




Research paper

“When AI generates ideas for you, that kind of defeats the purpose”: An exploration of teens’ uses and concerns about AI

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ABSTRACT

As young people rapidly integrate AI technologies into their everyday lives, they face numerous ethical dilemmas and decisions about their use. To support them in addressing these dilemmas, research is needed to understand how youth currently use and think about AI in their lives. We engaged 29 teens (ages 14–17) in five co-design sessions focused on their everyday uses of AI tools and platforms. Our results show that teens use AI to engage in a variety of tasks ranging from central to supporting in relation to their focal activity. We further demonstrate how teens exert different levels of cognitive effort while using AI tools. Through our analysis, we identified three types of concerns that teens expressed about their AI use: instrumental, personal, and existential concerns. We use these insights to offer guidance for designing AI tools and educational curricula to support teens’ responsible and ethical AI use.

1. Introduction

Young people are rapidly adopting AI-powered tools and services in their daily lives, from helping to develop their ideas for school assignments to talking with AI-powered chatbots on social media platforms (American Psychological Association, 2025; Hasse et al., 2024; Robb & Mann, 2025). These everyday uses of AI raise a variety of ethical dilemmas related to questions of authorship, authenticity, friendship, and agency, among others. At present, however, most youth receive little explicit guidance about how AI tools work, the benefits they can provide, and the ethical challenges they raise (Casal-Otero et al., 2023). Many schools have banned the use of large language models (LLMs) outright, while others have issued vague or no policies to guide their use (Elsen-Rooney, 2023; Famaye et al., 2024; Kasneci et al., 2023; Laird et al., 2023). As a result, youth have few opportunities to reflect on AI and its role in their lives. Despite this communication vacuum, young people’s use of AI continues to accelerate, raising questions about whether and how to prepare them for a world permeated by AI technologies.

Exploring adolescents’ evolving perceptions about AI tools is important given their uniqueness as technology users and their developmental context. Prior studies, for example, often point to teens as early adopters of technological advancements (Ito, 2013; Ito et al., 2005), positioning them to shape societal perceptions and future iterations of these innovations. The implications of teens using AI tools are also shaped by the developmental processes that are foregrounded

during adolescence, such as the development of identity, social relationships, executive function skills, and ethical reasoning (Blakemore & Choudhury, 2006; Davis et al., 2023).

Due to the recency of widely available tools and platforms built on LLMs, research is still emerging on young people’s uses and conceptions of AI. Existing research has documented many different ways that youth are using AI inside and out of school (Ali et al., 2021; American Psychological Association, 2025; Higgs & Stornaiuolo, 2024; Morales-Navarro & Kafai, 2023; Morales-Navarro et al., 2023; Robb & Mann, 2025; Thai et al., 2023), as well as how they are thinking about the ethical issues surrounding their AI use (Aitken & Briggs, 2022; Bilstrup et al., 2020; Forsyth et al., 2021; Gazulla et al., 2024; Higgs & Stornaiuolo, 2024; Landesman et al., 2024a; Morales-Navarro et al., 2024). However, this understanding is far from complete, especially in light of the speed with which AI tools are being released and adopted. Developing this understanding represents a critical step in identifying and developing supports to promote youth’s responsible AI use. Although teens’ uses and conceptions of AI will likely evolve just as rapidly as the AI tools themselves, the current work represents an important foundational view of how teens are approaching their ethical stances towards AI.

We engaged 29 teens (ages 14–17) in the Summer and Fall of 2024 in a series of five co-design sessions focused on their everyday uses of AI tools and platforms. Youth were members of a university-based Youth Advisory Board that met regularly as part of an ongoing, long-term engagement in research and co-design. This meant that we entered

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this research with strong design partnerships between adult researchers and teen participants. These design partnerships provided a rich context for identifying and reflecting on the variety of ways that AI permeates and shapes teens' daily lives, and allowed youth to surface their implicit and intuitive thinking through the design process (Obrenović, 2011).

The following research questions guided our investigation:

RQ1: In what ways are teens using AI-powered tools and platforms in their everyday lives, inside and out of school?

RQ2: What concerns do teens express about AI technologies, and how do they manage these concerns?

Through a thematic analysis of session recordings, design artifacts, and teens' individual research journals, we documented a variety of ways that teens use AI tools for schoolwork and entertainment (RQ1). Participants also described AI tools that are seamlessly integrated into other tools and platforms (e.g., music streaming platforms, social media) and therefore used without much, if any, conscious thought. Our results show that teens' AI use can be categorized along two dimensions: (1) whether they are engaged in a central or supporting task in relation to their focal activity, and (2) the level of cognitive effort they exert while using AI. We further identified seven primary concerns expressed by participants about AI technologies (RQ2), which we classified into three groupings: (1) the usefulness/quality of AI output, (2) AI's impact on personal well-being, and (3) how AI's efficiency threatens our humanity.

This work contributes new empirical evidence documenting how teens are currently using and reasoning about AI technologies in their daily lives, with a particular focus on teens' reasoning about the ethical dimensions of AI. Our mapping of teens' AI uses along the two dimensions of supporting/central tasks and high/low cognitive effort (cognitive engagement vs. cognitive offloading) provides new insight into the circumstances under which teens' AI use supports or undermines their sense of personal agency. Our model depicting the broad range of youth's present concerns about their AI use demonstrates that they are prepared and eager to move beyond discussions of AI and cheating.

2. Related work

2.1. Young people's uses and perceptions of AI

AI technologies are rapidly becoming integrated into young people's daily lives. As early adopters of new technologies (Ito, 2013), teens are exploring ways to use AI tools that are specific to their environments and evolving needs. In a report from 2024, 53% percent of US teens said they have used generative AI (gen AI) to help with homework, 42% to fight boredom, and 38% to brainstorm ideas (Hasse et al., 2024). In the context of school, teens use AI chatbots and text generators most frequently, with almost half (40%) the teens surveyed reporting they have used AI in school in some capacity (Hasse et al., 2024). Though there is much public concern about teens' use of AI to cheat on their schoolwork, one recent study found no change in students' cheating behaviors on school assignments since the release of gen AI tools like ChatGPT (Lee et al., 2024). These findings are reflected in reports surveying teachers, which found that a majority (59%) of teachers believe that gen AI is likely to have legitimate educational uses (Walton Family Foundation, 2023). At the same time, evidence is emerging that students' use of gen AI may undermine aspects of their cognitive engagement in school assignments (Melumad & Yun, 2025). Within this context, teens and their parents have expressed concerns about the lack of clear AI guidelines in schools, believing that AI tools should be limited until rules and regulations are put into place (Common Sense Media, 2023).

Outside of school, teens are using AI tools to create content (19%), ask for advice on personal (18%) or health related (14%) issues, and seek companionship (15%) (Hasse et al., 2024). As AI tools and features

become integrated into popular applications and platforms, young people are increasingly interacting with AI in some form during their social and learning activities (McDonald et al., 2023). Social media platforms such as Instagram (TechCrunch et al., 2023), Snapchat (Snapchat Help, 2025), and TikTok (TikTok Newsroom, 2025) are rapidly integrating AI features into their platforms, ranging from chatbots (Snapchat Help, 2025) to content generation features, (TikTok Newsroom, 2025; Wei & Tyson, 2024) which young users encounter on a daily basis.

In addition to investigating young people's use of gen AI, researchers are also exploring youth's perceptions of AI technologies. This research suggests that youth are aware of, excited, and concerned about AI in their lives. For instance, teens surveyed in the US in 2024 reported their belief that gen AI is likely to have both positive and negative impacts on their lives in the next ten years (Green et al., 2024). In a report from the Alan Turing Institute in 2023 (children's rights & ai, 2023), children (ages 7–11) from across Scotland shared a wide range of perceptions about AI's usefulness in schools, alongside concerns about AI's role in replicating bias in society and infringing on their privacy. In another report from 2024 investigating US based teens' and young adults' perceptions of AI, approximately one third (34%) of respondents who had not previously used gen AI said they did not believe it would be useful to them, citing concerns about the potential impact that AI might have on intellectual property theft, privacy, and misinformation (Green et al., 2024). As gen AI tools continue their rapid development, it is vital for research to track young people's evolving uses and perceptions of AI so that researchers, educators, and developers can build robust supports for responsible AI use in ways that attend to youth's hopes and apprehensions.

2.2. Young people's ethical reasoning about AI

Understanding how youth identify and reflect on the ethical complexities of AI is key to supporting their responsible AI use (Gazulla et al., 2024). Gaining this understanding is particularly important in light of adolescents' distinct moral developmental stage (Kohlberg, 1981; Piaget, 2013; Turiel, 1983), which prior work has shown to shape how adolescents reason about the ethical dimensions of their technology use (Flores & James, 2013).

Research exploring youth perceptions has examined young people's understanding of machine learning applications and their societal implications (Kaspersen et al., 2022); their knowledge about gen AI and its limitations (Ali et al., 2021); and their understandings and apprehensions about AI (Lee et al., 2022). Prior work has found that young people often react to AI tools with fear and rejection given the black box nature of large language model (LLM) reasoning (Alexandre et al., 2021). Collectively, this work indicates that youth are actively engaging with questions about the role of AI in their lives.

There is growing evidence that young people's active engagement with questions about AI includes reflections about the ethical issues that arise when using large language and image models (Dwivedi et al., 2024; Higgs & Stornaiuolo, 2024; Lechelt et al., 2020; Williams et al., 2023; Zhang et al., 2023). In their work with diverse youth to explore critical conceptions of fairer AI systems, Solyst et al. (2023b) found that teens are able both to identify ethical dilemmas that AI systems pose and to propose solutions to complex ethical problems regarding technological bias and unfairness. Other researchers have found that young people easily and eagerly engage in discussions of ethics in the context of fairness and bias in AI (Lee et al., 2021), writing with AI agents (Higgs & Stornaiuolo, 2024), and discussing potential benefits and harms of LLM systems (Ali et al., 2021; Landesman et al., 2024a; Morales-Navarro et al., 2024). In a different approach, Dwivedi et al. (2024) explored the values reflected in children's designs as they worked with teachable machines, suggesting that by understanding the values children hold we can better understand their needs when designing AI tools. Recent work by Gazulla et al. (2024) examined the ethical frameworks teens employed while analyzing AI use cases,

and found that teens analyzed dilemmas through a consequential lens, sticking to their own worldviews and reasoned principles. This work represents scholars' growing understanding of youth's capacity to recognize ethical complexities when interacting with AI tools, as well as the values and ethical lenses they themselves employ when using these tools.

Notably, much of the published work exploring youth's ethical perspectives on AI, especially in the field of HCI, focuses on supporting young people's thinking about *design ethics* (Antle & Hourcade, 2022; Gazulla et al., 2024; Mechelen et al., 2020). Design ethics is concerned with the ethical dimensions of a technology's design, with a focus on the personal and societal impacts of the specific design choices made by developers (Mechelen et al., 2020). In contrast, *everyday ethics* explores the ethical dimensions of people's interactions with a particular technology; the focus is on the user and their interactions rather than the developer and their design decisions (Mechelen et al., 2020). Frameworks and pedagogies that position youth to think about design ethics focus on topics such as the ethical implications of designing technologies in a specific way (Antle et al., 2022; Schaper et al., 2022); the inherent biases that exist in digital environments (Solyst et al., 2023a); and the moral decisions made by organizations and individuals when building AI tools (Bilstrup et al., 2020). Some of these studies do address everyday ethics to some degree, but typically without an explicit focus (Solyst et al., 2024). Less commonly, approaches focused on everyday ethics (Higgs & Stornaiuolo, 2024) specifically explore the values and ethical choices that youth make when using AI in their daily lives, such as at school or at home (Gazulla et al., 2024). Explicitly foregrounding youth's everyday ethical thinking about gen AI represents an important component in helping them to develop the full set of skills they need to confidently approach and make decisions about using AI. Moreover, a focus on supporting everyday ethical thinking about AI is key to provide teens a better understanding of ethical issues from a socio-technical perspective (Sartori & Bocca, 2023), and allow them to see a space for agency in their daily lives when interacting with AI (Daly, 2022; Gazulla et al., 2024). In this work, we reference agency in relation to self-determination theory (Ryan & Deci, 2000), which emphasizes an individual's capacity to act intentionally and autonomously. In the current work, we explore the specific and situated uses, perceptions, and ethical concerns that youth express about AI and use these insights to propose a set of design considerations for supporting their everyday ethical thinking about AI.

2.3. Supporting youth's AI literacy

The rapid emergence of AI technologies in K-12 settings (Heintz, 2021) has prompted the publication of numerous frameworks that identify what youth need to know about AI (Yim, 2024). For instance, Touretzky's 5 Big ideas in AI (Touretzky et al., 2019), the 4A's AI Literacy Framework for Families (Druga et al., 2021), the AI learning levels SEAME framework (Waite et al., 2023), the AKIEE Curriculum Framework (Chiu et al., 2021), the affective, behavioral, cognitive, and ethical (ABCE) learning framework (Ng et al., 2021, 2024), and the AI4K12 initiative (Touretzky, 2019) are all examples of approaches that aim to prepare youth to think, work, and live in a world with AI. Within HCI, Long and Magerko (2020) developed a conceptual framework based on their synthesis of interdisciplinary literature to help guide the design of AI literacy learning interventions. The framework consists of a set of competencies and design considerations that are organized into five core themes: (1) What is AI?; (2) What can AI do?; (3) How does AI work?; (4) How should AI be used?; And (5) How do people perceive AI?. In their review of AI literacy efforts in K-12 settings, Casal-Otero et al. (2023) identified two categories of work: (1) designing learning experiences focused on understanding AI, including an understanding of how AI works (e.g. Burgsteiner et al. (2016), Lee et al. (2020), Vartiainen et al. (2021)), and (2) work concerning the implementation of AI learning at the K-12 level, which includes teacher training, resources,

and curriculum design. The same review urges educators and scholars to foreground the critical questions youth may have about AI (Casal-Otero et al., 2023; Veldhuis et al., 2024), and to actively examine how AI tools adopted by youth in K-12 settings (Li et al., 2022) may have been designed without considering their needs (Howley III, 2019).

More recent work in this area argues for the need to move beyond AI literacy to *critical AI literacy* frameworks, noting AI technologies' positioning within broader sociocultural contexts which may have far reaching implications on the individual user and society at large (Casal-Otero et al., 2023). Defined by Veldhuis et al. (2024) in a recent review of critical AI literacy efforts, *critical AI literacy* is the "capacity to analyze, critique, and transform AI's critical implications". That same review (Veldhuis et al., 2024) recognized a variety of efforts whose learning objectives are to encourage youth to question how AI is integrated into their lives (DiPaola et al., 2020), highlight unique attributes of AI and its critical implications (Dai et al., 2024; Schaper et al., 2023), or discuss issues of existing AI systems in daily life (Everson et al., 2022; Forsyth et al., 2021; Solyst et al., 2023b). Work by Higgs and Stornaiuolo (2024) examined high school students' critical perceptions of AI-mediated writing in the context of an English Language Arts class. Alongside showcasing the complexity of teens' ethical perspectives about AI, the authors urged educators to offer more support to students in thinking about the role of AI by helping them to "thoughtfully and critically engage with, and take informed actions to address the everyday ethical dilemmas that surface" (Higgs & Stornaiuolo, 2024) when using AI. However, work exploring young people's critical and ethical views of AI points to the scarce supports available to teens to learn about the ethical dimensions of their technology use (Gazulla et al., 2024; Vakil & de Royston, 2022), as well as the lack of concrete guidance for implementing existing critical AI frameworks in practice. We see understanding teens' ethical dilemmas and concerns about using AI as an important component in developing this guidance. By surfacing and mapping teens' AI uses alongside their concerns about using AI tools and platforms, our research lays the foundation to build support mechanisms for teens to examine their everyday ethical thinking when interacting with AI.

3. Methods

3.1. Cooperative inquiry with youth

Our study employed a participatory design (PD) method called Cooperative Inquiry (CI) (Druin, 1999), also known as co-design (Yip et al., 2017). CI is a design method that emphasizes equal and equitable design partnerships between young people and adults throughout the entire process of design (Druin, 1999; Yip et al., 2017), and has been used in human-computer interaction (HCI) to explore complex topics with youth such as gender and sexuality (Liang et al., 2020), science learning (Yip et al., 2013), and privacy (Kumar et al., 2018).

We decided to use CI for our investigation for several reasons. First, we build on prior knowledge that points to the fact that while interviewing and surveying teens is possible (Heiervang & Goodman, 2011), exploring abstract and complex topics like hesitations and perceptions about AI can be difficult to elicit with methods using a singular point in time (Yip et al., 2023). Instead, workshops and PD techniques such as CI allow young people to concretely express abstract ideas about complex topics due to the in-depth and rich engagement they are able to have.

Additionally, our work was done with an established youth advisory board that works closely with adult researchers for prolonged periods of time. We created this group in order to engage teens in long-term, intergenerational co-design and research initiatives at our university. Prior work has shown that conducting CI in this type of long-term, supportive context allows youth to express deep and complex thoughts due to their prolonged engagement and the relationships they form with each other and with the adult design partners (Yip et al., 2023).

Table 1
Participants' self-disclosed demographic information.

Participant ID	Age	Gender	Sessions attended
P01	17	Female	DS1, DS2
P02	17	Female	DS1, DS3
P03	17	Female	DS1, DS2, DS3, DS4, DS5
P04	14	Male	DS1, DS2, DS3
P05	16	Male	DS1, DS2, DS3
P06	14	Male	DS1, DS2, DS3
P07	17	Female	DS1, DS2, DS3
P08	16	Female	DS1, DS2, DS3, DS4, DS5
P09	17	Male	DS1
P10	17	Female	DS2, DS3, DS4, DS5
P11	16	Female	DS2, DS3
P12	16	Female	DS2, DS3
P13	15	Female	DS5
P14	16	Female	DS4, DS5
P15	15	Female	DS4, DS5
P16	17	Male	DS4, DS5
P17	15	Female	DS4
P18	14	Male	DS5
P19	15	Female	DS4, DS5
P20	17	Female	DS4
P21	15	Female	DS4, DS5
P22	15	Female	DS4
P23	14	Female	DS4, DS5
P24	17	Female	DS4
P25	15	Female	DS4
P26	17	Female	DS4
P27	14	Female	DS4, DS5
P28	14	Female	DS4, DS5
P29	16	Female	DS4, DS5

When approaching the topic of teens2019 current uses and concerns about AI, this type of collaborative environment is key to surface granular perceptions.

By engaging our participants in design activities, we sought to surface their tacit and intuitive knowledge about AI tools (Obrenović, 2011), which would allow us to accurately represent their lived expertise in our findings. As such, we align our work with conceptualizations of youth participants as protagonists in the design process, which frames the objective of participatory work not as the design or testing of a particular product, but the "insights, skills, and reflective stance that children develop through the process" (Iversen et al., 2017).

3.2. Participants

Over the course of four in-person workshops and one virtual workshop, we worked with teens (ages 14–17) to explore how they use AI-powered tools in their daily lives and their concerns about using AI technologies. Workshops included adult researchers (investigators and undergraduate research assistants) and teen participants (N = 29), as described in Table 1. This group of teens is one of our university's youth advisory board (YAB), called (anonymous). Members of the (anonymous) work with researchers, graduate students, and undergraduates on research and design projects and local advocacy initiatives throughout the year. We recruited participants from local high schools through snowball sampling and word of mouth. Teens who join the YAB are usually highly motivated individuals, who seek to learn more about research and adolescents' relationship with digital technologies. In each of the sessions, at least two adult facilitators acted as design partners with the teens. Participants' attendance varied throughout the workshops, and is indicated in Table 1. Each session included three adult facilitators except for DS4, which had two adult facilitators. The (anonymous) met over the course of Summer and Fall 2024 to conduct the workshops described below, including various activities that allowed participants to work within both small and large groups.

The teens in this study represent the voices of engaged, passionate youth eager to work on and think about research with adult collaborators during their summer break and throughout the school year.

Their voices do not represent teens as a whole, and offer only an initial glimpse into their reasoning processes and uses of AI. Nonetheless, the voices represented here are important ones, as they reflect perspectives shared through in-depth, scaffolded conversations about AI use in and outside school.

3.3. Design sessions

The two-hour design sessions were structured as scaffolded explorations of the AI technologies that teens interact with inside and outside of school followed by discussions exploring the benefits and drawbacks of using AI. The scaffolding that facilitators provided served as a guide for the teens to access and express their perceptions of AI. This collaborative effort reflects inter-generational partnerships in PD contexts, which allows for mixing and generating ideas in a co-design group (Yip et al., 2017). The sessions were centered around exploratory activities and open-ended discussions, and aimed to support and surface teens' experiences and perspectives related to using AI in their everyday lives. Each session was purposely structured as a standalone workshop, accounting for the varied attendance of the teens. Participants' varied attendance, alongside the workshops' standalone nature, led to some instances where teens who attended several workshops and built on their previous statements had to explain their thinking process more elaborately to the group, but ultimately did not impede the activities of any one particular session. The first three in-person design sessions (DS1, DS2, DS3) were held in July 2024 over the span of two weeks. The fourth in-person design session (DS4) was held later in the year (December 2024), and the fifth design session (DS5) was held virtually later that same month.

Each of the five design sessions began with introductions and an ice-breaker (approximately 5 min) so that the group could feel comfortable with each other. Each session foregrounded one or two main activities, with group-wide discussions following each activity (approximately 45 min each). At the end of each session, teens completed individual research journals (approximately 15 min) to reflect on the session's activities and discussions (see Appendix A.1 for a description of the journal questions), which we used in our data analysis. In design sessions 1 through 4, which were held in-person, research journals were physical pieces of paper participants filled out at the end of the session. During design session 5, which was held virtually, participants filled out their research journals online by answering the questions in a Google slide deck. The sessions described below are also summarized in Table 2.

3.3.1. Design Session 1 (DS1)

Tinkering with AI Tools. The first design session focused on exploring teens' preconceptions about AI by tinkering and reflecting on several common gen AI applications. The session began by creating a collaborative word cloud reflecting participants' initial thoughts and reactions when they think of AI. Then, teens split into groups and rotated between two stations (45 min each) where they were introduced to five different gen AI tools: (1) Google's verse by verse tool (Verse by verse, 2024) which generates a poem in the writing style of famous poets, (2) Suno (Suno, 2024) an online song generator, (3) Google Gemini (Google gemini, 2024), (4) Microsoft Copilot (Microsoft copilot, 2024), and (5) ChatGPT (Openai & chatgpt, 2024). We selected the specific tools based on their popularity with teens at the time of the study (Hasse et al., 2024), accessibility, potential novelty, and possible applicability in teens' everyday lives. Teens used the first two applications (station 1) to craft poems and songs, and the three other applications (station 2) to generate and compare outputs from both visual and text inputs. At each station, teens filled out their research journals (See Appendix A.1), as well as a set of end-of-session questions.

Table 2
Description of design sessions.

Design Session (DS)	Design session goal	Design activities
DS1 (in person)	General perceptions about AI	Teens tinkered with various AI tools and reflected on their potential uses and limitations in their research journals.
DS2 (in person)	Appropriate uses of AI	Teens were presented with two cases about using AI tools, and analyzed them by engaging in group discussions and individual reflections.
DS3 (in person)	Using AI in school	Participants brainstormed how they could use AI in school, and collaboratively came up with guidelines for using AI tools in school settings.
DS4 (in person)	Describing AI	Teens were asked to describe AI to someone unfamiliar with it in small groups, and then discussed their perceptions in the larger group.
DS5 (virtual)	Using AI in everyday life	Participants mapped out their daily AI uses, and then divided into small groups to categorize the uses surfaced in the group.

3.3.2. Design Session 2 (DS2)

AI Case Studies. During the second session, researchers presented teens with two case studies to prompt discussions about what they thought were appropriate and inappropriate uses of AI tools. The first case study was a hypothetical story about a student whose first language was not English using AI to improve their writing assignment. In the case study, the student was caught and expelled for using AI. Participants were asked to reflect on the fairness of the punishment in two small groups (approximately 15 min), and then in a larger group discussion (approximately 30 min). After discussing with their group, students individually recorded their reflections in their research journals (See [Appendix A.1](#)). In the second half of the session, participants read an article about AI being used in an art competition ([Roose, 2022](#)). Participants discussed the case study in a large group format (approximately 45 min), and finally filled out their end-of-session questions in their research journals.

3.3.3. Design Session 3 (DS3)

AI Policies in School. The third session engaged teens in designing guidelines for using AI tools in school. In the first activity, participants were divided into 2 groups and brainstormed (approximately 25 min): (1) how they would use AI in school, (2) why they would use AI for that purpose, and (3) what others should keep in mind when using AI, recording their thoughts on a whiteboard (see [1](#)). The two teams then presented their ideas, and all participants then gathered to collaboratively create rules for AI use in school (approximately 20 min). In the second half of the session, participants looked over recently released local guidelines concerning AI use in K-12 (anonymous), and compared them to the rules they created. Finally, the teens filled out the end-of-session questions in their research journals.

3.3.4. Design Session 4 (DS4)

Describing AI. The fourth session surfaced participants' definitions and common uses of AI-powered technologies. This session was held a few months after the prior sessions (in December 2024), and included a mix of returning and new members of the group. After an introduction (5-10 min), we divided participants into three teams of four or five people and asked them to discuss and present their answers to the following questions, pretending as if their audience were completely unfamiliar with AI and its capabilities: (1) what is AI?, (2) what are some common uses of this technology?, (3) how would you use this technology inside and outside of school?, and (4) are there any specific warnings you would like to mention about using AI-powered technologies? Each group was given time to discuss and write down their answers, after which they presented their work to the larger group, pausing throughout for impromptu discussion (45-60 min). Participants did not complete research journals during or after this session due to lack of time.

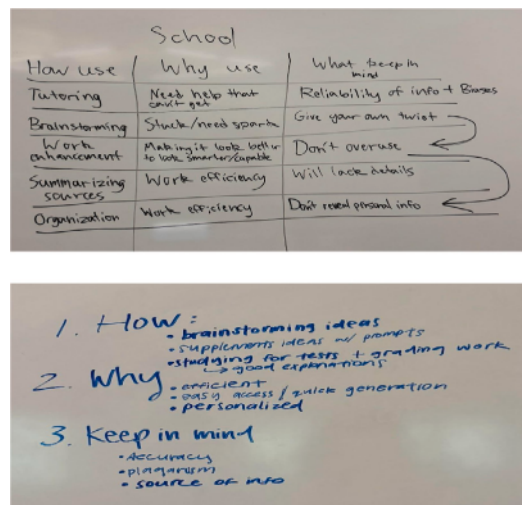


Fig. 1. Participants' mapping of their AI use during DS4, answering: (1) How they would use AI in school, (2) Why they would use AI for that purpose, and (3) What others should keep in mind when using AI.

3.3.5. Design Session 5 (DS5)

Mapping AI Uses. The fifth and final session with participants was held virtually, and explored how participants use AI in their everyday lives. The session began with an ice breaker (5–10 min), and then the first activity where facilitators asked participants to individually map out their daily AI uses their individual research journal in as much detail as possible (15–20 min). For example, participants were asked to identify all the ways that AI surfaced during their daily routines, such as an alarm clock using AI, using navigation apps in their commute to school, and so forth. Then, participants were divided into small working groups, where they shared their maps with each other and used a virtual whiteboard to collectively categorize the AI uses they had identified (5-10 min). After this categorizing exercise, participants shared their work with the larger group and discussed notable themes and patterns (approximately 45 min). Finally, participants filled out their research journals. These research journals were virtual since the session was virtual as well.

3.4. Data collection

We recorded and transcribed all session discussions, collecting a total of 15 h of audio. Audio recordings included both the large and small group discussions throughout the sessions. We focused our analysis

on the text based sources, namely the audio transcripts and participants' 2019 research journals. Participant artifacts, such as drawings, notes, and sketches were used to triangulate our data and refer back to what participants spoke about in their discussions. Additionally, the undergraduate research assistants who attended the sessions wrote analytical memos (Birks et al., 2008) during the sessions, and those notes were used to cross-check recordings and journal reflections throughout the analysis. Since attendance was not consistent among participants, our results reflect the group's salient ways of thinking throughout the workshops. In this way, we aim to foreground participants' 2019 collective sensemaking of the topics discussed, rather than individual changes in perceptions over time. By surfacing these viewpoints, we can build our understanding of the issues teens care about and consider how to engage them further in critical exploration of these issues.

3.5. Data analysis

We used a reflexive approach to thematic analysis (TA) to analyze the data (Braun & Clarke, 2006, 2021; Nowell et al., 2017). Reflexive TA is an iterative approach to qualitative data analysis that foregrounds the researcher's interpretations of the data in relation to the overarching research questions guiding the study (Braun & Clarke, 2006; Nowell et al., 2017). This approach differs from more post-positivist approaches to coding and theme development that emphasize quantifiable measures and inter-rater agreement (e.g., Boyatzis, 1998; Guest, 2012). With reflexive TA, researchers generate themes through active engagement and interpretation of the data rather than counting discrete instances of codes. Our approach to analysis focused on the group's collective sensemaking over the course of five design sessions. It is likely—especially in the context of researcher-facilitated conversations and design activities—that teens' individual perceptions of AI changed during this process. However, in light of our focus on group-level sensemaking, our analysis captured the salient themes expressed collectively by teen participants rather than changes over time in any one individual teen.

The first author transcribed and organized the data in ATLAS.ti (ATLAS.ti, 2024), immersing and familiarizing themselves with the data (Braun & Clarke, 2006, 2021; Nowell et al., 2017) and taking notes of initial impressions as they did so in light of the study's research questions. The first and second authors met four times over a period of one month to discuss and document theoretical and reflective thoughts that emerged from the first author's initial readings. The first author then performed line-by-line open coding of two transcripts using ATLAS.ti (ATLAS.ti, 2024), identifying codes such as “using AI tools to grade work” and “over-reliance on AI”. The first and second authors grouped these codes into broad categories reflecting the study's research questions. These categories included: participants' uses of AI, concerns about AI, and considerations for using AI. The first author then created an initial codebook with codes in each of these categories, such as “AI hurts learning” (concerns about AI) and “maintain authenticity” (considerations for using AI), which they then shared with the author team for feedback and reflection.

The author team met weekly over the course of one month to discuss and refine the codebook, using their discussions to develop the interpretive themes reported in this paper. For example, when coding participants' uses of AI tools, we identified three primary categories of use: *AI in school*, *AI for fun*, and *AI integrated seamlessly into other tools and applications*. These three categories became the primary organizing factor for codes corresponding to RQ1, and are reported as such in the results. Within these categories, we further identified distinctions between whether teens were using AI for a central or supporting task related to their focal activity, as well the level of cognitive effort they exerted while using AI in different contexts and for different purposes. We draw on the findings reported in Section 4.1 to present a framework for understanding teens' AI use (see Section 5.1).

We followed a similar process for coding participants' concerns about AI (RQ2). We identified several reasons why teens chose not to use AI tools (such as “following a personal value” or “mistrust of AI”) as well as challenges teens saw when using AI (such as “inaccuracy” and the “undermining of authenticity”). In total, we identified seven primary concerns that teens expressed about AI (see Section 4.2). Through discussion of these seven concerns, we identified three groupings, ranging from concerns about the quality of AI output (an instrumental concern), to AI's impact on personal well-being (a personal concern), and, finally, AI's threat to humanity (an existential concern) (see 5.2). Appendix B (B.3) summarizes our final coding scheme.

Once the research team had agreed that the final codebook faithfully reflected the data and addressed the study's research questions, the first author applied the coding scheme to the entirety of the data corpus. The second author then reviewed several coded transcripts, citing agreement or disagreement. This process ensured that at least two members of the research team reviewed each transcript. Once all transcripts were coded, the authors met to discuss and resolve any coding disagreements. For example, team members clarified the code “personalization” to mean specifically teens using AI to seek personalized explanations, and the code “entertainment” changed to “fun with friends” to specify its social nature. While coding the data, disagreements were resolved by surfacing the perceived meaning of each code by the author and its subsequent fit to the data, followed by a discussion between the authors to refine and clarify the code's meaning and placement within the coding scheme.

4. Results

To answer RQ1, we describe the ways that teens use AI-powered technologies in their everyday lives. Then, we describe the concerns they surfaced about their AI usage (RQ2).

4.1. RQ1: Teens' AI usage

Participants reflected on how they use AI-powered technologies across the different contexts of their daily lives. These uses fell into three primary categories: (1) schoolwork, (2) entertainment, and (3) interactions with AI that are integrated seamlessly into commonly used applications and platforms. Within each of these contexts, we identified distinctions between whether teens were using AI for a central or supporting task related to their focal activity, as well as the degree of cognitive effort that teens applied as they interacted with various AI tools.

4.1.1. AI at school

Teens described four primary ways they use AI tools in school: (1) as a starting point, (2) for work enhancement, (3) seeking personalized explanations, and (4) as a study tool. The first two uses are about gen AI's ability to help teens complete assignments such as an essay or a research report, while the second two are about gen AI's ability to support their understanding of concepts.

A starting point. Participants described how they use gen AI to explore and brainstorm starting points for school projects. P02 (age 17, female) reflected in her DS1 journal that AI “gives humans some inspiration/a place to start by helping brainstorm”, while P04 (age 14, male) explained during a group discussion in DS2 that “gen AI is so helpful for getting your project started or getting ideas. And it is just very easy to grab information.” In DS3 (focused on AI use in school), participants reflected on using AI to brainstorm when they felt “stuck, and need somewhere to start... mostly for writing” (P09, age 17, male), and that “ChatGPT is very useful creating ideas that help the mind going” (P11, age 16, female). In her DS1 reflection journal, P01 (age 17, female) explained that “[AI] can be used to inspire others, or to generate ideas. It is also very interesting [to use] and could save time, especially if

you have to make and show rough drafts”. In each of these instances, teens described using gen AI primarily as a starting point and more for supporting tasks such as brainstorming; ultimately, they retained cognitive control over the process and final product.

However, participants did note that, although they had not done so themselves, they had heard about or know peers who have used gen AI in a manner that goes beyond brainstorming — sometimes to write whole assignments. P28 (age 14, female), for example, recalled in a small group discussion in DS4 that “At school, if you’re doing assignments, it is very hard to think [that] nobody is using AI for at least some sort of assistance with certain assignments. Whether it is literally copying your entire essay like from ChatGPT. Like word for word. I mean, some people do that”. In such cases, AI is being used for a central task (e.g., writing an entire essay word for word) rather than a supporting task (e.g., brainstorming ideas for an essay). There was general agreement among participants that such uses occurred regularly in their schools.

Work enhancement. Teens described ways they use AI tools to boost the quality of their work, either by adding visual elements, changing their word selection, or supplementing their work with additional media components. In a conversation during DS3, P07 (age 17, female), for example, recalled using AI in school to make her “presentation look better, or add creativity [to it]”, while others reflected in their DS1 journal that they would use AI tools if “perhaps if I was creating a video and I wanted some background music to accompany it” (P05, age 16, male). Participants did point to a line that should not be crossed between work enhancement, on the one hand, and letting AI take over a task, on the other.

In DS3, P06 (age 14, male) explained that “there’s a difference between using [AI] with things like Grammarly, [which] has existed for a while, where it is just making your writing adhere to strict and set grammar rules. That’s different than using it to come up with ideas of how your paper can be improved more broadly”. Although participants agreed that such a line existed, there appeared to be ambiguity around where, exactly, to draw this line. For instance, in contrast to P06, some participants described using gen AI specifically as a feedback tool, using it to gauge their performance on an assignment before turning it in. In a discussion during DS4, P29 (age 14, female) explained that she often “put in the rubric and then also put in what [I] wrote for a project, and then ask ChatGPT to grade it, and see if [I would] get a good grade on that”. The discrepancy in viewpoints between P06 and P29 illustrates the challenge of determining which tasks in a particular focal activity should be considered supporting and which should be considered central.

Seeking personalized explanations. Participants identified personalization as a major benefit of gen AI tools; specifically, when they asked tools such as ChatGPT to reiterate and explain school-related concepts they did not fully understand. In DS4, teens explained they appreciated the “tailored or personalized [explanations]” (P24, age 17, female) they received for complex topics or questions they had trouble wording. In the same session, P16 (age 15, female), for example, recalled using gen AI instead of asking for help in school:

“From personal experience, my 7th grade science teacher was really bad, so I wouldn’t learn anything in this class, and I would end up ChatGPT-ing [to complete] all the study guides. And then I ended up doing good on the test just because of chatting [in] a different way, answering questions, it clicked with me.”

In DS4, Teens reflected that they actively engaged with gen AI to clarify math problems and history concepts (P24, age 17 female), explain complex ideas in physics and economics in a “more digestible and less formal language” (P29, age 16, female), and “figure out how to (learn) a concept and ask your own variation of questions to figure it out your way” (P08, age 16, female). The personalization of AI tools

helped participants take control of their learning, since using AI tools could “help with like memory and retaining knowledge that you’ve learned. You can find specific ways to teach yourself concepts. So, for example, if what’s being taught to you in class isn’t really making sense to you, you can ask ChatGPT about it and explain what you need help with and what you want to focus on more. So it can also be like a personalized tutor for areas that you need help that maybe school isn’t giving you” (P28, age 14, female). Teens found these accessible, personalized explanations especially beneficial for topics they did not feel comfortable asking a teacher about, such as topics covered in previous courses.

A study tool. Teens often used gen AI as a powerful and efficient study tool by creating additional study materials tailored to their specific needs. During the large group discussion in DS1, P26 (age 17, female) shared that her “Spanish teacher told us to use it to make practice tests” while P22 (age 15, female) explained that “many people use it as a study resource to make study guides from the content you’re learning in a class, and then also free grading or feedback on the work you’re doing for something, and also practice tests to help you study for something”. Others reflected in their DS5 journal that they turned to gen AI to “find common threads between my psych textbook notes and my psych podcast notes before seminars” (P16, age 17, male), or to “summarize lengthy documents or articles” (P13, age 15, female). In each of these instances, teens used gen AI’s processing power and synthesizing abilities to actively make their work processes more efficient and specific to their needs. In DS4, P08 (age 16, female), for example, explained the benefit of using gen AI to synthesize study materials since “the internet has so many pages. We cannot go through all the pages possible, but [AI] goes to all the pages possible for us, and summarizes them”.

4.1.2. AI for fun

Teens described two primary ways they (or other teens) used AI outside of school: (1) having fun with friends and (2) interpersonal connection. Whereas most teens shared personal examples of the former, they distanced themselves personally from the latter—describing instead how *other* teens use gen AI to form relationships.

Fun with friends. Participants described using gen AI platforms to create content related to their personal lives. They spoke about creating humorous and entertaining content intended to be consumed with peers or individually. While collaboratively brainstorming in DS2, one participant recalled that she “wanted to make a poster for my friend for a soccer slogan... And I wanted to incorporate their name into it, so I just asked ChatGPT how to do it, what words rhyme... [it came out] really cute, actually” (P12, age 16, female). Others reflected in their DS1 research journals that they had used gen AI tools to “have fun with my friends, making jokes into images” (P01, age 17, female), or to use an AI website where “[you] feed it a story and will make like endless reels for you to post” (P10, age 17, female). In a small group discussion in DS4, P30 (age 16, female) described how she used gen AI to create content to use with her friends:

“My friend and I wanted to figure out how to throw [a murder mystery dinner]. So we asked AI how to set it up. We had no idea where to start, or what websites to go through, and everything had a paywall. So we asked it for a detailed guide on how to figure out how to set that up, how to build a storyline for that, and work out some specific details. And it worked — it helped get [us] started.”

These examples demonstrate a variety of ways that teens seek out AI tools to support their ideas for entertainment, especially in the context of their peer interactions.

Interpersonal connection. Participants also discussed using gen AI to form interpersonal connections. Tools such as Screen.AI, for example, are virtual chatbots that teens used (or recalled their friends using) to talk with characters of their choosing. P16 (age 15, female) explained this in a conversation with P03 (age 17, female) during DS4:

P16: “If you go to Screen.AI, it gives you AIs that are based off of characters. They like copy characters’ mannerisms and texting styles, the way [the character] would speak. So [the conversation] would be very personalized to a very specific character.”

P03: “Yah, my friend for example had this huge crush on Pedro Pascal, and she went to character AI, and she spent 3 h [talking to it] - seriously”

Although participants mentioned that their peers were using these AI chatbots to form relationships that could be entertaining and enjoyable, they also expressed reservations about doing so. In a separate interaction during DS4, P03 (age 17, female) explained that “Some people choose to treat it as companions and seek conversations with AI instead of humans”. When one of her peers challenged her to ask if that is necessarily a bad thing, P29 (age 16, female) reflected that “It [treating AI as a companion] can be [bad] because at the end, I guess AI is still mimicking human intelligence. You do not get all of the same benefits that you would from interacting with an actual human, because it is not in any sort of physical form, you miss out on things that you can do with another physical person.” P08 (age 16, female) added that this situation could be compared to having “an imaginary friend”. In contrast to the openness with which they described using gen AI to create and share content with friends, teens were notably conflicted about using AI chatbots to form relationships, with some teens expressing concern about the potential for chatbots to replace human connection.

4.1.3. Seamless AI integration

In the AI mapping exercise (session 5), we expanded the scope of AI beyond generative tools such as ChatGPT and Stable Diffusion to include tools that incorporate some form of AI capability, such as recommender systems and navigation tools. As participants reflected on their daily use of such AI-powered technologies in DS5, they quickly realized how many tasks in their daily lives included AI and how seamlessly—and invisibly—AI was integrated into them. For instance, teens gave several examples of tools they use without thinking as they go about their day, such as using a navigation app, checking the weather on their phone or with a voice assistant, or setting alarms using voice commands. More deliberate uses of AI-integrated tools and platforms included “searching different books related to the ones I like” (P29, age 16, female), or music services such as “Spotify which uses AI” (P22, age 15, female) which they use to play “music through my Alexa as I get ready for school each morning” (P03, age 16, female).

None of these seamless integrations, however, were as top of mind for teens as AI’s integration into social media. Participants were acutely aware of AI’s presence in the algorithms that shape the social media platforms they use. P24 (age 17, female), for example, explained in a conversation in DS4 that “you can use (AI) on social media: Meta has an AI, Snapchat has an AI, there’s character AI, there’s a lot of different AIs that are specific to certain social medias. A lot of social media uses AI just to generate content”. Teens expressed concern about the increase of AI generated content overshadowing human made content on their social media platforms, and reflected on the increasing difficulty of distinguishing between the two as AI blended into their social media experiences.

4.2. RQ2: Concerns regarding AI usage

As the teen participants reflected on their uses of AI inside and outside of school, they expressed several concerns about how AI technologies are becoming integrated into their lives. Below, we describe the seven primary concerns they identified and how they responded to them. Through our analysis, we organized these concerns into three groupings that reflect increasing levels of existential concern, from concerns about the usefulness and quality of AI output (an instrumental concern), to AI’s impact on personal well-being (a personal concern), and, finally, AI’s threat to humanity (an existential concern).

4.2.1. Concerns about the usefulness and quality of AI output

AI can be inaccurate. Throughout our design sessions, teens frequently referred to the possibility that gen AI can sometimes provide false or misguided information. Participants shared several personal experiences where they had caught the AI tool presenting inaccurate information, and were surprised by its inaccuracy. P22 (age 15, female), for example, recalled during DS4: “So I speak French, so sometimes I’ll translate it from English to French, and what we get is not correct, but it also doesn’t have a filter. So you have some interesting stuff sometimes”. In the same session, P21 (age 15, female) expressed the simultaneous benefits and dangers of using gen AI, quoting inaccuracy as her main concern:

“Using things like ChatGPT can be really helpful. But you also need to keep in mind, you shouldn’t trust it with everything, because it is not always going to give you up to date information. And it is not really reliable all the time, and it is not always going to give you specific information. Like one time, I needed help on how to phrase a sentence, and it was about a really niche topic, but ChatGPT just like made up some information. So I had to tweak that, and like you can tell that it is very made up.”

In a small group reflection during DS2, P06 (age 14, male) described his preference for using traditional search engines over AI tools when searching for information, explaining that “a lot of the time, if I’m using ChatGPT for something, I have to go back to Google and fact-check what it generated for me, so that just wastes my time. I could just do the research on Google without using ChatGPT. I don’t really trust this credibility”. One method that teens described using to address the potential inaccuracies of AI-generated output was to refine their prompts with specific and detailed guidance. P05 (age 16, male), for example, reflected with the group in DS4 that “you need to give [AI] background information...you wanna tell it exactly like what you need from it. Just give it all the guidelines that you need to get a good response out of it. And it [might still] make a lot of mistakes”. The range of techniques teens used to combat the potential inaccuracy of AI tools often came down to weighing how much they would benefit from using a tool versus the time it took; if the benefit turned out to be relatively small, many teens chose not to use AI at all.

AI reflects human bias. Teens were also concerned about the bias of the information produced by AI tools. During DS4, P03 (age 17, female) explained that gen AI often reflects human biases since “it pulls from...data, not just scientific stuff, but also everything people have said on the Internet. Yeah, both good and bad, it pulls from that”. Teens talked throughout the sessions about different examples of gen AI bias they had heard about or experienced themselves. For example, in a large group discussion in DS4, P21 (age 15, female) referenced a video she saw of an AI model being trained to parse out sentences based on court transcripts. She recalled that “[In the video], they started filtering [the transcript] with AI [to look for offenses], and depending on the keywords they would use, the AI would give out a sentence. But they realized, for African American people, and people with darker skin color.... They often got a higher sentence, because the models that the AI was learning from was our previous stuff, which were all like

bias". This concern about AI tools reflecting human biases indicates teens' understanding that LLMs are trained on biased data, as well as their desire to avoid contributing to the spread of this bias.

Teens reflected on the need to use gen AI tools cautiously, and admitted they sometimes worried about the reliability of information they receive given the limited and biased training data they know these tools use. In the same session (DS4), P16 (age 17, male) explained that "That's why AI has a lot of bias, because it uses what we've done in the past and all that stuff, and it doesn't really have a filter on like, Oh, my, gosh What we thought about like when the earth was flat, that's not what we think anymore. Like stuff like that it doesn't know what's right and what's wrong, I guess. So that's where you can get the bias stuff". This concern for bias made teens more distrustful towards gen AI tools, and was often the reason participants quoted for not relying exclusively on AI for important information or important decision making.

4.2.2. AI's impact on personal well-being

AI uses you. Participants spoke with apprehension about the ways gen AI tools and platforms used them, most commonly for data extraction and without their explicit consent. In DS3, for example, teens shared advice they had received to not "put in your personal information...because if you're going to use it for your personal information, it can store stuff, right? So like, think of your own privacy. Once you put it out there, it is going to be out there forever" (P03, age 17, female). This concern of being used as a source of personal data resonated beyond the need for privacy: participants expressed concern about their data being used to characterize them in a specific manner, thereby shaping their online experiences in undesirable ways. As P22 (age 14, female) explained in DS4:

"The literal chatbot, sometimes it might just, take the information that you're putting into it. Like I use it for like to study for an AP World [exam] - So it might sell that information to Amazon....and then Amazon is going to start recommending me AP World textbooks."

This overarching sense of gen AI tools using you was present in many participants' conversations (DS1, DS3, DS5), such as when they talked about tools that take creative outputs without the creators' consent (P03, age 17, female; P10, age 17, female); tools that are used to create deepfake materials that might be harmful to others (P08, age 16, female; P04, age 14, male); and even instances when AI is used to simulate interpersonal connection, leading the human to experience a feeling of genuine connection while the AI uses the interaction to extract data from the user. P11 (age 16, female) explained this phenomenon to the group in DS4 as part of a conversation she was having with a friend, who admitted they had developed a small crush on the AI agent they had been messaging:

"It is also the type of thing - I mean, I guess humans also technically do this. But in talking to [an AI agent], you kind of have to be aware that anything you say to it, any conversations you have with it, it is purely using that to learn more. It is not actually using that for any sort of connection... like a one way situation."

These quotes illustrate teens' understanding of their personal role in producing data to help strengthen and refine LLMs, including the privacy implications of this role.

AI takes jobs. Another potential harm that teens identified was the threat of AI taking future jobs they desired themselves, or making them obsolete. In her DS1 research journal, P03 (age 17, female) recalled that "Lots of artists on Instagram are complaining about AI taking their work", and reflected on how AI's rapid adoption by the workforce has caused her to reconsider her own potential career trajectory:

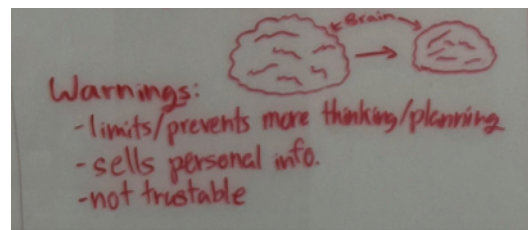


Fig. 2. Participants' representation of a brain before and after using AI.

"Like, graphic design, I used to really want to go into the field, but then I talked to people, and they were like, well, the field may be kind of dying off, or at least branches of it are, because of AI. I mean, obviously a lot of people have Canva, but also an AI [tool]."

Similarly, P07 (age 17, female) observed in a group discussion during DS2 that some career paths may be more affected than others, using the contrast between her father's career path and her own potential trajectory as an example:

"When I was younger, I really wanted to be an artist. It's my dad's career, and I know other artists. But I don't like the way [my own art online] is being used, and the way that AI is being used to take over creative fields rather than other fields that maybe are less [dependent on] humans — it's weird to me."

For these teens, AI threatens to shrink their employment opportunities and cut them off from careers to which they aspire.

4.2.3. AI efficiency at the expense of humanity

AI hurts learning. Teens expressed concern that using AI tools could hurt their learning by making the task at hand too easy, eliminating the *effort* they thought of as a critical component of the learning process. In a DS1 discussion, P08 (age 16, female) explained that using AI in school "takes the whole point of school away. You're supposed to be doing schoolwork to learn something, get something out of it. And if you're doing different work [using AI], you're not getting what you're supposed to be getting out of it". Teens consistently expressed (in DS2, DS3, and DS4) that using AI will eventually make you "intellectually lazy" (P03, age 17, female), and that using it may "limit, slash, prevent more thinking or planning" (P20, age 17, female). In the main activity during DS4, one group showed a picture of a brain they had drawn on the whiteboard; the brain had an arrow coming out of it, pointing to a smaller version of the same brain (see Fig. 2). P22 (age 15, female) explained that "here we see this lovely picture of your brain before AI and your brain after AI, because you're not thinking".

Oftentimes, statements like the ones above turned the conversation towards discussing the goal of education more broadly, and why some participants felt AI tools could hurt that goal. P03 (age 17, female), for example, explained that "Analysis and opinions should always be your own because we must learn how to think for ourselves; isn't that the point of education? When AI generates ideas or brainstorms things for you, that kind of defeats the purpose of that". This reflective process and the underlying concern it conveys about AI's potential to hurt learning indicates teens' complex ideas about the nature of learning and the way AI tools may undermine it.

AI creates dependency. Similar to the concern of AI endangering learning, teens expressed concern about becoming dependent on AI as they use it for everyday tasks. In her DS3 reflection journal when asked what advice they would give others before deciding to use an AI tool, P07 (age 17, female) offered: "Don't completely rely on AI to give you ideas or completed work because you won't always have access to them when you need it". Others, like P03 (age 17, female), explained in DS3 that

they feel like “the more you use [AI], the fewer of your own ideas [you have]. At least for me. Like if I use it for a long time, then I start lacking my own ideas, and I start relying on it more. I try not to”. Other participants focused on the idea of humans becoming lazy if they start to rely increasingly on AI, since “at some point you just keep using [AI] to [do] things that for you... Then you won’t need to like, think yourself. And then it is kind of lazy” (P08, age 16, female). Teens described this slippery slope of using AI tools to make tasks easier in terms of a tempting path that may ultimately make them “lazier” (P05, age 16; male) and “less capable” (P16, age 17, male).

AI undermines authenticity. One of the greatest concerns our participants expressed when using gen AI tools was the potential to undermine authenticity, both in their experience of personal authenticity and in the way their authenticity is perceived by others. When talking about using gen AI tools in their schoolwork during DS3, for instance, participants agreed that “using AI to do your schoolwork is, like, bullying the kid into doing it for you” (P06, age 14, male), which “can ultimately harm original and credible work” (P13, age 15, female). By asking AI to do something it was either not meant to do or by taking advantage of its capabilities, teens felt that a *shadow* was cast over their own credibility and authenticity. P05 (age 16, male) explained how this blurring of what is authentic and is not often drives his peers to avoid using AI all together:

“I feel like people are just scared to use it in school. Like they’re scared of getting caught. That was definitely my case. I did not use it until... I’m not a Luddite, but I was not (going to use AI). Because I felt like if I used it, it would not be my own work. It would be disingenuous.”

Using gen AI in school specifically brought up the topic of authenticity and its importance in the context of academic integrity, as participants engaged in conversations about the term’s amended and changing definition in contemporary times. During a large group conversation in DS1, P08 (age 16, female) explained that using gen AI tools for a school assignment may not only undermine her own sense of authenticity in the work she has done, but also others’ perceptions of the work itself:

“[Using AI] also kind of taints the image for the rest of the thing. Like, even if, like, you had an assignment and 90% of it you did yourself, there’s just, like, 10% you did with AI, and they’re, like, oh, my gosh. Like, 10% of it was AI. Oh, wait. And that destroys the credibility for the rest of the assignment. I mean, I assume at least somewhat. Like, in the background, there’s, like... Is that you?”

These reflections illustrate that teens are not simply trying to avoid getting caught cheating if they use gen AI tools; they are concerned about the potential for AI to undermine their sense of authenticity.

5. Discussion

As the HCI community works to build tools and frameworks to support young people’s ethical and responsible AI use, we see a need to develop a more robust understanding of youth’s everyday uses and concerns about AI. The current study addressed this need by engaging a group of 29 teens in a series of five co-design sessions that explored the variety of ways that AI permeates and shapes their daily lives. Unlike methods such as interviews and surveys, co-design allows for teens’ nuanced explorations of complex topics (Heiervang & Goodman, 2011; Yip et al., 2023), as well as utilizes the strength of design-based research methodologies to surface participants’ tacit and intuitive knowledge about their AI use (Obrenović, 2011). Situating these sessions in an established group of teens and adult facilitators engaging in a long-term design partnership provided a supportive context for teens to engage in deep reflection and express layered viewpoints. As a result,

we were able to generate a rich corpus of data with which to examine how teens used and viewed AI in their lives at the time of the study. The insights derived from this analysis, which we discuss in the following sections, will contribute to researchers’ and educators’ efforts to help teens become responsible and critically minded users of AI.

5.1. A model for understanding teens’ AI usage

Our analysis of participants’ design session discussions surfaced a variety of ways they use AI inside and outside of school, from creating study materials to generating jokes and images to share with friends (see 4.1). Teens identified uses that played a supporting role in relation to their focal activity and others that were more central to the activity. Participants also described differing levels of cognitive effort they applied while using AI tools. Therefore, in this section, we consider teens’ AI uses along two dimensions that describe the *centrality* of the task for which teens use AI and the level of *cognitive effort* they exert while engaging in the task. We present this model of teens’ AI usage (shown in Fig. 3) for researchers and educators to help identify specific areas where teens may need support to maintain their sense of agency while interacting with AI. We define agency in relation to self-determination theory (Ryan & Deci, 2000), which emphasizes an individual’s capacity to act intentionally and autonomously. In the context of our findings, exerting cognitive effort while using AI tools would be considered evidence of agency, while cognitive offloading would signal a lack of agency.

Our model reflects the possibility—which we observed in our analysis—that a particular use of gen AI may not be experienced in the same way by all teens and across all contexts. Whether a teen uses AI to offload or engage their cognitive effort, or whether they are using AI for a central or supporting task depends in part on the individual teen and the context in which they are using the AI tool. In the case of using AI as a starting point (see 4.1.1), for example, some teens described feeling empowered when they used AI to stimulate their creative thought processes at the beginning of an assignment. They explained that using AI tools to brainstorm ideas helped them to get started, but ultimately, they valued the ability to direct the process and produce the final product themselves (an example of cognitive engagement). Other teens, however, described using AI to brainstorm quite differently, stating that turning to AI for help with idea generation was a lazy and passive thing to do—evidence of a lack of cognitive effort (i.e., cognitive offloading). These differing viewpoints illustrate that teens can experience varying levels of agency even when engaging in the same AI task, depending on how they interpret the context and purpose of their AI use. When teens engage in cognitive offloading, their sense of agency is diminished because they are no longer acting intentionally or autonomously. Characterizing AI use as more or less supportive of teens’ agency, therefore, is dependent on the way a teen approaches and experiences the AI-supported task.

The distinction between central and supporting tasks is similarly malleable and context-specific. It was evident from our analysis that teens considered the centrality of an AI-assisted task when judging whether or not it was acceptable to use AI. In the context of school, teens agreed that AI should not be used for central tasks such as completing a school assignment. However, tasks that support the assignment, such as creating study materials or providing brainstorming assistance, were generally (though not unanimously) viewed as more benign. In the context of using AI for fun, teens similarly distinguished between central and supporting tasks, but their judgments of acceptability were somewhat different. For instance, teens described using AI to create entertaining content to share with their friends online. As prior work has documented, sharing memes and other cultural artifacts with friends is a central activity in teens’ social media use (Landesman et al., 2024b). As long as AI was not employed maliciously or surreptitiously, teens found it acceptable to use for the purpose of augmenting

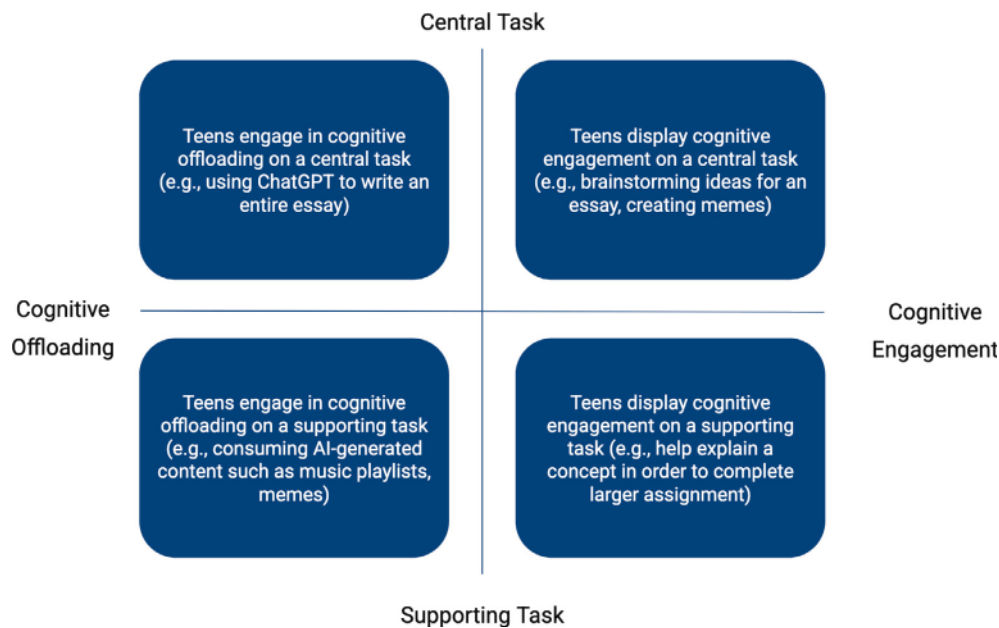


Fig. 3. Axis mapping teens' AI uses on two axes: uses of AI where teens are experiencing cognitive engagement versus uses of AI where teens are experiencing cognitive offload on central versus supporting tasks. Each quadrant contains an example of a use a teen may consider to be in that space.

their fun with friends. Teens also described more supporting orientations towards their AI-enabled fun, such as listening to AI-generated playlists as background music.

We see opportunities for this model to extend existing AI literacy frameworks (e.g., Chiu et al. (2021), Druga et al. (2021), Long and Magerko (2020), Ng et al. (2021, 2024), Touretzky (2019), Veldhuis et al. (2024), Waite et al. (2023)) by adding depth and specificity to the concept of youth's responsible AI use. The two dimensions highlighted in our model—cognitive effort and task centrality—underscore both the individual and the contextual nature of young people's AI use. Calling attention to each of these dimensions and the ways they interact could help youth develop a more nuanced understanding of when and why they should or should not use AI. For instance, critical AI literacy frameworks that encourage youth to question how AI is integrated into their lives (e.g., DiPaola et al. (2020)) could use the central-supporting distinction as an entrypoint into discussions with youth about their daily AI use and its impact on their sense of agency. This may also be important given prior work highlighting how difficult it is for many adolescents to experience agency on networked platforms due in part to their distinct developmental vulnerabilities (Davis et al., 2023), as well as contemporary work being done to give young people agency in AI contexts (Tench, 2025). The AI literacy framework developed by Long and Magerko (Long & Magerko, 2020) similarly could draw on our model to help youth think deeply about the framework's core ethical question "How should AI be used?" by encouraging youth to reflect on how various uses of AI situate them along the model's two axes. If a student, for example, notices they mostly use AI to offload cognitive effort for central tasks, they could then move on to consider whether this state of affairs aligns with their value system and beliefs. If it does not, that could signal a worthy point of intervention for educators and designers to support AI usage that aligns with youth's values. In this way, our model complements and extends existing AI literacy frameworks in their efforts to move beyond a dichotomous "good vs. bad" view of AI use to a more flexible, contextual way of thinking about youth's everyday ethical decision making.

Our model has value for a variety of stakeholders concerned with supporting youth's responsible AI use. For instance, HCI researchers can use the model's axes to understand youth's experiences with gen AI and to identify design mechanisms that are likely to engage (rather than offload) cognitive effort while using AI. Educators and curriculum

designers can use the model to scaffold student reflections on their daily use of AI and to plan and prioritize discussions about AI that foreground promoting cognitive effort in the context of central tasks.

5.2. Categorizing teens' AI concerns

Our analysis of teens' concerns about AI aligns with prior work exploring youth perceptions of gen AI technologies (Green et al., 2024). Similar to this work, the teens in our study expressed concerns about intellectual property theft, privacy, and misinformation (Green et al., 2024). However, they also identified concerns that have received less attention in the literature, such as the fear of AI undermining authenticity and creating dependency. Through our analysis, we identified three primary groupings of concerns that vary in their weight of ethical and existential implications (shown in Fig. 4). The first grouping captures youth's reflections about the usefulness and quality of output from AI tools, which we describe as an instrumental concern. The second grouping addresses AI's threat to personal well-being (a personal concern), while the third grouping addresses concerns about the fate of humanity more broadly (an existential concern). Each grouping represents an important focus of concern; collectively, they follow a progression from instrumental concerns to personal concerns, and, finally, existential concerns about what it means to be human in an AI-infused world. Below, we describe each grouping of concerns, followed by a reflection on how the model can be used to scaffold discussions with youth about the ethical complexities of living and interacting with AI technologies.

5.2.1. Instrumental concerns: Usefulness/quality of AI output

The first grouping of concerns addresses the **usefulness or quality of AI output**, and includes participants' concerns about **AI tools being inaccurate**, and **AI tools reflecting human bias**. At this level, participants reflected on how well AI tools were performing, and talked about the drawbacks of using a tool that may not always be accurate or neutral with respect to its viewpoint.

5.2.2. Personal concerns: AI's impact on personal well-being

The next grouping of concerns focuses on **AI's impact on personal well being**, and includes worries about **AI using you** and **AI taking jobs**. In this grouping, teens worried about AI tools making them intellectually lazy and potentially overusing AI to the point that it

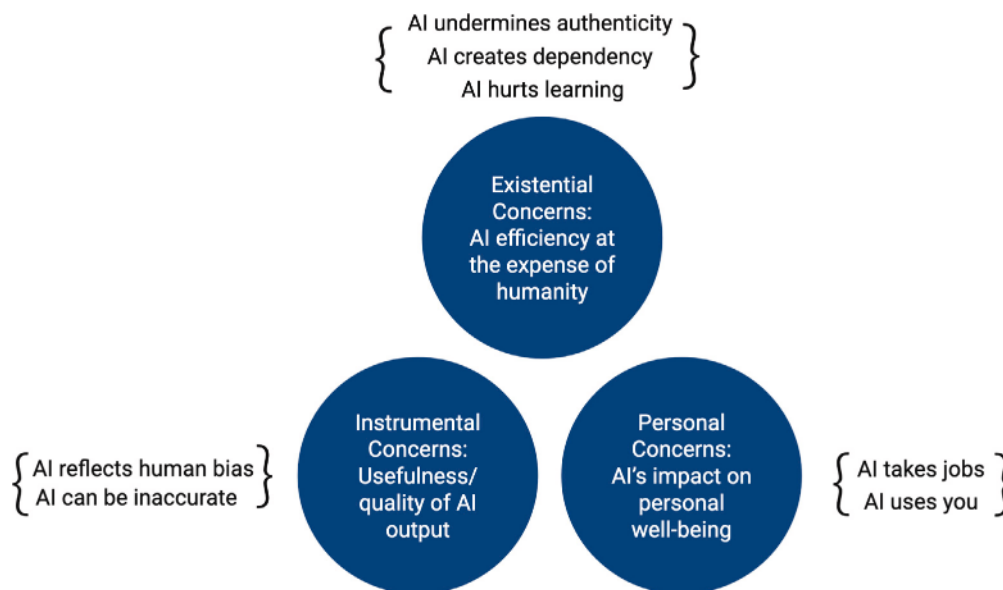


Fig. 4. Participants surfaced concerns about using AI in three groupings of concerns.

hinders their creativity. These concerns had less to do with how well the AI tool was performing, as in Grouping 1 concerns, and more about the short- and long-term effects of AI on teens' sense of personal agency, intellectual capacity, and even future career paths.

5.2.3. Existential concerns: AI efficiency at the expense of humanity

In the third grouping, teens expressed concerns about **AI undermining authenticity, AI creating dependency, and AI hurting learning** - all of which point to apprehensions about the tensions between **AI efficiency at the expense of humanity**. For participants, maintaining authenticity in their work meant not succumbing to the lure of AI efficiency. They emphasized the importance of putting in their own effort in order to maintain a claim to authentic ownership of the resulting work product. The concerns that teens expressed about authenticity, dependency, and undermining the learning process illustrate their readiness to engage in conversations about the state of humanity in a world permeated by gen AI technologies.

Collectively, these concerns demonstrate that teens are prepared and eager to move beyond discussions of AI and cheating—which has been a dominant focus in public and policy discussions about young people and AI (Callie Holtermann, 2025; Hicks, 2025; Lee et al., 2024; Tamez-Robledo, 2025)—and engage in a wide range of ethical considerations about their use of AI. We propose that our model of teens' AI concerns can be used to scaffold these discussions, helping youth to think deeply and systematically about the ethical complexities of living and interacting with AI technologies. Whereas the model of teens' AI usage presented in 5.1 focused on teens' individual AI uses and personal sense of agency, the categorization of concerns in 4 takes a more expansive view, connecting teens' AI interactions to broader societal trends and implications. We envision the two models being used together in complementary ways: the first to facilitate teens' reflections on the personal implications of their AI use with respect to their sense of agency, and the second to help them broaden their view and make connections between personal and societal concerns. This shift in perspective is particularly important to support in teens, as prior work has shown that they sometimes struggle to engage with ethical issues beyond the personal sphere (Flores & James, 2013).

Like the model of teens' AI usage 3, the categorization of concerns can also be used to complement and extend existing AI literacy frameworks. For instance, with respect to Long and Magerko's (Long

& Magerko, 2020) AI literacy framework, instrumental, personal, and existential concerns can serve as a lens through which educators help their students develop specific AI competencies, such as recognizing AI's strengths and weaknesses and thinking in a systematic way about the ethics of AI. And, because these concerns are grounded in youth's perspectives, AI literacy education efforts can more precisely draw on teens' contemporary thoughts and apprehensions about AI, as well as what teens may not be taking into consideration as they use AI tools. Such an approach is more likely to resonate with teens, as it presents authentic entry points to support them in thinking about the everyday ethical complexities they experience with gen AI technologies.

Moreover, although many of the concerns represented in the model are not unique to teens (AI's inaccuracy, for example, is a commonly cited concern among adults, as well), they take on particular significance when considered from a developmental perspective. For instance, teens' concerns about AI creating dependency is grounded in their focus on self-definition during a period of identity development (Davis, 2023). While a person at any age could be concerned about increasing dependency on AI, this concern assumes added importance for teens who are newly exploring their own sense of identity and perhaps taking steps to establish independence from their family members. Educators can therefore make use of this model to scaffold developmentally appropriate and resonant conversations with teens.

5.3. Limitations and future work

Our study had some limitations, given our sample of participants and methodology choices. The teens in our study were all from similar geographic areas, and were not recruited for their geographic, economic, or racial and ethnic diversity. The AI uses and concerns expressed by teens in this study are only a temporal snapshot of what our participants were thinking at the time of data collection, and may be partially attributed to the way we structured our co-design sessions as well as participants' ongoing participation in a Youth Advisory Board. Members of the YAB usually seek such opportunities because they are interested in research and/or adolescents' relationship with digital technologies; therefore, the views presented in this paper may not be generalizable to other teens with different experiences, passions, or life experiences. Moreover, we acknowledge that the state and capabilities of AI tools is constantly changing, and the ones we mention in this study

might be outdated by the time other researchers see these results. Since our participants' perceptions are tied to the AI tools commonly used at the time of data collection in 2024, we encourage future work to re-evaluate these notions alongside changing tools and contexts. However, we emphasize the importance of our main line of inquiry, as it is continuously important to uncover teens' everyday uses and concerns about AI in its future forms as well.

Future work can dive deeper into some of the topics we briefly mentioned in our work but did not discuss in depth with our participants. Youth's perceptions about academic integrity, for example, may need to be revised in light of AI tools, and may intersect with teen's concerns around authenticity, AI's potential inaccuracy, and the embedded bias in AI tools. Future work may also choose to take a more nuanced look at the ethical perceptions behind the concerns teens surfaced in this work, in order to further explore teens' critical capabilities as they interact with emerging technologies.

6. Conclusion

This study investigated how teens use gen AI tools inside and outside of school and the primary concerns they expressed about their AI use. We categorized teens' AI use along two dimensions: (1) whether the task for which they are using AI is supportive or central to their focal activity, and (2) the level of cognitive effort they exert while using AI. We further classified the concerns teens expressed into categories ranging from (1) the usefulness/quality of AI output (an instrumental concern) and (2) AI's impact on personal well-being (a personal concern), to (3) how AI's efficiency threatens our humanity (an existential concern). This work contributes new empirical evidence documenting how teens are currently using and reasoning about AI technologies in their daily lives, with a particular focus on teens' reasoning about the *everyday ethics* of gen AI. Our mapping of teens' AI uses provides new insight into the circumstances under which teens' AI use supports or undermines their personal agency, which can be used together with the categorization of concerns expressed by teens to offer guidance for designing AI tools and educational curricula to support teens' responsible and ethical AI use.

Selection and participation of children

We obtained all appropriate parental consent and teen assents, and all research conducted was approved by our university's Institutional Review Board for ethics and safety. Participants were recruited through word of mouth and snowball sampling. Prior to their participation in the Youth Advisory Board, participants received a list of topics we would be discussing, as well as an explanation as to what type of research we would be doing with the insights from the design workshops we held. In addition, we made sure to remind all participants at the beginning of each session the voluntary nature of participation, the session length, the ability to end participation at any point and in any session, and the procedures in place to assure the confidentiality of their participation. We shared the information about the study and the consent form itself with participants via email, and they indicated their assent by clicking on a button indicating they understood the nature of the study and agreed to participate in it. In addition, there were at least two researchers certified to work with youth by the University present in all interactions with youth. During our virtual design sessions, participants were not required to turn on their cameras; for some, we only recorded their voices. The university IRB required both parental consent and teen assent for participation in this study, both of which were obtained in digital form prior to beginning the study.

CRedit authorship contribution statement

Rotem Landesman: Writing – review & editing, Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Larissa Schwartz:** Writing – review & editing, Formal analysis, Data curation, Conceptualization. **Katie Davis:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Katie Davis, Larissa Schwartz reports financial support was provided by Spencer Foundation. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A

A.1. Teen participants research journals

At each design session, participants filled out research journals which had set prompts to reflect on the session's activities:

A.1.1. Design session 1: Experimenting with AI tools

After each of the stations experimenting with AI tools (see 3.3.1), participants answered the following:

1. Where is the AI component in the tool you just used?
2. How can this tool be used for good? How can it be used poorly?
3. Do you think this type of application can show up in your everyday life? Where would/could you find it?

A.1.2. Design session 2: AI case studies

After discussing the case study within their small groups (see 3.3.2) participants answered the following:

1. What's the reasoning behind your group's decision?
2. What's the reasoning behind the other group's argument?
3. What's your personal opinion about the case study we discussed?

After examining the second case study (see 3.3.2), participants answered these additional questions:

1. Now knowing about this case, does that change your opinion about conclusions from the first activity? If so, how did they change?
2. Should you be able to sell your generated poem/picture/music for profit?

A.1.3. Design session 3: AI case studies

After collaboratively creating guidelines for using AI in school and examining existing local guidelines on the same matter (see 3.3.3), participants answered the following:

1. What do you think is the most important guideline from the policy we created? Why?
2. Acknowledging the changing nature of AI, what do you think are the most important guidelines/policies we read today that can ensure we use these technologies thoughtfully in the future?

In addition, participants received these same three questions at end of every research journal throughout the three design sessions:

1. What is something you learned today?
2. What is something you'd like to learn more about?
3. Is there anything you'd like to dive deeper into in our next sessions?

Table B.3
Final codebook for thematic analysis.

Theme	Code	Description
AI Uses	A starting point	Using AI to get started on tasks by brainstorming ideas or testing outcomes. It helps explore the unknown and ask specific, relevant questions.
	Work enhancement	Using AI to enhance work by adding visuals, changing word choices, or supplementing with media.
	Seeking personalized explanation	Asking AI to explain or reiterate concepts not fully grasped.
	Study tool	Using AI as a tool for studying in diverse ways.
	Fun with friends	Making humorous AI-generated content for fun, not for school.
Concerns About AI	Interpersonal connection	Replacing or supplementing human interaction with AI.
	Seamless AI integration	Using AI that is invisibly embedded in everyday tools.
	AI can be inaccurate	AI may generate incorrect or misleading answers.
	AI reflects human bias	AI reproduces societal biases in its output.
	AI uses you	AI extracts personal data without giving proportional value in return.
	AI takes jobs	AI is replacing jobs teens aspire to have.
	AI hurts learning	Instant answers from AI can hinder meaningful learning.
	AI creates dependency	Overreliance on AI may reduce creative independence.
AI undermines authenticity	AI blurs the boundary between human and machine-generated work.	

A.1.4. Design session 5: Mapping AI uses

After mapping out where they encounter AI in their day-to-day lives and categorizes those interactions, participants received three questions to reflect with in their research journals:

1. What is something you learned today?
2. What is something you'd like to learn more about?
3. Is there anything you'd like to dive deeper into in our next sessions?

Appendix B

B.1. Final codebook

See Table B.3.

Data availability

The data that has been used is confidential.

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