Student Agency and Punishment Logics in Imagined Future Classroom Technologies

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Abstract

Educators and policymakers are increasingly trying to control youth access to technology in the classroom, while simultaneously working to deploy technology for purposes of surveillance and behavioral control. While many scholars have explored the implications of intensifying dataveillance and disciplinary practices deployed by teachers in K-12 schooling, few have investigated how students' visions of technology deployment and use might align or diverge from those of designers and teachers. Using the resulting data from participatory design workshops and ethnographic research with students and staff in alternative hybrid schools, we explore students' concepts of future technologies for the classroom and how these artifacts reflect student perceptions of safety and good behavior. Rather than simply accepting or resisting the role of technology in discipline and punishment as presented by technology creators, wherein disciplinary decisions are made by teachers using technology, students actively respond to these narratives to increase the objectivity and accuracy of punishment. The results of this work show how visions of future technology can sometimes reify new forms of power and other times respond to unmet student needs to exert control in the classroom.

CCS Concepts

• **Human-centered computing → Empirical studies in collaborative and social computing**.

Keywords

Future workshops, design research, schools, dataveillance, public safety

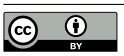
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1 Introduction

For decades, digital technology in classrooms was greeted with almost unchecked optimism, despite often disappointing and unremarkable results [2, 15, 18, 24]. Yet amidst a spiraling youth mental health crisis, teachers, parents, and policymakers have increasingly converged on labeling digital technologies, and especially social media, as poisonous to children's emotional and academic well-being and begun to seek out wide-spread solutions. In July of 2024, the U.S. Senate passed a controversial bill called the "Kids Online Safety Act" (KOSA) which would require the companies behind online platforms to amend their design and content in order to reduce the risk of harm to minors [56]. At the same time, school cellphone bans are returning in force across the country [50]. While youth-led access to digital technologies and online spaces is being curtailed, however, schools, tech companies, lawmakers, and many scholars continue to promote the use of online platforms and web applications to police youth and student behavior, including through classroom management systems, facial recognition technology, plagiarism detection tools, and broad digital surveillance [16, 24, 26, 40, 42, 45, 54, 63, 64, 66, 73]. These efforts reflect broader trends towards the use of both state-sponsored and privately managed surveillance technologies deployed in the name of public safety, which have been heavily criticized for amplifying structural inequalities and disproportionately harming minoritized communities [5, 9, 13, 14, 21, 44].

How do young people themselves understand these technologies and policies, and conceptualize what it means for them to cultivate safety in a technologically mediated world, particularly within the schools that take up such a large portion of their lives? Having grown up with ubiquitous utopian visions of how digital technologies would transform their educational experiences, students have also witnessed the remarkable resiliency of what educational historians Tyack and Cuban [70] refer to as "the grammar of schooling." Despite many challenges over the past century, Tyack and Cuban illustrate that the fundamental structure of public schooling in the United States has remained stunningly consistent. This project set out to explore how students would respond to the tension of seemingly unfettered technological progress and the continued retrenchment of the grammar of schooling through imagining the role of digital technologies in future schools. In particular, we chose people who had direct lived experience with virtual and hybrid schooling[1], to provide a concrete foundation which participants could embrace or rebel against.

Too often, technology research, design, and policy targeted at children do not center or respect the desires, needs, and perspectives of these youth [3, 63, 66]. Chang et al. [12] have shown that when



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[1]At the time of the study, this included almost everyone involved in schools in the past few years due to the shift to emergency remote learning because of the COVID-19 pandemic. As described in the Methods section, however, we primarily included those who had actively chosen hybrid school environments for reasons other than public health concerns.

encouraged to speculate about future technology use in schools, historically marginalized youth dream of using AI for collaboration and resistance to structural oppression that frequently ignores their needs and desires. Yet as Chang and Dudy [11] point out, researchers need to "Recognize that in the process of expansive dreaming, participants will often hold contradictory beliefs about what is needed" (p. 2). This is indeed what we witnessed in this study, which used future workshops [36, 52] to engage historically marginalized youth who attend alternative hybrid schools - and others involved in their education - in generating ideas for future educational technologies.

We did not set out with these workshops to study issues of safety and classroom behavior management in particular - rather, we were interested in exploring schools holistically and following where participants led us. However, we were struck by an emphasis on safety and appropriate classroom behavior emerging across workshops. From our initial data analysis, we identified two research questions based on how participants responded when asked to describe problems they faced in their current educational settings and their desires and fears for future schools:

- How do students envision safety and good behavior in hybrid school environments?
- What role do students imagine future technologies playing in facilitating safety and good behavior in hybrid school environments?

We find two outcomes when students are empowered to think about control, discipline, and power in the context of emerging technologies and education. First, students sometimes reify dominant narratives of punishment and carcerality they have been forced to navigate while shifting the locus of control. Second, at other times students challenge these dynamics in hopes of more restorative or transformative justice paradigms. Building off of prior work, which has primarily explored the implications of intensifying dataveillance and technologically-mediated discipline practices for students, this paper shows how students may actively participate in the construction of carceral logics for classroom technologies.

2 Related Literature

In recent years, two somewhat opposing trends have emerged regarding the use of digital technologies in the classroom and their relation to safety and good behavior. One relies upon digital technologies as valuable tools for discipline, while another understands digital technologies as a threat to the safety of youth. Both rely on adults as the arbiters of "good" technology use and understand student behavior as a problem to be solved. As Ashktorab and Vitak [3] point out, young people are rarely included in the design of technology meant to be used on them because their interests are frequently at odds with the adults who want to use technologies to control youth actions. A good deal of scholarship, which we discuss below, has critiqued both paradigms, while also recognizing the sometimes ambiguous effects of related shifts in technology and policy. Yet, with notable exceptions, much of this work presents a limited view of teacher and student agency. Teachers are sometimes portrayed as monolithic efficiency machines, deploying digital tools as intended by corporate creators, rather than as professionals who have their own critiques of these systems and work to integrate them in ways that align with their existing goals and values. In this view, students can be cast as purely reactive, objecting to restrictions while accepting their disciplining function and performance at face value. We look at how these relationships manifest in the literature on behavior management and safety as it relates to technology use and the classroom experience.

2.1 Behavior Management & Technology in the Classroom

Behavior management has long been a concern of education, where scholars have called for accurate measurement of student behavior in order to best intervene [25]. A primary concern of behavior management in the classroom is the reconciliation of care and control [49]. From a teacher's perspective, care often means recognizing the humanity and individuality of students through one's actions [34]. Control, on the other hand, demonstrates the ability to determine the "appropriate" ways of behaving in a classroom and choose how to respond to violations. Care and control, therefore, are frameworks for understanding a much broader and diverse literature on behavior management in classroom environments [1, 55, 71]. Recently, digital technologies have been lauded as a new tool of behavioral management and have become a key source of conversation in scholarship on learning technology and classroom dynamics between students, teachers, and parents. These conversations provide an opportunity for us to think more specifically about the relationship between care and control, on the one hand, and the concerns raised by classroom actors in our workshops related to how care and, more specifically, control are enacted. In response to this, here we provide an overview of research on digital behavior management tools and their role in the classroom related to issues of privacy and surveillance.

ClassDojo is a type of digital behavior management chart (BMC), tools that are frequently studied in research on the use of technology in the classroom. Digital BMCs like ClassDojo offer a real-time opportunity to track behavior in a classroom, usually accompanied with a collective visual element. In comparison to analog BMCs, Krach et al. [38] found that ClassDojo provided more reliable data. This has often been the selling point of digital BMCs like ClassDojo that offer more "efficient" and "transparent" ways of doing classroom management from a teacher's perspective. Others in HCI have gone on to build and deploy their own digital BMCs to address the shortcomings of existing ones like ClassDojo (e.g., delivering more immediate feedback to students, providing behavioral reinforcement) [64]. Digital BMCs like ClassDojo are only one tool among a suite of educational and learning technologies that have been deployed to intervene in the behavioral management in diverse settings, ranging from elementary (e.g., [38, 73]) to high school environments (e.g., [16, 24, 54]), and including student populations that range from those with specific behavioral management needs that are dictated by individual education programs (e.g., [64]) or general student populations (e.g., [42]). Much of the recent research at the intersection of behavior management and digital technology in the classroom is concerned with issues of data-driven surveillance, and the resulting privacy concerns, that accompany the introduction of digital BMCs into the classroom.

Issues of surveillance and data privacy are commonplace given the increasing presence and lack of regulation surrounding the use of educational technology. As Nemorin [54] argues, citing critical education scholars Monahan and Rodolfo [51], "surveillance [is] a dominant organizational logic of the public school as an institution, shaping its day-to-day activities" (p. 249). Deployed within an environment like a classroom, where surveillance of both student and teacher performance is a given, digital surveillance provided by educational platforms is accepted as the norm [16]. This surveillance provides opportunities for both care and control [42, 73], going back to where we began this section [49]. The introduction of educational technologies like digital BMCs encourages teachers to think about the responsibilities they have to their students with respect to digital privacy and security [39]. These concerns bring with them the realization that teachers are active stewards of student data, that they need to respond to policies and procedures related to the intersection of behavior and data privacy, and they want to utilize the introduction of technology to the classroom to model the appropriate use of technology for their students [24, 39]. But the introduction of digital BMCs to the classroom also brings attention to how power is distributed in the contemporary school, how that power is reinforced through datafication [33], and how digital tools encourage teachers to think about how they might control students' behavior [40]. As Kumar et al. [40] highlight, deployment of these technologies allows for data regimes that can track student learning and behavior simultaneously in an effort to keep students on task. This dataveillance and platformization pushes teachers to think about students as representations of data about behavior, transforming the dynamic between student and teacher [40].

Some scholars argue that the use or misuse of these platforms can result in real harm to students, and their relationships with other actors, in school environments. For example, Macgilichrist [46] argues that, "datafication in education provides a showcase of cruel optimism, i.e., when the object of desire is blocking one's flourishing" (p. 77). As Magilichrist and others [16, 39, 42] document, the datafication of educational data through classroom technologies might allow for increased efficiency and addressing issues of inequality, but how that technology (and resulting data) is implemented often results in an exploitation of teachers and students as data subjects, dehumanizing them in the process. Further research in HCI argues that even the successful incorporation of digital BMCs such as ClassDojo into the classroom can result in information breakdowns where they are needed most. Marcu and colleagues [48] document how the sharing of student information by teachers with their parents breaks down when parents misinterpret the information provided, or teachers disagree with how parents respond to perceived misbehavior. With respect to potential privacy harms of classroom technology, Wagman et al. [73] wonder at what point surveillance moves from a tool for care provision (e.g., in the context of the COVID-19 pandemic when millions of students in the United States were pushed into online learning environments) to a tool for control and surveillance.

Yet students and teachers are not neutral actors who lack complete agency in relation to educational technologies. Both students and teachers actively perform relationships in response to digital technology, the data they create, and the institutional environments that structure the place in which technologies are deployed. As Crooks [16, 17] argues in his work on dataveillance in the urban classroom, administrators, teachers, and students are always contesting, reinterpreting, and negotiating the power of data in education. For example, teachers perform surveillance through an understanding of how data produced by classroom technologies are going to be used, in some case manipulating the data collection in a way to best serve their desired outcomes. Students learn how to respond to behavioral expectations that are tracked through new digital technologies by similarly manipulating those technologies in their favor. Both Lu and colleagues [42] and Jonas [34] build on this work by demonstrating how teachers engage in resistance to data surveillance in the classroom by deploying care and seeking to contextualize the resulting student data produced by technology. Many studies have observed that students acknowledge the surveillant capacity of classroom technology and perform accordingly [16, 40, 42, 43, 47, 64]. For example, Spiller and colleagues [64] noticed that the introduction of a digital BMC in the classroom encouraged students to engage in "peer support towards [collective] behavior goals" (p. 167). Lu and colleagues [42] document how a student's perception of being surveilled through digital technologies gave a teacher more omniscient power and perception of control over the classroom.

Taken together, this literature demonstrates how digital technologies in the classroom, and particularly digital BMCs, are deployed in ways that allow teachers to exert both care and control in their relationships with students. Research on this technology largely finds that surveillance and data privacy are major concerns, especially from the perspectives of teachers who find themselves trying to balance care and control through these systems. Further, this research shows that teachers and students (as well as others such as administrators and parents) are not neutral actors in the creation of educational environments where data-driven systems are deployed. In fact, teachers and students behave in particular ways in response to the introduction of these systems — sometimes acquiescing to the demand for good behavior, sometimes rejecting the tools and the surveillant practices.

2.2 Schools, Safety, and Violence Prevention in HCI

The effects of classroom behavioral management are not confined to educational environments. Schools are generally understood as spaces of learning, but have also long been centers of discipline and punishment, even taking up many characteristics of penal institutions [62]. As illustrated by the common use of the phrase "school-to-prison pipeline" [74] among education scholars, for many students schools are the primary spaces where they come into direct contact with the power of carceral structures that can dominate their lifecourse. The "school-to-prison pipeline" framing reflects the fact that school discipline has increasingly intertwined with state policing, whether through the placement of law enforcement officers within school buildings or "laws mandating referral of children to law enforcement authorities for a variety of school code violations" [74, p. 10]. In the past few decades, scholars of education and inequality have come to understand schools as a key site for

particularly Black and Brown youth to be funneled into the criminal legal system. As Shedd argues, what she names the "school disciplinary superstructure" puts "some students squarely on the path to a heightened perception of criminal injustice and/or greater police contact" [62, p. 82]. However, Shange [61] and other education scholars criticize the popular term for promoting the idea that institutions of education and incarceration are theoretically separate and opposed rather than intrinsically linked. As Greene [24] puts it, "One set of institutions [schools and libraries] ... offers opportunity; the other [prisons] ... punishes those who do not follow the rules and accept the offer" (p. 34). This analysis makes it clear that there is no way to truly disentangle schools from broader carceral social practices. Thus, it is not surprising that when asked to think about systems of schooling in our design research workshops, many study participants emphasized punitive disciplinary technologies.

In prior literature, students have expressed varied opinions on the efficacy of the "carceral apparatus" [62] in their schools. Shedd finds that some students, those who feel relatively safe in their high-schools, "scoff" at metal detectors and doubt the need for security guards. Yet others, who attend a school with high rates of documented violence, largely express feeling unsafe and "want more security guards to patrol the classrooms and hallways inside the school" (p. 95). In the context of youth participatory design, Chang et al. [12] note that despite critical framings in youth participatory action research, "youth commonly re-appropriate dominant practices," proposing punitive interventions targeted towards peers. In their speculative design workshops with Black youth, Harrington and Dillahunt [30] find that students struggled to envision future technologies disentangled from existing social oppression. On the other hand, Gatehouse et al. [23] find LGBT youth to be decidedly ambivalent towards hate-crime reporting yet "many of the participants produced devices which enabled an immediate response, suggesting a desire for action and justice, albeit one not oriented towards the existing criminal justice system" (p. 1). These mixed reactions to traditional carceral and punitive approaches among youth, paired with an overarching desire for something other than their existing default, matches our own findings.

While many of the aforementioned behavioral management technologies focus on policing social norms, including student technology use for non-academic purposes [24], students and teachers also struggle with these material safety concerns both online and offline. In addition to violations to student privacy through school-based dataveillance, students face threats of bullying, including the use of social media or messaging applications, hate speech and identity-based discrimination, and physical violence. HCI scholars have directly engaged with questions around the role of digital technologies in broader strategies of promoting safety and preventing violence [6, 13, 19, 21, 41, 44, 57, 60, 72]. Notably, as Erete et al. [21] point out, many HCI contributions in this space have "focused on the benefits of using social media in public safety," (p. 3), establishing doubt around the efficacy of policy approaches that propose social media restrictions as a means of promoting well-being. Many scholars and activists have pushed back against the use of greater surveillance and other invasive technologies under the guise of public safety as cementing racial bias and diminishing human rights, particularly of youth, people of color, and members of LGBTQ+ communities [8, 9, 13, 44, 66, 67].

Technology interventions for child safety, those incorporated by tech companies, mandated by governments, and imagined by youth and their advocates, often focus on social media controls and features like moderation, hiding, blocking or labeling content, detecting and documenting illicit content, prompts for reflection, providing resources, private accounts, and age verification [3, 4, 32, 66]. While not necessarily pedagogically linked, schools often find themselves navigating online interpersonal conflicts between students that may spill into school grounds, making them interested parties to these developments. Besides adapting and implementing changes to existing systems, schools also utilize technology to block youth from technologies they claim to be harmful. For the last several decades, many schools have included filters on school devices or networks that limit the websites and applications students can access [58]. Recently, rules against using cellphones in classrooms have materialized in the increased use of magnetic phone pouches that restrict phone use during the school day or within school walls [50, 68]. As with the BMCs discussed in the prior section, these interventions differ markedly from a focus on greater youth agency and control emphasized by many who engaged in participatory design exercises around these topics in CHI and related fields [3, 4].

Since "safety" is the justification for the widespread imposition of new technology restrictions on youth, it is vital to understand how youth themselves perceive the threats they face in schools and the role they want technology to play in combating those threats.

3 Methods

3.1 Data Collection

Data collection for the study took place in 2023 and 2024, bringing together ongoing ethnographic research on virtual and hybrid schools in the Midwestern United States alongside design workshops with those connected to these programs. This ethnographic work focused specifically on virtual and hybrid schools as alternative educational pathways or "get-aways" [69] for students who had been marginalized in traditional schools for a variety of reasons, including race, class, sexuality, and geography. The first author reached out to a number of schools in the region, seeking for a diverse range of scenarios, and built initial research connections. Over time, the research team was fortunate to develop connections with both urban and rural school districts that had hybrid alternative schools. Students chose these schools for a variety of reasons, but all faced educational barriers and/or discrimination based on their social positions.

Most participants in the study are involved with public alternative schools run by their local school districts but which utilize a variety of private educational content and academic tracking platforms, similar to those described by education scholars Burch and Good [10]. These schools pair a mostly or entirely online curriculum with in-person classroom space staffed by one or more certified teachers. Students are required or strongly encouraged to attend in-person for a substantial part of the school week. The National Center for Education Statistics defines these "alternative schools" as those "that provide nontraditional education, address needs of students that typically cannot be met in regular schools, serve as

adjuncts to regular schools, or fall outside the categories of regular, special education, or vocational education" [53].

3.1.1 Ethnographic Fieldwork and Interviews. The first author initially began ethnographic work for this project in collaboration with an urban LGBT Center that acts as a site for one of these hybrid alternative schools. After agreeing on research goals and processes, the LGBT Center facilitated a connection with the hybrid alternative school, which runs multiple sites throughout the city. Research was approved by the relevant school district as well as the authors' institutional IRB. The first author introduced herself and her research in writing and verbally to staff and students at the LGBT Center school site, and had written introductions shared with student families which included methods for opting out of observational research. Interviews required separate affirmative assent and parental consent for those under 18. Observations included 65 days in the hybrid school classroom and offices of the LGBT Center, conducting 15 semi-structured interviews with students and 3 interviews with staff and teachers, and attending virtual staff meetings around once a month. During each observation session, the first author would record fieldnotes [20] with general happenings, school routines, various technologies used, and her perceptions of the emotions and social dynamics at play.

Building on prior work by the first and third author in the rural region [27–29, 35], the first author reached out to administrators at the school in which Workshop 3 took place and was granted permission to extend her research there via similar protocol, resulting in interviews with 2 current students, 1 former student, and 3 staff and teachers.

Interviews included questions about students' and teachers' prior school experiences, how they found out about the hybrid school option and what led them to choose that route, the benefits and challenges of their current form of schooling, and how their school had changed over their time there. During observations, the first author spoke informally with students and teachers about daily events, including asking students to reflect on their interpretations of particular interactions and dynamics. The data from this ethnographic work contributed to the design of the workshop protocol and supplemented issues raised in the workshops.

3.1.2 Futures Workshops. For this study, we drew from foundational literature on the use of future workshops in participatory design [36, 37, 52] alongside our prior research experience conducting future workshops [28, 29]. The workshop protocol was organized around the three phases of future workshops [52], each with a different purpose: Phase 1, critiquing the present; Phase 2, envisioning the future; and Phase 3, implementing or moving from the present to the future. In going through each of these phases, researchers "involve participants in new perspectives on their work, and help to develop new concepts and new initiatives" [52, p. 1067]. Further, as Kensing and Madsen describe [37], future workshops are "a technique meant to shed light on a common problematic situation, to generate visions about the future, and to discuss how these visions can be realized" (p. 156).

After approximately 9 months of ethnographic research, we worked with community partners to facilitate six future workshops [52] with teachers, students, parents, and members of relevant community groups. Our focus was on centering youth perspectives, while also taking into account other vital figures whose experiences are also often not directly addressed in the consideration of technology design. Further, conducting workshops with some adults, particularly in Workshop 5, emphasized the unique nature of youth perspectives, particularly given the participants in Workshops 1 and 5 are involved in the same school.

Our workshop protocol was developed iteratively and tested in two different pilot workshops: first with middle and high school students in the last authors' social network, and second with LGBTQ+ college students, most of whom had completed at least a portion of high school in a virtual school setting due to the pandemic. We chose these groups so that we could get feedback from youth who did not fit the primary focus of the study, but had commonalities with those who did.

Because we were working with many types of sensitive youth populations, we were able to receive permission to use an informed consent process in our research without needing to collect any signatures from our participants. All participants were provided an informed consent document at the beginning of each workshop that they were able to look over and ask questions about at the beginning of the workshop.

Workshops lasted approximately 1.5-2 hours. Each was conducted by the first author of the paper and audio recorded and transcribed, first using an automated transcription service and then verified by the first and second authors. Photos were taken throughout the workshops, including of the mock-ups and post it notes. Participants identified with a range of racial and ethnic groups and gender identities. Details about each of the workshops are below.

- Workshop 1 (September 2023) - urban Midwestern city: 10 LGBTQ+ students and allies, enrolled in an "alternative" hybrid school.
- Workshop 2 (October 2023) - urban Midwestern city: 4 LGBTQ+ students, half enrolled or previously enrolled in the above hybrid school, half enrolled in "brick and mortar" schools that had also experienced remote learning during the beginning of the COVID-19 pandemic.
- Workshop 3 (November 2023) - rural Midwestern town: 12 students, enrolled in an "alternative" hybrid school.
- Workshop 4 (February 2024) - urban Midwestern city: 8 students, enrolled in an "alternative" hybrid school.
- Workshop 5 (May 2024) - urban Midwestern city: 3 hybrid school staff 4 LGBT Center staff who work with LGBT youth and education programming who worked in school district from Workshops 1, 2, and 4.
- Workshop 6 (October 2023) – rural Midwestern region: 2 school district staff, 1 educator, 1 parent, 1 college student.[2]

Participants received a $25 incentive for their time and provided a meal or snack. This practice both supports broader participation in the research, increasing its validity, and acknowledges the value of expertise participants bring about their lived experiences [22].

In the first half of the workshop, participants were prompted to brainstorm and discuss as a group what typical problems they faced in school and what their desires were for school, and to write

[2]This workshop was not audio recorded due to one participant who did not actively consent to participate in research. Instead, the facilitator took notes on contributions of the other participants, who had agreed. Quotes from this workshop are not included in the Findings, though serve as a source of contextualization for the broader project.

down these ideas on sticky notes. The facilitator offered examples she had heard from participants in her ethnographic research, and would encourage participants to broaden the range of expressed concerns, but generally left the direction of each workshop open to participant input. The facilitator grouped these notes into rough thematic categories and read them back to students, summarizing and paraphrasing, in order to present them as products of the group rather than associated solely with particular individuals. Participants then used stickers to vote on which needs and desires they found most pressing and would like to engage in designing around to gauge levels of interest, though they were not restricted to those with the most votes. Following this, we asked participants to think about both dream and nightmare scenarios or outcomes (inspired by [30]) that might happen in the future in response to the desires and problems they faced in school.

In the second half of the workshop, participants worked in small groups to brainstorm and create low-fidelity mock-ups of design futures that sought to address or embody their future vision for school, both positive and negative. Groups were provided material such as Legos, paper, markers, and Play-Doh to construct their mock-ups. Groups presented their mock-up to the facilitator at the end of the workshop and were provided with guiding questions to answer about the purpose, inspiration, and design features of their ideas.

3.2 Data Analysis

Preliminary analysis of workshop and interview data began during and shortly after site visits through writing field notes and reflective memoing [20]. Once data collection for the workshops neared completion, the first and third author independently conducted first cycle open coding [59] on the workshop transcripts to identify quotes that could speak to important themes present in the data and that had been identified during the memoing process. These themes were clustered and organized by the team, then utilized to develop a codebook that was used for a second cycle of focused coding [59] on the workshop transcripts which was conducted by the second and third authors. Example codes included "hostility and conflict between students and teachers," and "power and control." The codebook was also used to conduct focused coding on select interviews with workshop participants to help contextualize workshop details and provide more analytical depth to the subject positions and interpretations of workshop participants. The research team met multiple times a week for the duration of data analysis to discuss the interpretation and application of the codes to workshop transcripts. In exploring this process, the research team became especially interested in the way participants connected power and control to issues of safety and wellbeing, which we focused on for this paper.

In addition, the first author conducted a similar initial open coding and analytic memoing process on the interviews and her fieldnotes. Upon narrowing in on the themes engaged in the workshops, the first author drew on her prior data to supplement the workshops, particularly seeking out evidence that could confirm, reject, or complicate patterns from the workshop analysis. As Emerson et al. [20] explain, this data analysis process that leads to focused coding and relies upon memoing, fieldnotes, and open coding, "involves building up ... [and] further elaborating analytically interesting themes, both by connecting data that may not have appeared together and by further delineating subthemes and subtopics that distinguish difference and variations with the broader topic" (p. 191). This ensures that the themes, which are translated in the Findings below, cover a wide range of experiences.

4 Findings

4.1 Providing More Objective Protection through Technology

Students complained, in workshops and interviews, about their human educators' approach to discipline, viewing it as at times over-accusatory and intrusive. As one student put it regarding one staff member at her school, "She'd be like, right there behind me. Like girl, back up... back up, like, I need my space ... It's just turned nine o'clock in the morning, I need my space, I need my coffee, I need my space." In another workshop, students bitterly denounced their new teacher, with one summarizing the dynamic as, "They expect respect from us, but give us none at all." Students in another school referenced being targeted unfairly by teachers as one of their reasons for leaving traditional public schools. Similarly, another student recalled that at her old high-school, "I just felt like they were picking on me, because there's been times where you'd have to get your bookbag checked, and the security guard would dump my stuff on the floor and tell me I have to pick it up." Repeatedly, students expressed one of their major problems with school as a concern that teachers and staff were invasive, disrespectful, unfair, and even cruel.

Ironically, Elena, a paraprofessional involved in Workshop 5, shared her fears that technology could overtake human judgment and lead to brutal and unfair discipline for students. She explained,

> My nightmare of use of technology is using AI to control and discipline students in a closed loop environment. So this is my AI computer that's determining which students need to be punished because they look too long at something ... before they actually commit crimes kind of thing. So if you squint too long at a teacher, you get detention, even though nothing was said or done that was disrespectful to the teacher in any manner.

Taking seriously the workshop prompt to consider what kinds of digital technologies might shape a desired future hybrid school environment, and which might show up in a more dystopian vision, Elena framed technology as a threat to student autonomy and privacy. Yet her description of a dystopian future ruled by preemptive discipline sounded eerily similar to students' descriptions of their current experiences.

While students had copious examples of disciplinary actions and punishments they found unfair or misdirected, their vision for ideal future schooling often did not so much resist these paradigms as it sought to ensure that these methods more effectively achieved their goals. In Workshop 1, one student argued that *more* punishment was needed. He explained, "they are so afraid of ... punishing any of the students for things that they're doing wrong because anything

that makes this center and this spot for the school look bad, it's just gonna make them want to close this down." From his perspective, imposing consequences for student discipline violations could draw attention to problems in the classroom and lead to the alternative hybrid program being shut down completely. In general, students expressed belief in the underlying dynamic that discipline and punishment would lead to a safer environment and should be an active part of their school experience. However, they wanted that behavioral management directed towards *others*, who they viewed as the correct targets, rather than themselves.

Embodying this tension of students' desire for a safer classroom environment through discipline while refraining from unjust claims, students' design mock-ups from the workshops used technology's aura of objectivity and efficiency to their benefit. In Workshop 4, two student groups came up with "robot security guards" that would intervene to address actions they considered inappropriate (e.g., fighting). When asked how these would differ from current human security guards, they explained that in addition to improved physical prowess, this robot guard would be "a protector," able to "tell the difference between students and people who are not from the school; if he detects that people are not from the school are a threat." Here, the student distinguishes between students, who need protection, and outsiders, who pose a danger. Unlike humans, who he explains "can't tell the difference," between real and imagined threats, this robot security guard can avoid false accusations. Compared to a teacher, the robot is "keeping it neutral," avoiding human bias.

To go along with the robot security guards, students in this workshop imagined a boomerang to automatically respond to bad behavior at an almost spiritual level. The student described their creation by stating,

> The respect you give, should come back. It should go both ways...Every karma you give to it, it comes back...Whatever negativity you put out, comes back to you... like somebody swears in school, right. You're gonna get a boomerang snap. Or if you do something good, the boomerang is gonna come along, and say like, you did a good job today.

Here, students draw on the programmed 'if, then' syntax of computing to envision a punishment and praise system that responds directly to student actions. Instead of including subjective assessments or relying on human teachers' limited perception, the boomerang technology was seen as able to implement an aligned consequence every time. In comparison to human teachers, the student explained, "It's our rule system that works." However, when probed about potential errors robot security guards might make, one student did raise the possibility of them "attacking humans on accident," but others quickly returned the conversation to human deficits. They countered, "We [humans] don't know how to react...don't know what to do. The robots just go."

In contrast to Elena's fears that future AI technology would bring about a cruel and dystopian classroom environment that punished those who had not done anything wrong, many students believed this state of affairs to currently exist through human policing in their schools. For them, technology could provide a more objective and effective option.

4.2 Turning the Tables - Disciplining Teachers

In addition to attributing future technologies with the power to indiscriminately and accurately assess and respond to bad behavior and rule violations, students also envisioned technology as a way to re-acquire a sense of power in the classroom, particularly in the face of past injustices that had left them feeling oppressed and helpless. In their technology designs, this took the form of students taking control of punishment technology. Asked who would determine what the robot security did, the student creator in Workshop 4 responded, "Me."

A rambunctious group in Workshop 3 designed several technologies specifically designed to punish delinquent *teachers*. Students had spent a large portion of the workshop discussion declaring their dislike of the new teacher, frequently explaining their frustration by comparing her to her predecessor, who had been widely adored. As one student complained, "We don't have supportive teachers...she treats us like we have no rights and threatens to suspend us...no one has the desire to get help from them, because after asking all I get is hands thrown at me." Another student exclaimed, "Actually, she isn't a teacher! She, she, won't help you! She doesn't teach! She sits there and supervises. She's a supervisor, not a teacher." While other workshops, as well as students in interviews, routinely highlighted issues of "disrespect" and and "unprofessionalism" they experienced in interactions with their teachers, Workshop 3 was particularly activated by our request to think about dystopian responses to the status quo in their classroom. In their designs, they exacted revenge. One of their designs was a shock collar, similar to the boomerang mentioned in the prior section in its immediate dispersal of punishment, but different in that it was applied solely to the teacher, who these students saw as the source of all their classroom misfortune. Reversing the supervisor/supervised dynamic they abhorred, these students imagined embodied technology that would perpetuate the same invasive surveillance and control they felt they were experiencing against their instructor, with their emotional strife transformed into physical pain. By invoking this behaviorist technique, these students enacted towards their teacher the dehumanization they felt they experienced. Another of their devices was a catapult, set to hurl away people - but in particular, the teacher - at the first sign of bad behavior. Asked to describe their technology, the student placed a figure in their Playdoh creation and threw it across the table, saying, "Watch this. Ready? She starts acting up. Gone, gone." Using the same terminology weaponized against them that had in fact been used to expel some students from their classrooms, students again materialized a reversal to launch their teachers far away.

4.3 Replacing Bureaucratic Approaches to Punishment with Physical Might

Students also imagined future technologies as mighty warriors, replacing seemingly apathetic administrative systems of punishment with superhuman force. Regarding the robot security guard design in Workshop 4, a student described the heroic qualities of his creation: "It has more force ... He can run, he's fast, without getting tired. He's bulletproof." The security guard was accompanied by semi-autonomous tools including the aforementioned boomerang, a whip, and a giant fist. Asked about how the fist would function,

the student designer explained that the fist would work as a tool of empowerment for those who had been targets of hostility, assisting in "being tough. In a good way...in a way that you're not getting bullying and stuff like that. Standing up for yourself."

Prompted to reflect on how these technologies differed from current agents of discipline, a student replied, "teachers are basically like, send you to the office or something like that. The boomerang's like a little bit more straightforward." Another student, at the school involved in Workshop 1, recalled of their prior school experiences, "people always say, if you're getting bullied, tell the teacher or tell an adult, but that usually just makes it worse. Because every time I did do that, it just made it worse. Because they would go and try to talk to the kid that was messing with me. And then the kid would be like, Oh, you told on me. So now I'm going to do it 10 times worse now."

Worse, many students had stories of teachers refusing to even exert that much discipline. In Workshop 1, students expressed their distress about teachers who they felt had abnegated their responsibility to protect students, saying emphatically,

> if you see it [bullying/harassment] happening, and you're supposed to be - you're the adult in the room. You're the teacher, you're the one that's in charge...You're the one that guides us, basically. So you mean to tell me that all these students are coming in here and we're all in the same room and we're all doing the same things and you mean to tell me you don't see these problems happening and you don't see - or feel the need to step in?!

Instead, as mentioned in section 4.1, bureaucratic punishment often fell on those who were the victims of harassment. Faced with repeated failures of educator intervention, many students no longer trusted bureaucratic methods to keep them safe. When one student in Workshop 1 proposed background checks for incoming students, another countered skeptically, "I don't necessarily think that doing the background check will do anything." These students' school was located within the LGBT Center, and a number of their classmates had expressed concern about the potential of the Center being targeted in a violent hate crime. As one student explained, "my mom was worried about like, the place being terrorized or something. Because it's a bunch of gay people [in a fairly conservative state]." As many students in the alternative hybrid schools had been the targets of bullying and harassment, they were acutely aware of these dangers. For them, the focus of behavioral management was generally physical and emotional safety, rather than more general rule breaking.

Frustrated with administrative and educator control that they felt still left them vulnerable, the form of behavioral management charts so popular in classroom technology was completely absent from student visions. Rather, they made clear that they found even analogue versions of this form of tracking and control offensive and counter to a productive learning experience. Another student at the school in the LGBT Center echoed the perspectives of many students across schools when she explained in an interview,

> [Our teachers] say that they think that it's better if we don't talk while we're doing work, because they think we get sidetracked. And they think that we cannot multitask...I have ADHD because I can't sit still for nothing...I'm a very friendly person. I am very talkative. I like to make friends. I like to talk to like the people that I'm around. And most of us we all have the same class, and we don't even know because they don't want us to talk...the thing that I don't understand is how you want us to sit here in silence for two and a half hours and only talk about school related stuff. No, I can't, I can't do that.

While teachers largely focused on policing activities like talking during class or using cell phones - generic rule breaking - students emphasized how to keep their classrooms safe and found current methods lacking.

In a rare exception, one student in Workshop 4 designed controls to restrict phone usage, which she felt was distracting and had become detrimental to her learning. She explained that currently, "On phones or tablets, you could just say you're doing your work, and then you get sidetracked when you see a Instagram post or a text." Even as her perspective here showcased the dominant narrative about phones as a threat, her solution was a hard-coded one, where "you will have 30 minutes of learning. And then after the 30 minutes, you could do whatever you want." Once again, her design suggested a distrust in the administrative system to manage deeply-entrenched problems, instead relying on the material affordances of the technology to neutralize the threat.

As these findings illustrate, normative approaches to addressing behavioral issues are rarely at the forefront of student concerns about their classroom experiences. When student perspectives do overlap with dominant narratives, they still differ on the methods of addressing such concerns and who should be the arbiter of an appropriate and safe learning climate. To return to the research questions we posed in the Introduction:

- Students envision safety and good behavior in hybrid school environments as respecting and supporting them in reaching their goals. They perceive threats to this ideal as biased and incompetent adults, toothless administrative systems, and hostile actors who go unpunished.
- Students imagine the role of future technologies in facilitating safety and good behavior in hybrid school environments to be increasing the objectivity and accuracy of discipline and punishment, facilitating a shift in power dynamics, and enacting direct material repercussions.

In the Discussion, we will explore how these student perspectives can be applied to broader education policy and technology development discussions.

5 Discussion

5.1 Youth Agency in Pursuit of Punishment

Given contemporary concerns about controlling student behavior in and out of the classroom, in our research we almost expected students to reject standard behavioral management techniques wholesale as tools for discipline and punishment that reflected a mismatch with their desires as independent and agentic subjects. Yet what we describe in our Findings did not fully align with our

expectations. Instead, many of the design ideas proposed by the students supported the "control" side of the "control and care" of behavioral management we described in the Related Literature. Given the prevalence of control-based designs in our workshops that imagine different forms of control than that typically seen in existing educational technology, we add nuanced youth perspectives to the scholarly conversation and a cautionary tale about the limitations of designing within existing systems.

Prior studies on technology use for behavioral management in the classroom were largely concerned with the work of teachers to utilize these new technologies and how students responded [24, 39, 40, 42, 54]. Following the work of Lu et al. [43] that proposed more speculative research on the potential role of these and other technologies in the classroom for students, we primarily centered students in our data collection and analysis. We intentionally turned the tables between students and teachers in many aspects in order to understand how their perspectives might shift when they were given power and influence over technology in the classroom, and how this might allow students to think more creatively about digital technology. This, albeit speculative, power shift wound up giving the students across workshops the opportunity to think about the types of surveillant and controlling dynamics that exist between teachers and students, and how that power could be reversed. They came up with different future technologies that would actually punish teachers for misbehaving, much in the same way students felt like they were unjustly punished.

One potential interpretation of this outcome from the research on datafication and surveillance is that of the performance of a surveillant subject [16] as someone who is both represented by particular types of data traces and evidence of certain behavioral attributes, and simultaneously responds to that surveillance in unexpected ways. Other complementary research in this space observed social surveillance in the classroom [40, 64], wherein students reacted to the affordances or implementation of classroom technology and either changed their own behavior or used it as a mechanism to surveil other students on behalf of the teacher/system. As Shedd explains, "Young people have yet to learn how to discipline themselves; the role of surveillance is both to supervise them and to teach them to surveil themselves" [62, p. 81]. The performance of the surveillant subject [16, 47] in our case falls in line with ideas of social policing and surveillance from this prior research. But our case highlights something unique, in that students are simultaneously correcting, through their speculative designs, for the perceived errors of existing actors, human or otherwise, in existing systems of discipline and punishment. Rather than students being the subject of surveillance, in our workshops, they took it upon themselves to create new visions of safety that would center students as knowing best how others should be surveilled. Take for example, the "robot security guard" that would be able to "tell the difference" between not only those who were supposed to be there and those who were not (i.e., outsiders), but also be able to efficiently intervene in situations where students were misbehaving (e.g., getting into fights). The students turned to technology they saw as more "objective" and "fair" as a source of punishment for other students who violated classroom rules that negatively affected them. Here, students asserted their expertise and the value of giving them control, but channeled that agency toward continued and intensified systems of surveillance and punishment.

This study builds on and extends the research on surveillance and performance in response to datafication by demonstrating, in many ways, how deeply embedded the surveillant subject is in the "grammar of schooling" [70]. Rather than rejecting the surveillant subject when given the opportunity, many of the students in our workshops doubled down. To some extent, this may reflect pragmatic student understanding of the resilience of existing social structures, as has been highlighted in other participatory design work with youth who have often been excluded from imagining future technologies [30]. However, rather than focusing the position of surveillance primarily on the student, we highlight how students focused on the teachers and those perceived as "others." While opposing having their own behavior constantly monitored and managed, many students remained invested in dominant forms of policing as central to schooling. In doing so, we demonstrate how the control element of care and control in behavior management is deeply embedded in youth perspectives on schooling, not only in the demands of authority figures. This serves as a reminder for designers, advocates, scholars, and policymakers that as Hoffmann [31] argues, a focus on including the traditionally marginalized within existing decision-making structures alone cannot overturn the oppressive consequences of those systems.

5.2 What Youth Designs in Response to Safety and Misbehavior Suggest about Current Technology Restriction Efforts

Perhaps because they were prompted to envision technology within schools rather than their lives more holistically, participants in our workshops focused primarily on embodied manifestations of discipline and protection, rather than on tools for social media or online resources, as has been common in other youth participatory design work around related issues [3, 4, 32]. In fact, the youth in this study generally expressed little concern about the influence of technology on their safety, security, or behavior, despite being prompted that their future technologies could veer either utopic or dystopic. While there is little doubt that many students overall are anxious about, for example, the influence of social media on their well-being and cyberbullying, within the context of their schools, students in our study had more pressing worries. Specifically as people who had actively chosen an "alternative" educational option, their lived experiences had taught them to be distrustful of institutions and adults wielding power and control over their lives, often under the banner of protecting children's safety. Instead, our participants found existing non-technologically facilitated efforts at discipline and punishment to be frequently unfair, ineffective, and harmful. Given these conditions, the last thing they might want would be to supercharge the power of these authorities, and therefore supercharge their ability to control, with technological enhancement.

The literature on BMCs highlights how those, and other types of digital technology, are used to enable teachers to navigate the dual roles of providing care and maintaining control in their interactions with students. Studies on these technologies frequently

emphasize significant concerns about surveillance and data privacy, especially from the viewpoint of teachers who must balance their caring responsibilities with the control facilitated by these systems [42, 73]. The desire from our workshops, for students to create environments and products where students had the control over discipline and punishment, rather than teachers, took a different formation than that which we see emerging from the literature on BMCs where students are not empowered to think about these alternatives. Even in the one case where a student's design encforced a form of behavioral management more similar to BMCs in its focus on strengthening academic performance and restricting extra-curricular activities on phones while on school time, there remained an emphasis on balance and respect for youth creativity and agency in pairing blocks of schoolwork time with equal periods of chosen activities. Greater youth control was necessary, their designs suggested, in order to provide a counterbalance to problematic teachers and their relentless focus on behavioral control that did not directly impact student safety. In the absence of that possibility (which many seemed to understand was far-fetched under their current educational regimes), they turned to the idea of autonomous technology that could cut through bias and misunderstanding, punishing perpetrators no matter their status, and avoiding weak and in name only consequences for truly harmful actions. This study contributes a new view of student-centered behavioral management, one which, as we highlight in 5.1, is somewhat paradoxical in comparison to what we initially expected from the students. This view of good behavior concentrates the ability to control the classroom environment in the hands of students. Returning to our research questions and resulting findings, this ability to exert control is based both in perceptions of safety that students desired, but also in response to unfair views of punishment in response to misbehavior. Through allowing students to dream freely, we locate a different impulse from literature that showed how existing BMC deployment in the classroom led students to surveil each other [42, 64]. Here, students seek to upend teacher's control over classroom behavior, but they accept the logics of punishment and the mediums of digital technologies.

So how might we apply this analysis to current efforts to restrict youth technology access for the benefit of their well-being? On one hand, both longstanding efforts such as web filtering and censorship of sensitive content, and newly emerging trends like forcing students to place their cellphones in magnetic pouches to curb use during school hours, align with the tendencies of our participants to privilege technological over bureaucratic or teacher-enforced methods of discipline. Here, student perspectives reflect broader cultural narratives of "techo-solutionism" [7]. However, the complete refusal these restrictions enact is in conflict with students' expressed desire for nuance and contextual specificity. As Thompson [68] argues about magnetic phone pouches, "Yondr-esque phone restriction policies are too blunt a measure to effectively satisfy current social realities or public policy necessities." To this we can add that they are also too rigid to account for the complexities that students recognize in their daily school environments, particularly in their configuration of students as problems while ignoring teachers and other elements of the educational landscape.

Indeed, mobile phones have been used to document instances of powerful authorities abusing those they are meant to protect (in both teaching and in cases such as policing or medicine) [54]. The same technology can also be seen in some ways as fulfilling student hopes to use technology to correct power imbalances, which puts a different valence on the proposed bans. In light of this context, efforts to restrict phone access appear designed to further minimize student power, including resisting adult authority they perceive as unfair. Phone bans purportedly aim to push back against the dominance of social media companies and redirect youth engagement to more trustworthy and protected channels, treating digital technologies like harmful substances that can easily damage young minds. But for students, they instead may represent a continuation of classroom policies that violate their autonomy, keeping them from accessing one place they can construct their preferred environment, including providing a source of social support that has been largely banished from their spaces of learning. This research demonstrates the need for a policy approach to digital technologies that recognizes the uneven power dynamics in the classroom. While complete shared governance between students and teachers is an unlikely outcome, we call for policies that engage rather than severely restrict digital technologies in service of providing both students and teachers with safety, autonomy, and respect.

5.3 Resisting Carceral Logics in the Future

This paper builds upon the work of scholars who have found that teachers and students negotiate digital technologies in the classroom in order to promote care and lessen potential negative outcomes [16, 34, 43]. Yet, what we show through our Findings largely refers to a reification of the "carceral apparatus" embedded in the grammar of schooling that centers discipline and punishment as the primary forms of behavioral control and means of promoting safety in a classroom. We cannot assume that having been harmed by these structures will automatically lead students to resist them, any more than we can expect students and teachers to simply acquiesce to the imposition of new technologies of control. Prior literature in this space (e.g. [13, 21]) emphasizes that an alternative approach to using digital technologies for promoting safety and preventing violence is to facilitate responding to the underlying needs that cause harm to occur. While students in this study exhibit support for punitive approaches, they also provide clear insight into the desires and needs that power their impulses towards surveillance and policing. They desire fairness, respect, autonomy, and a process by which to respond to harm, and they are open to the idea of using digital technologies in the process of meeting those needs.

In order to move beyond carceral and punishment logics in promoting school safety and youth wellbeing in relation to digital technologies, alternative frameworks need to be offered and students (and other school participants) need to have reason to believe in their ability to address their underlying concerns. For example, Erete et al.'s [21] discussion of street-outreach workers' community violence prevention strategies demonstrates an alternative to policing. Emphasizing the alignment between policing structures inside and outside of schools, similar methods could be highlighted for educational spaces, with associated possibilities around digital technology use. Lu and colleagues [44] offer another guide in their participatory work around surveillance technologies that engage community-members in acts of noticing. By specifically

highlighting the contested meanings of safety and the everyday acts of securing it, the authors and participants draw attention to other ways of acting. Students began this process in our workshops, challenging one another's ideas about how safety can be assured based on their lived experiences. Following the lead of Chang and colleagues [12], we see opportunity in our own future work to take things a step further, building "perceptual bridges" between the state of things (i.e., carceral logics, discipline, punishment) and potential futures that might exist "out there" [65] that don't rely on the performance of behavioral management, but instead design through resistance and transformation. In particular, we believe it would be valuable to ask students to engage directly with the tensions their designs have raised around approaches to punishment. In doing so, we can invite students into deeper conversations, and potential co-analysis, around issues of control, privacy, and surveillance in a more intentional setting that focuses on these ideas specifically.

We see great opportunity for future work in the educational technology space that takes participatory design interventions more seriously and explores what is necessary to picture a world where technology is not used for domination and violence, even against those considered guilty.

6 Conclusion

Asked to consider how they would design digital technologies for future schools, hybrid school students participating in our study developed a number of creative low fidelity prototypes that represented strongly-held beliefs and concerns about safety, security, and behavioral management in their classrooms. While these student perspectives often diverged from that of mainstream adult discourse, particularly in their assessment of effective method for promoting safety, they also at times reified underlying structures of discipline and punishment rather than calling for resistance or abolition. In this paper, we have described these nuanced desire and their implications for policymaking, taking seriously student agency in the ongoing creation of school structures and broader social norms. Taking as foundational that students deserve spaces of safety and learning, we encourage an ongoing and inclusive exploration of how technology can serve these goals.

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