, and which parties should be responsible for deplatforming. Though there has been some precedent in infrastructure providers deciding to withhold services to websites that host harmful content [5], whether or not this is a long-term solution, or even if the decision should fall on these entities is still an unresolved question.

Legal solutions and challenges. Some teachers used the threat of criminal consequences to deter students, using terms such as "child pornography" to impress upon students the gravity of creating SNCEI. However, whether this applies unilaterally across the US is an evolving matter. US states lack consensus on whether synthetic CSAM is legally equivalent to content not generated by generative AI tools. Legal scholars have pointed out that laws also have to contend with scenarios where individuals under the age of 18 create explicit images voluntarily of themselves (sometimes called "self-generated" or "voluntary" CSAM), such as youth exploring their sexuality and sending each other explicit material. Finally, yet-to-be-settled policies need to address whether youth who create synthetic CSAM should face the same legal ramifications as adults.

5.4 Future research

Further work by researchers from multiple backgrounds is needed to inform future interventions. In this work, we encountered challenges due to our status as mandatory reporters (see Sections 3.4 and 3.5), which required sensitivity and care to navigate. Research inevitably raises ethical considerations; navigating ethical and legal dilemmas in child abuse research is an open area of research [26, 32, 49], similar to ethical considerations of research with social media data [27, 72]. HCI researchers are well-positioned to navigate such challenges, particularly by bringing epistemic diversity, i.e., varied research methods, methodologies, researcher backgrounds, and research goals, to bear on complex sociotechnical issues.

Specifically, future work could investigate the perspectives of parents and guardians, law enforcement, school administrators, as well as students themselves. As SNCEI becomes more ubiquitous, follow-up studies can also explore teachers' direct experiences with SNCEI and how victimization or perpetration changes over time. Our study provides just one of many perspectives that will be needed to create robust and effective policies about SNCEI.

6 Conclusion

In this work, we conducted interviews with 17 teachers at US middle and high schools to use their thorough understanding of youth to construct threat models about SNCEI creation. We used a security and privacy lens to determine that while anyone could create SNCEI, teachers mostly anticipated that boys would create SNCEI of girls for cyberbullying and gender and sexual abuse. Teachers additionally described a multitude of interventions for mitigating the harms of SNCEI, calling for both proactive educational measures, e.g., sex education or digital safety education, as well as robust incident response measures. However, teachers' evaluation of these potential measures also depended on their conception of justice, as some teachers favored punitive approaches, while others advocated for restorative justice approaches. We synthesize our results to develop directions for teachers, schools, and technologists and policymakers to inform how to mitigate the harms of SNCEI and while also creating space for consensual online intimacy.

Acknowledgments

We thank our reviewers for their helpful feedback, Caroline Shelton for consultation about mandatory reporting, and to Galen Weld for insights about social media recruitment. We are deeply grateful to our pilot participants (Lauren Bricker, Jeremy Muench, John Rumney, and Gadiel Williams) as well as our study participants for sharing their perspectives and their dedication to their students. We acknowledge the UW Center for Studies in Demography and Ecology (CSDE) and Student Tech Fee for qualitative data analysis software access. This work was supported in part by the NSF under Award 2205171.

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A Study materials

A.1 Recruitment materials

The flyer used to recruit participants for our interviews is shown in Figure 1.

Figure 1: Recruitment flyer used to solicit participants for our interview study.

A.2 Semi-structured interview protocol

Our full interview protocol included the following questions. Note that since this was a semi-structured interview, the interviewer may have asked slightly altered or additional questions depending on the particular conversation.

Introduction
Thanks so much for joining, I'm [name of primary interviewer], this is [name of second interviewer], we're both graduate students at [institution name]. I'll be leading the interview and [name of second interviewer] will be taking notes. I have a few things to get through before we start the interview. And we should be done in about an hour. Sound good?

Did you get a chance to look at the consent form before we begin? Do you have any questions or does everything look okay to you? *If not, link to consent form and ask participant to read it.*

This isn't part of the study, but just as a check for us: What school do you work at?

And could you show a teacher ID, school T-shirt, notebook, or something else to confirm that you work for that school?

- If yes, or plausible reason about going to get it: Ah okay, perfect, I believe you! This was mainly to confirm participants are actually teachers, we've had some folks say they were but upon being asked for ID, they hung up.
- If no: Alright, please reschedule for a different time and have something ready so we can confirm your status as a teacher. Thanks!

I have a fine-print paragraph I need to read for you, if you could just bear with me: As researchers at a public university, I am a mandatory reporters of child abuse. This means that if you reveal identifiable information (e.g., name, organization, or location) of someone who has created or is in possession of pornographic depictions, real or synthetic, of someone under 18, I would be required to pass on this information to the appropriate authorities. For the purposes of this study, I'm only interested in your general knowledge and opinions and suggest that you do not reveal unnecessary identifiable information about yourself or others. Sound good? Any questions?

And last thing before we begin, would it be okay with you if we record this interview? This is mainly for the transcript so we can make sure we're catching what you said accurately.

Context Setting
In what context do you typically work with youth?

- How old are the youth?
- How long have you been working in this context?

How long in working with youth, overall, in any capacity?

How big is your school overall?

Could you describe the youth you typically work with – what kind of background or any other characteristics that stick out to you?

General Perceptions and Experiences Related to Deepfake Nudes
There's no right or wrong answers for any questions that I ask in this interview –= my main goal is to understand what your thoughts and opinions are. When I say 'deepfake nudes', what comes to mind for you?

Yup, seems like we're on the same page. So for the purposes of this study, we are most interested in learning about…
[[Depending on what they say, also remind them of the following details:]]

- Images generated/edited by a computer, whether through photoshop, AI tools, or other means (e.g., faceswap, undressing)
- Images that are sexually explicit or depict nudity
- Images that where the subject did NOT consent to their creation or sharing

In the last 6 months, how often have you seen any news stories about synthetic/deepfake nudes in schools? What do you remember about them?

In the last 6 months, how often have you talked to colleagues or students about synthetic/deepfake nudes, including overhearing conversations? What do you remember those conversations?

If someone had a laptop/tablet/phone and an internet connection, what else do you think they would need in order to **create** deepfake nudes of someone specific that they know?

And similarly, if someone had a laptop/tablet/phone and an internet connection, what else do you think they would need in order to **view** deepfake nudes / synthetic content of someone specific that they know?

You've said that [details from participants]. Do you think these factors would be true if it was specifically the students at your school that were creating or viewing synthetic content?

If you had to take a guess, do you think it's more likely a student would find it themselves vs. see it because others shared it with them?

Threat Model
What are some situations in which you could see a student creating deepfakes of someone else?

- For what reasons do you think a student would create deepfake nudes of someone else?
- Once an image is created, what do you think the student would do with it?

Speaking in general terms, what kind of students do you think might **create** deepfake nudes?

- Do you think students would work alone or together?

Speaking in general terms, what kind of students do you think might **be a victim** of deepfake nudes?

[Optional] And do you think people of certain genders would be more likely to create or have images created of them?

Case Studies
So now I'd like to share a little bit of what we've learned while conducting this research. We've been searching online and have found some stories local and national news, that…

- This has happened at least 9[10] schools in the US in different states
- In pretty much all cases, it was one or more boys, creating images of multiple female classmates
- Though the articles didn't always include all details, many described that students were using AI tools or apps, and in some cases, sharing the images through Snapchat
- Students who created the images were between 13 and 17. In some cases, the people in the images were between 12 and 15

What are your first impressions?

Do you think something similar is possible in your context?

What would you do if this happened in your context?

- [Optional] Would you report to law enforcement? [if asked, assure them you're not testing them, just curious how they think about it]
- [Optional] Do you think there are existing legal policies to handle this?

What do you think the appropriate response would be or what the consequences should be (if any) for a student who creates images of other students?

[Optional] What do you think other students would do if they received deepfake nude images from someone else, and showing someone else in the images?

Potential Interventions
What kinds of additional resources would be helpful for you to figure out what to do?

If you wanted to create policies or tools to prevent deepfake nudes, what would you do?

- [Optional] If you were asked to talk to your students at the beginning of the school year about deepfake nudes, what would you say to them?

What kinds of policies that exist for other related concerns might or might not apply to deepfake nudes? -OR- Does your school have content or courses about sex ed for your students?

Additional optional questions about prevention:

- [Optional] How does your school handle incidents that happen outside of school hours?
- [Optional] How well do you feel like your school responds to online safety concerns or incidents?

Deepfakes in the Future [Optional, if time]
We're almost at the end of the interview, just some final high-level questions before we wrap up.

With respect to deepfake nudes and students, what are your biggest fears in the next five years?

With respect to deepfake nudes and students, what are your biggest hopes in the next five years?

Conclusion and Wrap-up
Just a last thing to mention: We've been using the term 'deepfake nudes.' But of course this is still an emerging area of research and you might see people use many different terms. Some say 'deepfake porn', although there are academic researchers who argue that calling this type of content "pornography" is wrong because pornography should refer to consensual content and the person did not consent. Also, academics tend to call this content 'synthetic' or 'AI-generated' because those are more accurate terms than 'deepfake' is a reference to a specific computer science technique for creating fake images.

Do you have any questions for me? Or any questions I can answer about what we talked about today?

Thank you so much for your time today. As our research progresses, would you like to be kept up to date as we reach more milestones, such as reviewing a copy of the transcript from this interview, reviewing a draft of the paper, or being contacted about future research opportunities?

[10]At the time of the interviews, we had collected nine cases, but by the time of writing the paper, one additional case had been reported.