

The Future of Creative Education: What We Can Learn About Technology from Art Teachers and Their Classrooms

Isabel Li
Independent Researcher
San Francisco, California, USA

Ace S. Chen
University of California, Santa Cruz
Santa Cruz, California, USA

Shm Garanganao Almeda
University of California, Berkeley
Berkeley, California, USA

Katie Chung
University of California, Los Angeles
Los Angeles, California, USA

Jingyi Li
Pomona College
Claremont, California, USA

ABSTRACT

Art educators are on the front lines of designing a rising generation's relationship with creativity and media. While public access to generative AI tools has sparked new discussions and practices in creative communities, industries, and higher academia, secondary education art teachers often lack the digital literacy and resources to align emergent technology trends with classroom goals. We interviewed 19 art educators across the United States, surfacing 1) constraints around technological access, guidance, and agency; 2) five core values for art education; and 3) the social-emotional labour educators perform to create classroom communities. Lensed by educator needs and the sociotechnical contexts they teach within, we call for researchers to critically consider how art education technology can motivate creative thinking, enable peer teaching among students, complement analogue art-making, and prioritise joy over results to better attend to classroom needs.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**; • **Applied computing** → *Fine arts; Media arts; Education*; • **Social and professional topics**;

KEYWORDS

art education, visual art, educators, creativity, technology in classrooms, interview study

ACM Reference Format:

Isabel Li, Ace S. Chen, Shm Garanganao Almeda, Katie Chung, and Jingyi Li. 2026. The Future of Creative Education: What We Can Learn About Technology from Art Teachers and Their Classrooms. In *Proceedings of Designing Interactive Systems Conference (DIS '26)*. ACM, New York, NY, USA, 16 pages. <https://doi.org/XXXXXXXX.XXXXXXX>

1 INTRODUCTION

Art educators have always been key figures in teaching youth to practise creativity. With these young citizens of the world in their

care, the art classroom is not only a place for teaching technical skills, but a designed community space where students explore artistic identity, develop self-confidence, and engage critically with media. To understand the art classroom, we invoke bell hooks' notion of education as "the practice of freedom", where teaching begins with the intellectual, spiritual, and communal nourishment of students so that they may be empowered to look at the world for themselves [35].

Teaching art, then, is also teaching youth to respond to an ever-changing society and culture. As art students come of age against a backdrop of technological advancements, art educators act as designers of their classrooms, navigating new media, technologies, and creative tools to redesign their lessons alongside these paradigm shifts. In many cases, they become students' first point of entry to certain software, influencing how students begin to think about technology and the role of the digital in their own art practice [51].

The introduction of emerging media technologies such as generative AI forecasted significant disruptions to existing professional art industries, economies, and creative communities [7]. HCI researchers have studied artist perspectives towards these novel tools [44, 71, 73], artistic human-AI collaboration [9], and design considerations for using generative AI creatively [38]. At the same time, researchers are examining how AI is impacting primary and secondary education worldwide [20] and evaluating educators' readiness to implement digital technologies in their teaching [25, 31, 75]. Yet there is limited focus on how AI impacts *art classrooms*—sites of creativity, community, and critical engagement—at the secondary education level, and how teachers are designing their curricula in response to its arrival. McNutt et al. posit that, as a result of their dual identities as both guide and practitioner, studying educators sheds new light on art-centered tools, the communities they exist within, and their potential for students' artistic learning [56]. What can high school art educators' experiences tell us about how the current AI climate meets or changes the needs of the art classroom? As various creative domains are increasingly digitised, we turn to educator reflections to help identify and ground our understanding of critical problem spaces where emerging technology is outpacing and disrupting creative communities.

We conducted semi-structured interviews with 19 high school art educators in the United States and surfaced their experiences designing their classrooms with technology, including, but not limited to, AI. Our study was guided by the following research questions:

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org.

DIS '26, June 13–17, 2026, Singapore

© 2026 Copyright held by the owner/author(s). Publication rights licensed to ACM.

ACM ISBN 978-1-4503-XXXX-X/2026/04

<https://doi.org/XXXXXXXX.XXXXXXX>

- **RQ1:** What constraints shape art educators' ability to use technology in their classrooms?
- **RQ2:** What values do art educators have for designing their classrooms, and how do those values influence their use or non-use of technology?
- **RQ3:** How have the roles and responsibilities of art teachers evolved alongside emerging technologies?

This US-based study offers regional accounts of art classrooms at the American secondary education level (generally grades 9-12, or upper-secondary education¹), which is referred to by participants and throughout this paper as "high school." However, this work yields broader insights for communities where art education—and education as a whole—face deprioritisation and budget cuts [37]. Our participants draw from a country that is capitalistically promoting AI integration, positioning it as a productivity tool designed for all areas of schooling, work, and life [36]. We expect this research will provide valuable insights for designers of creative technology outside the US who experience reverberations of this ideology.

We surfaced three main findings from a thematic analysis of our interviews: the constraints around technological access, guidance, and agency that teachers navigate when designing their classrooms; five core values in art education of critical thinking, social-emotional learning, foundational practice, ownership, and digital citizenship; and the labours art teachers undertake to advocate for and nurture their students.

From these findings we present a set of four design considerations for engaging with the sociotechnical classroom contexts required for thoughtful art education tool development. Art educators may have varying digital literacies and resources, but they are at the front lines of guiding the next generation's technological perspectives. This paper positions high school art teachers as designers themselves. Building on research which makes clear the value and urgency of computer scientists learning directly from creative practitioners [52], we present a direction for technology design informed by art educators' uniquely valuable perspectives.

2 RELATED WORK

Art education is intimately interrelated to the art world while encompassing the practical work of teaching and pedagogy. Respecting the multi-faceted labour and identities of art educators, our work draws upon research in HCI for artist communities, workers, and educators engaging with emerging technology. To study socio-cultural classroom factors, we primarily focus on literature engaging high school, rather than post-secondary, education, given that most secondary school teachers are more limited by governmental educational standards and funding, and work with students towards personal, rather than vocational, growth.

2.1 Impacts of Emerging Technology from Artist and Worker Perspectives

Our study of art educator perspectives and needs sits adjacent to artist-centric accounts and attitudes towards emerging technology [5, 6, 58], as well as work critically engaging technology's

impacts on human labour [29, 49]. Prior work has presented artist voices in adopting new tools to their creative practice [58], the norms and sociotechnical influences which shape artists' tool use [51], and ways in which artists might negotiate the power expressed over them by their tools [53]. Almeda et al. investigate how online art communities are responding to GenAI-driven impacts, pointing to how researchers might work *with* creative communities to design sustainable, rather than disruptive, interventions into creative ecosystems [6]. We extend this lineage of work by studying how art teachers' community-situated perspectives on their roles and the ways they negotiate with emergent technology shape how young minds are first exposed to creative technology and media.

As we consider the role of teachers and how technology shifts their job expectations and requirements, we draw upon HCI research which interrogates the human labour demanded of new technological integrations [29, 69] and how interventions neglect the valuable domain expertise and social emotional labour performed by industry workers [1]. Law and Varanasi's systematic review of worker and practitioners' lived experiences with generative AI tools found that these tools fragment established tasks and introduce tensions around role boundaries [49]. Just as relevant to studying technology usage in work are the contexts for non-use; Cha and Wong identified sociotechnical factors for AI non-use in UX work, providing implications for AI application design and evaluation [21]. Our study into teacher perspectives, roles, and impacts aligns with HCI work that designs with existing domain-specific labour practices [4, 44].

Within the visual arts industry, existing literature has highlighted comprehensive impacts of AI on artists from artist perspectives [44, 45, 54], and agendas for how we as researchers can develop technology to respond to AI interventions [42, 43]. Artists have raised issues around the ethics of AI art [11, 43, 45, 73], attribution and copyright infringement [48, 54, 59], and job loss [45, 73]. These challenges intersect with the concerns of art teachers, both as their teaching pulls from their complex artist backgrounds and identities, and as they prepare students to enter future art industries impacted by technological change.

2.2 Emerging Technology in High School Classrooms

Looking beyond tool development for educational settings [22], our work is most closely related to educator perspectives on technology in the classroom. While HCI research has surveyed students' LLM usage [83, 85] and conducted technology co-design activities with high school students [3, 61, 66], we believe that centering educator perspectives contextualises the specific educational systems and standards that shape classrooms [10, 30, 57], resulting in a broader understanding of how generative AI tools influence learning outcomes. We emphasise Cuéllar et al.'s call to prioritise the needs of teachers, "as teachers largely determine the success of technology that gets deployed" [23].

This paper extends literature which emphasises the impact of individual classroom contexts and the factors that affect meaningful technology adoption beyond software itself [31]. We build on work exploring teachers' current perceptions of AI tools and the deliberate reasons they have or have not chosen to integrate

¹Communicated in the International Standard Classification of Education framework as the "second/final stage of secondary education preparing for tertiary education or providing skills relevant to employment", with students typically age 14-18 [27].

them [8, 22, 41, 82]. Chu et al.’s systematic review of LLM agents in education research surfaces the critical challenge of integrating these tools within existing educational ecosystems, alongside privacy concerns, bias, and poor factual reliability [22]. Xie et al. held AI education curriculum co-design workshops with 8 cross-disciplinary high school teachers, noting the variable contingencies across high schools which complicate curriculum adoption [81]. Li et al. found both K-12² teachers and students faced barriers in AI literacy in subjects beyond computer science, as well as limited device access and time [50]. Yin et al. surveyed K-12 teachers to examine their priorities for AI technologies in the classroom, finding that fairness and safety were teachers’ most important values, underscoring the necessity for AI to better align with teachers’ needs [82]. These works make visible the often overlooked or implicit constraints within which teachers must design their classrooms.

Finally, we draw from research that is critical of the ways generative AI can transform teaching practice [18, 39]. Broadfoot and Rockey present a theory of how generative AI impacts existing social functions of educational assessment, introducing additional needs for teachers to discern the authenticity of student work [18]. In a year-long pre-mortem on generative AI in education, Burns et al. find that the risks to students’ foundational development outweigh the potential pedagogical benefits, calling for “governments, technology companies, education system leaders, families, and all those who touch this issue” to take action towards mitigating harm [19].

2.3 Art Education in HCI

Art classrooms have long considered how to integrate computer technology [2] and researchers have called for supporting teachers in developing and implementing tool-assisted arts curriculum [28]. Prior systems have been developed to help students understand 3D space [15], explore painting processes [68], and have fun while learning [72]. The advent of remote art classrooms signaled an increased demand for technology-mediated learning [55]. However, most of these tools are evaluated with students [46], omitting the educator’s perspective.

Greh portended on the integration of technologies into art education, “If the computer can do all this, is there any need for the art teacher? The answer is a resounding yes, more than ever” [32]. Our study of teachers’ values complements Greh’s speculations that art teachers will make their own diverse decisions about teaching alongside technology—whether they enthusiastically embrace, are forced to adopt, or choose to avoid new tools. McNutt et al.’s interviews with creative coding tool-builders and educators, primarily at the university level, highlight the values, perspectives, and sociotechnical contexts that guide pedagogical decision-making in the classroom [56]. Our paper builds on this work in examining the values and perspectives of high school art educators, who are likely to have less AI experience and access than university faculty [41].

Zhang et al. survey university educators on the impacts of generative AI on learning art, acknowledging curriculum design challenges but not presenting actionable participant needs [84]. Wang et al. interview two teachers about generative AI for elementary school art courses and offer suggestions for AI tools [77], but

do not address the feasibility of these suggestions. While limited works [34, 78] present the pedagogical reflections of art educators who use AI in their teaching, our research highlights the reflections of art educators who are not already predisposed to integrating AI, directing more attention to the existing needs of educators and what they envision could change about their current classrooms.

3 METHODS

To understand high school art educators’ technological perspectives and contexts, we conducted semi-structured interviews with 19 teachers. Our investigation was initially motivated by AI-driven impacts and tension in art communities [43]; this served as an entry point for engaging art educators, towards understanding how emerging technologies interact with, or disrupt, their work.

As we soon discovered, art teachers are often not software experts, may have limited interest in or knowledge of AI, and mostly do not employ AI tools in their classrooms, leading to few AI-specific insights. Instead, our participants provided deeper perspectives on their responsibilities in a changing art world, the frictions between their pedagogical values and technology use, and how their sociotechnical contexts motivated or curbed technology in the classroom. This guided our research trajectory towards socio-cultural considerations for art education technology design and integration. We accordingly broadened our analysis to focus on the needs of art teachers regarding technology in general, with AI as a contemporary talking point for how educators respond to new tools.

3.1 Participants and Recruitment

We recruited 19 US-based high school art educators, all with active teaching experience within the past 3 years. Participants were recruited from the authors’ artistic community networks and through mailing lists for national and state art education associations.

We recruited 14 women and 5 men. The median participant age was 50 years old, and the median years of experience teaching art was 19 years. 17 participants were actively practicing high school art teachers; 1 retired in 2024; 1 retired from high school teaching in 2022 but continues to teach university level art and consult for K-12 art education. Teachers were based at schools across 10 states and reported a variety of socioeconomic backgrounds, including rural schools. Our participants represent a diverse range of media and visual art backgrounds, including experience with elementary or middle school art education, freelancing, working in a creative industry, adult art education, teaching high school age students outside of a formal institution (such as summer camp, workshop, or tutoring), and senior leadership positions in their school (e.g. Head of Department). Table 1 shows information about participants’ schools and courses taught.

3.2 Regional Context

Interviews took place in the United States of America, where in 2025–2026, there are ongoing government funding cuts to arts education nationwide [37]. As of 2025, there is a teacher shortage: about 1 in 8 of all teaching positions nationally are either unfilled or filled by teachers not fully certified for their assignments [40]. Across the country, art classrooms are under-funded, under-resourced, and

²K-12 refers to kindergarten through 12th grade, the levels of primary and secondary education in the US public school system.

P#	Years of teaching exp.	State	Type of high school	Socioeconomic status of school	Art classes taught
P1	19	Maryland	Public	Upper-middle	Foundations level art, photography, AP Art, intro to visual communications
P2	15	California	Public	High/affluent, middle/mixed	Graphic design, drawing, painting, AP Art
P3	26	Maryland	Public, magnet ^a	Middle/mixed	Photography, interactive media, adaptive art, AP Art History, AP Art and Design
P4	20	California	Public	High/affluent, middle/mixed	Photography, AP Art
P5	17	New Jersey	Public	Middle/mixed, low	AP Art, honors level, ceramics
P6	2	New York	Public	Low	Studio, digital photography
P7	19	California	Public, arts-focused	High/affluent	Beginner to pre-professional painting, drawing, sculpture; AP 2D, 3D, Drawing; studio classes, high level conservatory
P8	24	California	Public, Title I ^b	Middle/mixed, low	Painting, drawing, photography, AP Art
P9	24	Wisconsin	Public	Middle/mixed	Drawing, painting, sculpture, mixed media, collage, ceramics, digital art, AP Art
P10	32	California	Public	High/affluent	Figure drawing, painting, film, animation
P11	25	Maryland	Public, arts-focused magnet	Middle/mixed	Drawing, sculpture, interdisciplinary
P12	33	Utah	Public	Middle/mixed, low	2D media, digital storytelling, 3D
P13	19	Iowa	Public	Middle/mixed, low	Photography, graphic design, 4D art, drawing, painting, printmaking
P14	5	Missouri	Public	Low, rural	All (as the only art teacher), including art foundations, drawing, painting, ceramics, sculpture, senior portfolio ^c , AP Art
P15	7	Missouri	Public	Middle/mixed, low	Sculpture, drawing, collage, mixed media, painting, fibers
P16	18	Missouri	Public	Low	Photography, graphic design, drawing art foundations
P17	7	Missouri	Public	Low	All (as the only art teacher), including drawing, painting, sculpture, 3D, textile art, mixed media
P18	7	Texas	Public	Middle/mixed, low	Comprehensive introduction to art, sculpture, jewelry, 3D design, AP Art
P19	8	Florida	Public, Title I	Low	Photography, 2D, 3D, drawing

^a A “magnet school” is a kind of public school with a particular academic focus, such as STEM, fine and performing arts, or Career and Technical Education. Admission is typically based on student application and/or lottery system, and the name refers to how these schools can “pull in” students from different geographical school zones.

^b A “Title I school” is one which serves a high number of students from low-income families and receives additional federal funding under Title I, Part A of the Elementary and Secondary Education Act. [26]

^c Participants sometimes referred to “senior portfolios”, which are art portfolios created by students in their final year of high school, usually for AP Art, university admissions, or personal development.

Table 1: Self-reported participant demographics from the initial screener survey. US-specific educational terms that are used nation-wide are defined in the footnotes. Undefined terms, e.g. class subject names, are school-specific.

under-staffed. The government is investing heavily in AI tooling, including in the educational sphere [36]. Our participants speak to their experiences teaching within this geographical context.

We offer some clarifications of common, nationally-defined educational terms used throughout this paper by our participants. A traditional US public high school is most similar to upper secondary school in the ISCED model [27], usually serving students age ~14-18 in grades 9 to 12. Public schools are government-operated and taxpayer-funded, and students are assigned to schools based on their geographic school zone or by a lottery system. Our participants all taught at public schools, as opposed to charter schools (government-funded but independently operated) and private schools (independently funded and tuition-based). Schools are organised into school districts, which are administrative bodies below the state level that oversee budget, curriculum, policy, and other operations.

Many of our participants spoke of teaching College Board AP Art [13]. College Board [14] is a non-profit organisation which develops and administers standardised tests and curricula used by high school students as part of the post-secondary education admissions process. Advanced Placement (AP) is an academic program created by College Board to offer undergraduate-level curriculum to high school students. AP is not implemented uniformly across the US and is primarily offered at larger schools: as of 2024, only 48% of public high schools had five or more AP courses, but these schools serve 80% of US high school students [14]. AP Art encompasses three AP courses—2-D Art and Design, 3-D Art and Design, and Drawing—for which students develop new original artwork to submit in a portfolio due at the end of the academic year. In 2024, College Board introduced their official AI-use policy for AP Art [12]: “The use of artificial intelligence tools by AP Art and Design students is categorically prohibited at any stage of the creative process.”

3.3 Interview Protocol and Data Analysis

Interviews took place between July and December 2025, three years after the public release of ChatGPT and text-to-image generators. Each interview was conducted remotely over Zoom and automatically recorded and transcribed for analysis, with each session lasting approximately 60 minutes. Participants were compensated for their time with a \$20 USD gift card. All participants consented to a recorded interview, and this study was approved by a university institutional review board.

We developed a semi-structured interview guide split into three sections, each centered around a research question: teaching and technology goals, navigating AI and new technology in the art classroom, and envisioning the future of art education. Our interview protocol did not ask about specific AI companies or tools—rather, we initially asked teachers about “AI” to learn about their own existing interpretations of AI and use of emerging technologies at large.

We analyzed the data with a qualitative reflexive thematic analysis approach [16, 17]. Open coding was conducted over the duration of the study period using an online collaborative whiteboard platform. We split coding equally between the first four authors; each interview was reviewed and coded independently by at least two of these authors, who referred to the interview memos and coded

the transcript. Preliminary themes were formed by the research team during weekly meetings, where all authors reviewed the codes together, discussed potential themes, and further developed directions for theming as new data was collected and analysed. The resulting themes were finalised through consensus. We ended data collection after reaching theoretical saturation [33].

3.4 Positionality

The authors of this work are US-based computer science researchers specialising in human-computer interaction. The first author received their secondary education in New Zealand; the others attended high school in California, Maryland, and New Jersey. Each of us has experience teaching in higher education, and in a range of artistic fields (game art, graphic design, creative coding, UX design, etc). We all identify as visual artists and received some high school art education. During data collection, the semi-structured interview guide and the conversations we had with participants were influenced by the research team’s own educational and pedagogical experiences. Our deep backgrounds in visual art also lent us contextual knowledge for parsing and identifying themes in the array of art-making processes teachers described across different media. Our lines of inquiry were shaped by our positions as educators, computer science students and researchers, artists, former art students, and the sociotechnical contexts we operate within when we assume these identities.

4 FINDINGS

Here, we report on three themes that surfaced across teachers’ experiences: constraints on teachers’ access to, guidance around, and agency over technology; (mis)alignment between emergent technology and teachers’ goals; and the expansive social, emotional, and practical labor teachers undertake. We summarize our findings in Table 2.

4.1 Technological Access, Guidance, and Agency

RQ1: *What constraints shape art educators’ ability to use technology in their classrooms?*

Despite mainstream narratives characterising AI’s transformative or disruptive impacts on education, we found few examples of teachers or students intentionally teaching or using AI in the art classroom.³ Only one teacher (P3) had a lesson plan for teaching students how to use an AI tool. Meanwhile, 12 teachers had full or partial AI bans in their art classrooms.

To understand this attitude towards AI in art education and the state of technology adoption, we looked to the institutions and systems contextually shaping teachers’ power. In designing curricula and classrooms, teachers juggle policies and demands from external stakeholders, including the national, state, and local government, school administrations, College Board, extra-curricular art competitions, and students’ parents. These constraints impact art teachers’

³For P4 and P12 who retired in 2024 and 2022 respectively, these findings report on their most recent high school classroom experiences.

FINDING	SUMMARY
(4.1) TECHNOLOGICAL ACCESS, GUIDANCE, AND AGENCY	Teachers' decisions around technology are constrained by external stakeholders. Teachers cannot benefit from technology without access—even when they do have access, teachers may not be able to use technology effectively without guidance or agency. These limitations impact what outcomes they can achieve with technology in the classroom.
(4.2) TECHNOLOGICAL (MIS)ALIGNMENT WITH ART CLASSROOM VALUES	Art educators form their curricula around teaching critical thinking, social-emotional learning, foundational traditional skills, creative ownership, and digital citizenship. They are tool-agnostic in their teaching, and will choose technology for their classrooms only if it can be used in service of these values. Existing technology use varies in its alignment with these priorities; future tools may design towards these values to meet classroom needs.
(4.3) ART EDUCATORS' EVOLVING SOCIAL, EMOTIONAL, AND PRACTICAL LABOUR	Beyond learning goals, art educators' responsibilities include navigating the role of technology in building student relationships, contextualizing art in history and culture, advocating for the arts, and researching learning opportunities in new tools. As technologies evolve, they create additional labour for educators who must learn to assess, use, and teach them.

Table 2: Summary of findings.

access to classroom technology, the amount and quality of resources supporting their use, and their agency over how technology is implemented. Operating within these systems complicates teachers' ability to effectively design learning experiences.

4.1.1 Access. Teachers cannot incorporate technology they do not have access to. Nine teachers reported struggling to receive adequate funding from (national, state, or district) governing bodies to acquire technology for their students. P13's perspective was that "not all schools are treated equally as far as funding goes... because we are a bigger school, and because of the taxpayer money, we have more money to spend on those [classroom technologies]." P19's district "gives no money to the visual arts... None."

Beyond school budgets, teachers also faced challenges persuading school administration to actually allocate that money to technology for the arts. Teachers (P9, P14) met resistance when advocating for their schools to offer digital art programs. "I've been laughed at [by administrators] when I talked about adding... just iPads and [Apple] Pencils", P14 said. "They don't see the importance of it. They see us making amazing art, which we are, and we get kudos, we win contests... But it's not what the kids need." As a result, P14 lends their personal devices to students to support digital art experiences. P15 and P19 reported struggling to find funding for art materials in general, connecting this to ongoing deprioritisation of the arts in education. P15 said, "The school's not going to spend money on software for us. We're [the art department]... We have to get coloured printing approved." While the CTE⁴ program at P19's school is getting "thousands of dollars", the art teachers are "looking for pencils."

⁴Career and Technical Education (CTE) refers to vocational education programs that train students to work in particular industries, such as agriculture, business management, healthcare, and manufacturing. CTE programs are highly variable and typically implemented at the school level with district and/or state oversight.

Technology access is not limited to hardware. Some educators (P4, P6, P9, P16, P17) taught at schools that banned online tools. P16's district "is knowledgeable about the changes in AI, but is very cautious about providing instruction and curriculum that uses it", resulting in a "very controlled" district where most AI websites are blocked. P4 reported using their personal hotspot to support students experimenting with AI. While these bans may be well-informed decisions, blanket policies from the school's governing bodies undermine teachers' agency over their classrooms.

Beyond having, or not having, technology—art teachers can lack access to the *right* technology for their classrooms. P1, P11, P15, and P17's schools supply students with Chromebooks; these laptops lack the power to run many digital art software programs. P1 and P15 described how state-wide high school phone bans restricted student access to the most useful and convenient technology at their disposal, while "Chromebook photographs are absolutely horrible" (P1). P15 asked, "These Chromebooks don't even have rear-facing cameras on them, how do you expect the kids to photograph their work?"

Teachers struggle to even consider using novel technologies when they cannot access basic classroom resources. P19 expressed that the advent of AI technologies did not practically impact their classroom at all, because they did not even have reliable access to computers or Wi-Fi. When asked what technology or skills they would like to acquire for their future classroom, they explained that having warm water would make cleaning paintbrushes easier for students. P16, a photography teacher, reported the impact of their darkroom being demolished: "I'm struggling to use a storage closet and a custodial sink for my darkroom... It's all been condensed to about a third of what I'm used to."

Without access to basic art materials and resources, let alone the appropriate technology, teachers cannot begin to introduce students to new media or emerging creative tools.

4.1.2 Guidance. Even when teachers had access to technology, they did not feel equipped to effectively approach them without guidance, policies, and training. Guidance here might refer to how a teacher should use technology to prepare classes, discuss technology with students, teach students technology skills, or assess student work created with technology. For P5, funding challenges not only meant no money for resources, but also for training: “We were told that we will have no funds for professional development because [New Jersey state is not abiding by federal anti-DEI laws.] Teachers are being punished. And the students, obviously, because we’re not being trained.” They acquired Wacom tablets for their students but personally did not have experience using them: “I know very little about technology, and it’s really the kids that come in, and I’ll ask ‘how do you know how to do this?’”

When guidance was provided, it led to concrete outcomes. Ten participants taught AP Art classes, where the official College Board policy prohibits use of generative AI tools in any part of student work and offers guidance for disabling generative AI features in common digital art software [12]. Teachers strictly enforced this policy, ensuring that students accustomed to using LLMs understood the portfolio eligibility requirements. P9’s school district’s IT department developed a “scale for AI from zero to five” to clearly communicate to students how AI can be used for an assignment: “Let’s say for this particular project [it’s] zero, meaning, you cannot use AI at all... However, if I say I’m gonna give you a two for this assignment, then you can use AI to generate ideas.” P3, P8, and P11 were given options to participate in professional development workshops for understanding how AI may apply to their teaching. When P8 took the workshop, they “learned how to kind-of use AI”, noting that they previously had “zero experience... Zero like, I don’t even know what you’re talking about, AI.” On the other hand, P11’s personal attitudes and experiences with AI led them to feel there was little to gain from workshops: “The county has had professional development stuff about, ‘What does AI look like in the art classroom?’ And I’m like, it doesn’t. Kids don’t care, and we don’t care.” Although teachers did not always agree with the guidance provided, these resources allowed them to make informed design decisions about their classrooms, and paved a way forward for using technology with institutional support.

Seven teachers who reported a lack of reliable access to resources or training described spending significant time researching and developing curriculum on their own. P1 “didn’t have any sort of support with teaching [a new] class and had to do a ton of research on my own time in addition to my regular job.” P19 relied on online teacher communities for lesson plans because their school stopped providing them with any curriculum, including the teacher’s edition of their textbook. On the other hand, teachers who could not afford to self-learn faced uncertainty with new technologies, like AI, and could only design their classrooms reactively rather than proactively. P10 did not realise students were even capable of submitting AI-generated homework until we contacted them for an interview. Shortly after, they prohibited AI in their film class when a student used it to complete a screenwriting assignment.

Without in-depth guidance, AI policies varied from classroom to classroom depending on teachers’ personal literacies and attitudes. Besides the AI ban by College Board for AP Art, only four teachers received formal guidelines from their schools which suggested

policies for students using AI. P3, who teaches students how to use Adobe Firefly as well as cite and identify AI-generated images, can only teach children whose parents have opted in to AI-related lessons from their school. P14’s school has general homework policies on ChatGPT usage that are not particularly useful to the art classroom. Without any input from their schools, three teachers have no policies around how or if AI is used in their classrooms at all; an additional four teachers have no policies besides abiding by the AP ban. Eight teachers had unique classroom policies restricting students from using AI including full bans on AI in their classroom (P1, P10, P15) and limitations of AI to certain steps in the creative process (P2, P7, P13, P16) or assignments (P3, P16). When asked how they might prepare students for a world changed by AI tools, P1 exclaimed, “I mean, I really don’t know, because otherwise I’d be doing it!”

Teachers must navigate interactions with various, potentially conflicting, external stakeholders. P5 encountered a “moral dilemma” upon learning a student submitted AI-generated images to a local art competition: “We contacted [the competition organisers], and they had no rules. They didn’t even know anyone could do that, because this is run by older people who are not artists [...] The next year, I looked at Scholastic Art and Writing contest and I shared some of their AI rules with [the competition organisers] so they could model it, hopefully.” Teachers must frequently use their best judgment to make critical decisions around technology—even when they do not feel well-equipped to do so.

4.1.3 Agency. Even with access to necessary resources, teachers’ need the *agency* to shape their classrooms—and this agency can be threatened by the stakeholders granting them those resources. For example, P10’s software access depended on a corporate partnership: “Why the Adobe Suite? Because that’s offered to us for free.”

Teachers (P3, P4, P14, P19) face pressure from their school communities, with some reporting direct impacts on their curriculum or resources. P14 described a sentiment in their conservative community as “fearful” of AI: “If I actually set up a lesson plan for that, I would probably get quite a bit of backlash.” Parents in P4’s community exercise their privilege and influence over the classroom: one parent on the school board instated an AP Art program so their child could enroll; another gifted a \$23,000 large-format printer to see her child’s art at a larger scale.

Some participants felt relative freedom and agency over the design of their classrooms and curricula, attained through years of experience and leadership positions (P3, P5, P16), or by demonstrating positive results to gain trust from administration (P11). P11 shared, “They don’t mess with us too much. Students are winning national awards every year. Get good scholarships to those four-year art schools... So we kind of keep those things up, and you can leave us alone...” P3 described one of the “perks of being a veteran teacher” as the “level of autonomy given” over their lesson plans and rubrics.

But teachers with the power to make significant classroom design decisions did not always reach for more technology. P2 described a general aversion to computers in the art classroom: “I have this urge to be like, ‘No! No more screens!’ ...they’re just on the high school campus going from screen to screen.” P1, P10, and P15 banned AI

use in their classrooms, citing how AI's affordances can undermine effective learning experiences. Teachers need access, guidance, and the agency to evaluate whether integrating a new technology will serve their classroom values and goals.

4.2 Technological (Mis)alignment with Art Classroom Values

RQ2: *What values do art educators have for designing their classrooms, and how do those values influence their use or non-use of technology?*

We surface five core values which teachers hope to impart on students through their learning goals. While they had varying rubrics and methods of formal assessment, teachers believed the purpose of the classroom was to nurture the values of (1) critical thinking and creative problem solving, (2) social-emotional learning with peers, (3) building foundational skills through traditional media, (4) ownership over tooling decisions, and (5) good digital citizenship. These values were tool-agnostic and remained consistent even as technology became more prominent in the classroom, informing teachers' adoption of tools. While some teachers were optimistic about new tools, others found technologies' affordances in conflict with their goals. By examining these values and cases where tools align and misalign, we develop an understanding of how technology can be designed to meet real classroom needs.

4.2.1 Critical Thinking and Creative Problem Solving. 17 of 19 teachers emphasised the importance of students learning "critical thinking," "creative thinking," or "problem solving." P7 believed that "a huge part of teaching, no matter what subject it is, is critical thinking. [...] To think creatively. And to realise that they need to be flexible, because a lot of things can change." Art teachers saw this as being able to explore different materials, techniques, and ideas. P4 said, of teaching photography: "What I care about is that you took a variety of shots to show me that you worked through the problem."

Six teachers reported feeling worried about AI undermining students' opportunities to be creative during a critically formative period of their lives. Teachers lamented how AI makes "cheap and easy" (P2) solutions "too readily accessible" (P1), precluding students' engagements with creative struggle and divergent exploration. P1 reflected on their own processes as a young art student, asking peers to live model and iterating between photographing and sketching to ideate on alternative composition ideas: "My fear with AI is it makes it more difficult for students to know that they can come up with ideas on their own."

Teachers (P1, P3, P7, P14, P16) tried to imbue students with the sense that failure is not final, and friction can be part of the process. P1's co-workers agreed that students are now more afraid of being wrong, seeking more assurance from teachers; P1 has been "trying to get them comfortable with taking a risk and not knowing if it's going to work." When P7 demonstrated a new medium for students, they would "show them all the ways it can be messed up." P7 believed, "when you kind of learn how things can go wrong in

art, you start to learn how you can fix things." P3 used constraints in different media and software as learning opportunities, telling students, "This, you have much more control over—this one, you don't have so much. I let them make that part of their problem solving."

Teachers (P2, P5, P14, P15, P19) championed that all students would take the creative problem-solving skills they learn in the art classroom into their futures. P15's goal is to "make [students'] lives easier, whatever they decide as a future career." To P14, art teachers are "teaching more than just art, [they're] teaching learners how to learn and how to think." P2 thought this idea was emphasised even more by the introduction of generative AI tools: "Now, anyone can produce a glossy product, so it needs to be more about creative thinking... Many of my students don't go on to work in the visual arts, so I try to emphasise problem-solving resilience as just a way of moving throughout the world."

Teachers hoped that future tools might introduce more *friction* to "gel better with critical thinkers" and "push [students] to think deeper about what they want from the program" without "sabotaging" the problem-solving process.

4.2.2 Social-Emotional Learning and Peer Support. P4 described social-emotional learning as, "how to regulate yourself, how to think about excess versus limitations, how to treat others kindly. How to collaborate, to share thoughts and ideas and express themselves. And how to share those thoughts and appreciations for other people's art as well." Ten teachers cited social-emotional learning as a core teaching outcome, describing collaboration and peer community as critical to their classrooms. Here, solitary screen time is misaligned with the face-to-face interactions students need.

P1, P2, P10, and P12 described students becoming less responsive and connected this to technology access. P10 suggested that the lack of social skills was a result of remote learning: "The kids that are just now getting into high school, they're very strange. I'll talk to them, and it's like they don't feel like they have to answer—not in the misbehaving way, but it just doesn't occur to them that I'm not on a screen [...] and they don't communicate with each other well."

Teachers exercised students' social muscles by encouraging peer teaching (P1, P2, P4, P9, P11, P13) and classroom critique (P4, P11). P2 emphasised having students share tables, "even though they're producing individual projects a lot of the time." P9 aimed to "build a community of support" where "everyone in the class is going to support each other one way or another." P11 saw classroom critique as "super rich" community building with a "great diversity" of ideas: "I look at participating in the critique as participating in the community of that classroom. You're giving other people feedback, you're getting feedback from your peers, and when everyone's engaged like that, it's amazing."

Beyond teaching tool use or technical skills alone, art teachers use deliberate experience design choices to shape their classrooms into flourishing sociotechnical learning environments.

4.2.3 Building Foundational Skills through Traditional Processes. All interviewed teachers taught classes using traditional media, where digital tools were optional or supplemental. Basic traditional skill-building was prioritised over technical flourish. Guided by the

National Visual Art standards⁵, classes focused on art foundations such as understanding form, lighting, and, perspective, as well as appreciation for art and art history. Teaching students how to *see* was more important than teaching tools. P13, who works at an arts magnet school, recalled that their industry contacts did not value how to use software tools as it could be taught on the job. Instead, they wanted to “teach them to see. Teach them to make good visual decisions to understand form and lighting and all that good stuff... That understanding is what’s going to make great ball rigs coming out of the water when they do CGI stuff later.”

Nine teachers spoke highly of “hands-on” processes in the classroom and subscribed to constructivist teaching philosophies, arguing that you could only “learn [art-making] by doing so”. Emphasising the possibilities afforded by physical processes, P2 explained, “They have to make everything in the studio in front of me... [Even if] they make something digital, let’s print it out. Let’s tear it up. Let’s look at it in a new way.” P8 hoped students would “have an understanding of time spent, and maybe historical reference, and inspiration for future action. That would be possible through *doing* things and not just learning things.”

Teachers and students alike were excited to experiment with analogue processes, with P2 saying, “They are obsessed with more traditional materials—they would rather use an ink blotter than a pen. They don’t want to use a stamp that was produced in a factory like that has perfect shape; they want to make the stamp themselves.” When asked to imagine one way technology could assist them best, P4 held up one of many analogue cameras behind them and asked if AI could assist in figuring out the exposures. In P19’s classroom, students “love looking at analogue cameras, and absolutely love [holding one].”

For P14 and P19, traditional processes are critical tools for teaching students motor skills. P19 explained how their students “don’t have the small motor skills anymore... their handwriting is horrible, and their pressure is horrible to paper.” P14 similarly spent the first few weeks of class on “building perseverance and muscle control” before students could draw. Both participants cited how the rise of computers in the classroom means pen-and-paper skills like note-taking and cursive are “going away”.

Only after prioritising mastery of technical skills in traditional media did teachers teach creative software skills. P6 wanted students to have the option to prepare for a digital art world, because “digital technology is the way the world’s going right now, whether it’s a good thing or a bad thing,” but added that “it’s definitely important to teach traditional art before digital.” P13’s and P18’s classrooms focus on creating a studio environment engaged in traditional media and critique practices; here, P13 reports seeing no appropriate place for generative AI tools: “When it first came out, we had kids in the painting class put the painting assignment into ChatGPT... It’s not on canvas and oil paint, so it’s not gonna fool anybody, right? If the kid’s not making those decisions, then it’s really hard to make the argument that they’re learning anything.”

Even as technology changes the classroom, art teachers continue to build foundational skills through traditional media. Teachers sought technology that could supplement or support analogue

methods, leading to misalignments when some tools, like text-to-image generators, are instead positioned to replace traditional practice.

4.2.4 Tool Decision Making and Ownership. Nine teachers said that while they do not restrict what media or tools students use, they want students to be able to defend their decisions and artwork. P6 implemented self-assessments, where students were asked to reflect on their artistic decisions, process, and why they believe they should attain a certain grade. P2 told their students, “Being an artist is part lawyer. If you can explain your choices, then it’s fine.”

While acknowledging that they too had limited perspectives, P3 and P4’s philosophies around generative AI were to provide as much information as possible, such that students can make their own choices about whether a tool is valuable to them. P4 said, “AI, it’s not just magic. Show them the curtain behind the magic, right? I think that’s a responsibility... to not just think that it’s a great tool, but also to know that its [risks] could potentially harm the environment.”

In addition to tooling decisions, teachers (P6, P9, P10, P15, P18) hoped students could take creative ownership of their ideas. P9 recounted how their students’ work addressing race, to be displayed in the school library, was challenged by the administration: “Rather than saying it’s inappropriate, [they said] we want to hear your students’ rationale... I told her if she wanted me to be in this meeting, I’d be more than happy to.” P9 was proud that their student chose to meet with the administration alone, and “was able to defend [herself].”

Teachers aimed for their students to have a complete understanding of the technologies and media at their disposal, allowing them to make informed decisions about their creative processes and take ownership of their work.

4.2.5 Digital Citizenship, Attribution, and Originality. 14 teachers actively taught students about crediting, citing, and derivative art in their curricula, including copyright infringement and digital citizenship. AI tools complicate digital citizenship, attribution, and originality. P12 believed that “in every school throughout the United States, there should be at least one semester course of using technology in moral, ethical ways, or being a good citizen with technology... We have so many people [...] use it in a bullying way [...] or believe everything they read without scrutinising using critical thinking.” P9’s district began to teach “AI ethics student guidelines, so, respect for privacy, academic integrity, responsible use, analyzing AI... reporting concerns with AI-generated material.” Teachers (P2, P4, P6, P11, P12) disparaged the idea of students being “digital natives” and highlighted how crucial it is to guide them both technically and philosophically rather than assume they already have expert grasps on technology.

Crediting and attribution of external images, in particular, became a baseline to which ten teachers adapted their practical AI policies for students. P6 reacted to a student who submitted AI-generated work as a final output: “I tell them, obviously you can’t get credit for this. You didn’t make this.” P7, P17, and P18 compared using AI work as “plagiarism”, with P7 explaining “just how bad [it is] that AI is, especially in the art world, basically taking existing artists work that is gathered online and regurgitating that.” Five teachers critiqued the use of AI tools for generating images; P12

⁵The National Coalition for Arts Standards [70], a non-governmental organisation, establishes these core standards as Creating, Presenting, Responding, and Connecting.

cited that students can use generative AI to produce “homogenised” works, while P10 did not find AI’s originality to be impressive enough to contribute meaningfully to student assignments.

Rather than teaching technology skills like prompting generative AI or mastering creative software, teachers prioritised teaching students how to use technology to “research art and do it responsibly” (P7).

4.3 Art Educators’ Evolving Social, Emotional, and Practical Labour

RQ3: *How have the roles and responsibilities of art teachers evolved alongside emerging technologies?*

We identified four roles and responsibilities art teachers undertake: building relationships with students and the community; facilitating a worldly education that situates students in the history of art, culture, and humanity; advocating for student needs; and, from this intimate understanding of student personality and positioning, making assessments about how new technologies and learning methods may assist student learning. While these responsibilities encompass achieving the learning goals surfaced in 4.2, in this section, we highlight the additional labour art educators do outside of supporting student outcomes. Emerging AI technologies have furthermore forced these responsibilities to evolve, while revealing the types of labour tools may strive to support.

4.3.1 Building Student Relationships to Support Individuals’ Self-Expression. 11 of 19 teachers expressed that their roles included meeting the needs of each individual student, who each had a variety of interests and technical skill levels.

Teachers had a degree of flexibility with media, tools, and subject matter to cater to students’ individual preferences; P2 and P7 found it important to take notice of when a student “gravitates” towards a certain medium, and nurture this enthusiasm. P6 emphasised the importance of personalised relationships in grading, saying, “Art is a very unique and personal kind of process. Not everyone creates art the same way, and not everyone should be graded exactly the same based off of quality face value. You gotta take each student into mind.”

Because these teachers’ labour was tailored to individual students, they did not treat digital tools as a wholesale solutions for their classrooms. As technology becomes more prominent, teachers have also become tool facilitators and recommenders; introducing a tool to a student required an understanding of both how the tool works and the student’s goals. In contrast to LLM-based tools that claim to provide personalised student support, art teachers preferred helping their students scope technology to a certain use case for their individual learning outcomes. For example, P18 described how, after meeting with a student who felt “really stuck” on a series of jewellery designs, they suggested ways to prompt a LLM chatbot for useful questions to aid the students’ self-reflection and ideation; P18 otherwise opposes AI use in their classroom without their explicit instruction.

Technical support is only one part of teachers’ commitment to individual student growth. P1 and P10 prioritised deconstructing barriers for students to pursue their own interests, including sexuality, violence, and other sensitive topics “so long as no one gets hurt.” P1 hoped that in their classroom “everybody feels comfortable expressing themselves and what they want to say without feeling like somebody else is going to judge them.” P2 found that their bonds with students extended outside art pedagogy as they became a trustworthy adult to whom students shared their personal feelings and struggles.

Seven teachers (P1, P2, P6, P14, P15, P17, P19) worked at schools that required students to take art classes to graduate, which shaped the profile of students in the classroom community. A teacher like P6 may have to adapt their curriculum to teach “fundamentals” to students who have lower interest and proficiency in art than a teacher at a school with no art requirement: “Some of them [...] might not have had art their whole life.” When designing their classrooms, these teachers must work to reach students who “don’t really think they care about art or can’t do art” (P19) or who “are [only] there to graduate” (P17).

P9 suggested that, given that teachers have limited resources and time, they could see AI or digital resources as a potential aid for increasing students’ accessibility to support such that no student would “fall between the cracks”; however, they noted that ideally AI support should be a last resort if teachers and peers cannot be available.

4.3.2 Breathing Real World Contexts and Communities into Art Education. 15 of 19 teachers spoke of sharing stories and relating topics like ethics, techniques, and culture to art history, current events, and personal experiences. They did so to relate how artists can impact the world so students could better appreciate art. While advancing technologies are able to bring new experiences *into* the classroom, these teachers described the importance of exposing students to experiences *outside* the classroom as well. P9 said that their most valuable assets as a teacher were “the perspectives that I bring to the classroom—perspectives that I’ve experienced outside of the classroom as an arts professional.” P12 saw art education as a gateway to worldliness and an attitude towards community engagement for all students: “Most people that take art classes in high school do not become artists, or even work in the creative industries. But we want them to use the arts as a way of engagement with the world they live in. The communities they exist in—and art is part of that.”

Teachers shared how internet access allowed them to more readily and accessibly incorporate artwork from their personal expertise and knowledge of art history into their curriculum. P1, P3, P5, P8, P9, P10, and P15 drew from historical examples such as Shepard Fairey’s Barack Obama “Hope” poster to teach students how to be ethical artists. P4 incorporated current events into their classroom schedule, teaching about Black History Month during February and activist-photojournalist Bob Fitch as an example of how students can practice activism through art. They asked their students what they felt close to and wanted to explore: “It could be animal rights, it could be women’s rights, it could be anything that they wanted. What do you feel connected to? You’re 16, you’re 17, you’re 18.

You're a citizen of the world. What do you want to be an advocate for?"

As part of P2, P5, P13, P14, and P17's curricula, students make art for those in their campus communities. P13 said, "I'm very passionate about bringing it back to the community. For instance, in graphic design, we do a children's book project, and they go to the elementary school, and the elementary kids help them design the children's book." P12 brought guest artists and other professional creatives to their classroom so "students [could] understand that creativity and the arts are not just painting or displaying in a gallery, but a lot of creative industries. Museum directors, designers, font designers. I wanted them to see the wide spectrum of the possibilities." For high school students who are still learning to become "citizens of the world", technology can supplement—but not replace—human expertise and community experience.

4.3.3 Advocating for Student Work, Technology Resources, and the Arts. In the United States, where the arts are underfunded compared to STEM subjects, teachers must advocate for the importance of their students' work, access to tools and technologies, and art education as a whole. P4 had to "go toe-to-toe" with parents who dispute their children's poor grades, "and not for any reason except 'it's just art', right?", suggesting that parents would not expect to treat STEM with the same disrespect. P5 experienced similar hurdles when requesting better technology: "I asked for a smart board for eight years, and I was told you don't need that in your classroom because you're an art teacher... It was an uphill battle."

P6 saw a teacher's role as representing student interests to higher-ups in order to secure classes, learning pathways, and technologies. Along with their department, P6 convinced the school district to allow a new pathway where students were assessed in a way that matched their interests and learning styles, such as art, rather than standardised testing: "We're really trying to put the students first, whether it's something that they're interested in, or it's something that's really going to benefit them like [...] a brand new program."

P12, a "prolific grant writer" who found regular funding for their students, was "really aggressively in people's faces that the arts are doing good things" by staging art exhibitions, collaborating with local establishments, and making community murals. "Having my students' work very visible in the community helped reinforce the idea to the school board that what we were doing had value. They saw the impact, so asking for funding, even from the school district, became easier." P16 facilitates community partnerships to demonstrate the importance of professional mentorship, such as having students work with professional artists on a mural in their city's downtown: "we've done this for the last three or four years, where we work with students and professionals, and that's been a very successful project for our community to see how students can get up to a higher level."

Teachers become the faces of students to institutional powers and persuade them for resources, funding, and recognition in students' best interests. They take on advocacy not only to the school community but to the wider world as well, and work to promote the value of each new generation of artists.

4.3.4 Incorporating and Scoping Emergent Learning Opportunities. Teachers are responsible for researching a constant influx of new technologies, policies, and expectations to appropriately implement

into their high school curriculum. State, county, and district pathways for teaching are subject to ongoing changes; an art teachers' work includes navigating and implementing these changes in the classroom. P1, P2, P5, P6, and P12 detailed the additional labour in understanding new accreditations for students and revisions to existing qualifications such as AP Art and Design. P1 explained that their state was undergoing educational reforms, "which I'm now tasked to figure out [...] and again I get to navigate what that might be for the county."

Digital innovations contributed to the load teachers had to manage; P2, P15, and P19 referred to the constant output of new technologies and tools to learn as "overwhelming" and "exhausting," and teachers (P6, P13) expressed that they were regularly updating their curriculum with other teachers in the department to address learning opportunities. P13 said, "I try and mix it up every year, because [...] I'll have lots of kids that have maybe taken a level before, so I want something new." Of how quickly and often new software releases, P4 said: "There's so much to learn. You can go really deep with the technology in a class like photography. With any kind of technology that's still being actively maintained and actively updated, you're always having to learn more, so whatever level of knowledge you have about Photoshop today, two years from now is gonna be completely different."

Teachers P8, P11, and P17 suggested that their reasons for not incorporating generative AI into their classroom, despite acknowledging that there is potential for meaningful intellectual engagement with AI as a medium in art, were that it was not appropriate at a high school level and beyond the grasp of a high school age student. As such, introducing AI at the skill level of their students would only produce poor results. All teachers we spoke to saw AI as another medium or tool, but harboured concerns that high school students lacked the maturity and perspective to employ AI responsibly. P17 said, "I don't think high schools or elementary should be the place where we prove how much [AI] can do."

In response to the ever-evolving introduction of technology in art and their classrooms—some enforced by higher institutions—teachers must sift through, research, and make decisions on how these opportunities can be appropriately incorporated or addressed.

5 DISCUSSION

This paper inspects art education from a sociotechnical lens that centers the perspectives of educators, surfacing the institutional contexts, pedagogical values, and forms of educator labour that intersect to shape classroom technology use. We apply our findings to propose a set of tool considerations to promote learning outcomes in art classrooms. Following this, we underscore the need for HCI art education research to critically consider how technology can complement teacher labour and scaffold emerging technology adoption with guides for digital citizenship and educational use.

5.1 Design Considerations for Art Education

While computer science researchers may not have direct control over the institutional regulations, resource management, and hurdles that control tool use in the classroom, we do make design decisions about the intended goals, affordances, and use of these tools [51, 53]. Drawing from art educators' core values and prior

work from creativity support research and edutech, we present a set of tool considerations which, while not novel in HCI, can be a useful lens for designing and teaching visual artists at an institutional scale.

5.1.1 Nurture creative problem-solving through friction. Teachers emphasise critical thinking and creative problem-solving as not only a process to make art, but also a lifelong skill (4.2.1). Teachers shared concerns that students are increasingly afraid of failure and risk-taking in the classroom, and make a deliberate effort to show students that friction through tool constraints and learning curves are opportunities in creativity to iterate on ideas and discover new, more exciting alternatives. Digital tools, too, can introduce productive friction and constraints [24] by providing static variables, such as a discrete set of features, or given canvas sizes. Tools could even adopt the capability of “going wrong” [47, 74] like the traditional media students learn from: pigments which mix but cannot un-mix, materials fused together permanently once glued down. To normalise exploratory and branching workflows critical in developing ideation skills, tools could materialise version history instead of saving a single file [62]. Teachers observed that students could only think about solutions and learn from their interactions with tools if the machine did not “shortcut” them to the solution. They emphasised how students need ownership over their process and the ability to defend their decision-making (4.2.4). Researchers building generative AI tools for art education should carefully consider the intended end usage of these outputs, the purpose of providing them in the first place, and what students should learn in the process before arriving at any outcome [60].

5.1.2 Enable collaborative tool use and peer teaching. While there is extensive research on collaborative tooling for creativity or educational purposes [76, 80], based on our findings in 4.2.2, we specifically align with and advocate for classroom technology which promotes time for students to collaborate face-to-face. Despite art classrooms centering in-person, synchronous interactions, teachers are still seeking ways to encourage students to proactively speak to each other without teacher interventions. Given the live, constructive nature of peer teaching and critique, we encourage researchers to consider how digital tools for art education can be designed for co-located, synchronous communal use, where students may sit shoulder-to-shoulder to look over the same interface, take turns using the technology as they assume roles in mutual learning and teaching, or platform and preserve the in-person lessons, feedback, and interactions as they occur.

5.1.3 Complement analogue processes. As described in 4.2.3, high school art teachers foregrounded traditional, rather than digital, media in their classrooms. Traditional media and equipment, such as pencil, paper, paint, or clay, can be more financially accessible to classrooms, are historically allocated within department budgets, and can be effectively used to teach students art foundations. While designing tools which bring the characteristics of traditional media into digital platforms can improve creative accessibility for users who might not have access to a physical studio space or mess-making materials, traditional media is the current baseline in high school art classrooms. How can digital tools be designed, then, to augment analogue processes or aid students in learning

them? HCI research in craft and fabrication communities provide a reference point for how technology can assist the individual artist’s making of a physical outcome [65, 86], but what other traditional media which excites teachers and students alike—sculpting, linocut stamp-carving, film photography, painting—can be expanded on with digital tooling? Can we develop educational technology for these material-focused practices for inclusive user groups, deepening understanding for those inside the classroom and reducing barriers for at-home learners? How can tools build intentionally on students’ foundational skills developed from traditional practice, targeting a user group accustomed to hands-on learning and material consequences, to extend their creative possibilities?

5.1.4 Prioritise joy and personality over results. High school art students are unique and growing individuals in a time of crucial identity formation and self-exploration. Educators revealed in 4.3.1 that a key part of teaching these students was also learning how to meet them where they are emotionally and find ways for them to discover joy in creative expression and art-making. This could mean encouraging a student to try certain materials and techniques they gravitated towards, or imbuing a student with the self-confidence to be vulnerable and personal with their depicted subject matter (4.2.4). Teachers also built opportunities for joy through customised and community learning experiences, where students enjoyed the satisfaction and relationship-building of making artwork for a friend, family member, or member of the local community (4.3.2). For a tool to prioritise joy and personality may mean making room for a student to insert their own particular interests and curiosities through features which provide “wide walls” and “high ceilings” [63]. It may also mean choosing to permit student exploration over technical finish, or self-reflection over productivity [64]. While tools which suggest more prescriptive processes and smooth the wobbles in students’ brush strokes may produce more “professional” work or prepare students for industry workflows, teachers know that many of their students will not go on to pursue art careers, and engaging them in the act of creation so that they may learn to have fun and feel proud of their craft [67] can be far more important.

5.2 Teaching Art as Designing a Community of Practice

For some computer scientists, technology represents opportunities to scale education, particularly in school environments that are under-resourced and under-staffed. Recent development of AI chatbots for homework help and emotional support suggests that technology can automate teachers’ labour. Yet our findings argue otherwise; teachers are not canned solutions or sets of social-emotional skills. Art teachers are irreplaceable facilitators and designers of communities of practice [79].

Every art classroom is different. The community of practice designed by a teacher is unique to the students within it. Our participants taught a diversity of students, such as budding experts who would go on to pursue art careers, or reluctant beginners who merely needed the class to graduate (4.2.1). Teachers built upon the individual interests and skills of students (4.3.1), but also facilitated their collaboration and trust in each other (4.2.2), as young adults learning to be express themselves, present their art, and critique what they have shared. Creative education as a whole—learning

critical questioning, peer support, ownership, citizenship (4.2)—is a relational practice between human beings. To teach to transgress [35] is to adapt pedagogical values to the current culture and moment. For example, teachers supplemented more opportunities for social interactions between students to make up for excessive screen time during online schooling (4.2.2), or devised critical lessons to respond to AI-generated media (4.2.5). By acting as solution-makers to problems created by technology, we frame teachers not as passive recipients of technology, but rather designers who require agency (4.1.3) over how technology can be meaningfully deployed in their classroom—or if they should be introduced at all (4.3.4).

When researchers propose technologies that automate teaching labour, that should not automate away the social and emotional aspects of teaching. Our participants spoke of wishing they had more time to spend with their students in the classroom: to individually counsel and nurture student interests (4.3.1), or to engage in collaborative hands-on making to work through ideas (4.2.3). In these cases, software which streamlines uploading student work to a cleanly-formatted portfolio might trump a creative AI agent with which students are expected to collaborate.

Our tool considerations for art education leave room for each unique teacher to design their own unique classroom instructions. We invite researchers to critically consider the classroom functions that technology can fill. Art education technology should be designed such that *teachers* have power over their *tools*, rather than the tools dictating the norms and behaviors of teaching.

5.3 Developing Technology in Service of Art Classrooms

Teachers often navigate the inadvertent consequences of emerging technology being forced upon them, sometimes describing the constant influx of new tools as “overwhelming” (4.3.4). We observed gaps where teachers become primary decision-makers about how technology should be approached in the classroom, despite limited digital literacy and resources (4.1.1). Under-resourced teachers have been left to grapple with the disruptive effects of ChatGPT and other LLMs in their art classrooms (4.2.1).

Our findings show that although art educators may not have had opportunities to develop their own AI literacy, they are still at the front lines of teaching the next generation how to use these tools (4.1.2). Despite the high volume of claims that generative AI will disrupt creative industries, the companies and technologists behind generative AI have not formally provided teaching and training resources for educators; if the resources have been provided, none of them have effectively reached the teachers we interviewed. Developing tools in service of users does not stop when the tool is finished, but includes the responsibility of supporting continued access, guidance, and user agency (4.1).

One possibility for researchers to support high school art educators may look like value-sensitive toolkits for teachers and students alike to think through how emerging technologies will fit into our world’s evolving definition of digital citizenship. Teachers taught about credit, authenticity, and copyright, rather than effective LLM prompting (4.2.5). When new tools are released, teachers care less about their students’ software proficiency and more about how students position themselves towards technology, if student usage

is ethical, and hashing out the capacities, risks, and conceptual roles of a tool. In addition to providing tutorials and resources, researchers should collaborate and co-design with art educators who teach *about* tooling rather than *how* to use tools to think through tool values and sociotechnical impacts.

6 LIMITATIONS

Our findings do not include accounts of classroom experiences beyond the US; we believed that a more focused study could advocate for the value of researching sociotechnical contexts to better understand the needs of a regional target user group. Given the variance in global education systems, a wider scope of recruitment could yield data from contexts that are difficult to compare, and risk producing findings not applicable to any specific region at depth. Future work may explore art education technology at other levels of education or in regions besides the United States.

7 CONCLUSION

High school art teachers’ domain expertise can provide critical perspectives on the core values of their classrooms and the labour necessary to provide students a quality art education. Educators serve as crucial social and emotional glue for their students, connecting them to wider histories, art worlds, and local communities. Teachers create classrooms that nurture creative problem-solving, social-emotional learning, practicing foundational skills, creative ownership, and digital citizenship, while operating under limited technological access, guidance, and agency. Through interviews with 19 art educators, we uncovered insights to suggest how HCI researchers might listen, connect, and build alongside teachers to create future technology compatible with current secondary education classroom constraints, and motivate technology for art education informed closely by those who teach it.

ACKNOWLEDGMENTS

We thank the former art students who put us in touch with their high school teachers, and all the art teachers who so generously shared their perspectives with us.

REFERENCES

- [1] Hunter Akridge, Bonnie Fan, Alice Xiaodi Tang, Chinar Mehta, Nikolas Martelaro, and Sarah E Fox. 2024. “The bus is nothing without us”: Making Visible the Labor of Bus Operators amid the Ongoing Push Towards Transit Automation. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) (*CHI '24*). Association for Computing Machinery, New York, NY, USA, Article 479, 16 pages. doi:10.1145/3613904.3642714
- [2] Bassam AL-Radaideh. 2006. Art Education in the Age of Computer Technology. *Abhath Al-Yarmouk "Hum. & Soc. Sci"* 23 (01 2006), 743–755.
- [3] Safinah Ali, Prerna Ravi, Randi Williams, Daniela DiPaola, and Cynthia Breazeal. 2024. Constructing dreams using generative AI. In *Proceedings of the Thirty-Eighth AAAI Conference on Artificial Intelligence and Thirty-Sixth Conference on Innovative Applications of Artificial Intelligence and Fourteenth Symposium on Educational Advances in Artificial Intelligence (AAAI'24/IAAI'24/EAAI'24, Vol. 38)*. AAAI Press, 23268–23275. doi:10.1609/aaai.v38i21.30374
- [4] Shm Almeda, Robin Netzorg, Isabel Li, Ethan Tam, Skyla Ma, and Bob Tianqi Wei. 2025. Labor, Power, and Belonging: The Work of Voice in the Age of AI Reproduction. In *Proceedings of the 2025 ACM Conference on Fairness, Accountability, and Transparency*. ACM, Athens Greece, 1238–1249. doi:10.1145/3715275.3732082
- [5] Shm Garanganoo Almeda and Bjoern Hartmann. 2023. NFT Art World: The Influence of Decentralized Systems on the Development of Novel Online Creative Communities and Cooperative Practices. In *Proceedings of the 2023 ACM Designing Interactive Systems Conference* (Pittsburgh, PA, USA) (*DIS '23*). Association for Computing Machinery, New York, NY, USA, 353–370. doi:10.1145/3563657.3596034

- [6] Shm Garangano Almeda, Joy O Kim, and Bjoern Hartmann. 2025. Creativity Supportive Ecosystems: A Framework for Understanding Function and Disruption in Online Art Worlds. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, 1–17. doi:10.1145/3706598.3713734
- [7] Nantheera Anantrasirichai and David Bull. 2022. Artificial intelligence in the creative industries: a review. *Artificial Intelligence Review* 55, 1 (Jan. 2022), 589–656. doi:10.1007/s10462-021-10039-7
- [8] Pavlo Antonenko and Brian Abramowitz. 2023. In-service teachers' (mis)conceptions of artificial intelligence in K-12 science education. *Journal of Research on Technology in Education* 55, 1 (Jan. 2023), 64–78. doi:10.1080/15391523.2022.2119450
- [9] Mia Magdalena Bangerl, Leonie Disch, Tamara David, and Viktoria Pammer-Schindler. 2025. CreAltive Collaboration? Users' Misjudgment of AI-Creativity Affects Their Collaborative Performance. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, Article 195, 17 pages. doi:10.1145/3706598.3713886
- [10] Gabrielle Benabdallah, Sam Bourgault, Nadya Peek, and Jennifer Jacobs. 2021. Remote Learners, Home Makers: How Digital Fabrication Was Taught Online During a Pandemic. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (Yokohama, Japan) (CHI '21)*. Association for Computing Machinery, New York, NY, USA, Article 350, 14 pages. doi:10.1145/3411764.3445450
- [11] Charlotte Bird. 2024. Artists and AI: Creative Interactions and Tensions. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA '24)*. Association for Computing Machinery, New York, NY, USA, 1–6. doi:10.1145/3613905.3651041
- [12] College Board. 2024. *AP Art and Design: Plagiarism and Artificial Intelligence Policy*. <https://apstudents.collegeboard.org/ap/pdf/ap-art-and-design-plagiarism-and-artificial-intelligence-policy.pdf>
- [13] College Board. 2025. *AP Art and Design Program – AP Students | College Board*. <https://apstudents.collegeboard.org/art-design-program>
- [14] College Board. 2025. *College Board – SAT, AP, College Search and Admission Tools*. <https://www.collegeboard.org/>
- [15] Wendy Bolier, Wolfgang Hürst, Guido van Bommel, Joost Bosman, and Harriët Bosman. 2018. Drawing in a Virtual 3D Space - Introducing VR Drawing in Elementary School Art Education. In *Proceedings of the 26th ACM International Conference on Multimedia (Seoul, Republic of Korea) (MM '18)*. Association for Computing Machinery, New York, NY, USA, 337–345. doi:10.1145/3240508.3240692
- [16] Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative research in psychology* 3, 2 (2006), 77–101.
- [17] Virginia Braun and Victoria Clarke. 2012. *Thematic analysis*. American Psychological Association.
- [18] Patricia Broadfoot and James Rockey. 2025. Generative AI and the social functions of educational assessment. *Oxford Review of Education* 51, 2 (March 2025), 281–300. doi:10.1080/03054985.2025.2455549
- [19] Mary Burns, Rebecca Winthrop, Natasha Luther, Emma Venetis, and Rida Karim. 2026. *A new direction for students in an AI world: Prosper, prepare, protect*. Washington, D.C. <https://www.brookings.edu/articles/a-new-direction-for-students-in-an-ai-world-prosper-prepare-protect/>
- [20] Lorena Casal-Otero, Alejandro Catala, Carmen Fernández-Morante, Maria Taboada, Beatriz Cebreiro, and Senén Barro. 2023. AI literacy in K-12: a systematic literature review. *International Journal of STEM Education* 10, 1 (April 2023), 29. doi:10.1186/s40594-023-00418-7
- [21] Inha Cha and Richmond Y. Wong. 2025. Understanding Socio-technical Factors Configuring AI Non-Use in UX Work Practices. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, 1–17. doi:10.1145/3706598.3713140
- [22] Zhendong Chu, Shen Wang, Jian Xie, Tinghui Zhu, Yibo Yan, Jinheng Ye, Aoxiao Zhong, Xuming Hu, Jing Liang, Philip S. Yu, and Qingsong Wen. 2025. LLM Agents for Education: Advances and Applications. arXiv:2503.11733 (mar 2025). doi:10.48550/arXiv.2503.11733 arXiv:2503.11733 [cs].
- [23] Mariano-Florentino Cuéllar, Jeff Dean, Finale Doshi-Velez, John Hennessy, Andy Konwinski, Sanmi Koyejo, Pelonomi Moilola, Emma Pierson, and David Patterson. 2025. Shaping AI's Impact on Billions of Lives. *Commun. ACM* 69, 1 (Dec. 2025), 54–65. doi:10.1145/3746132
- [24] Jonathan Ericson. 2022. Reimagining the Role of Friction in Experience Design. *Journal of User Experience* 17, 4 (2022).
- [25] Katrina Falkner, Sue Sentance, Rebecca Vivian, Sarah Barksdale, Leonard Busuttill, Elizabeth Cole, Christine Liebe, Francesco Maiorana, Monica M. McGill, and Keith Quille. 2019. An International Study Piloting the MEasuring Teacher Enacted Computing Curriculum (METRECC) Instrument. In *Proceedings of the Working Group Reports on Innovation and Technology in Computer Science Education (Aberdeen, Scotland UK) (ITICSE-WGR '19)*. Association for Computing Machinery, New York, NY, USA, 111–142. doi:10.1145/3344429.3372505
- [26] National Center for Education Statistics. 2026. NCES Fast Facts Tool. <https://nces.ed.gov/fastfacts/display.asp?id=158>
- [27] UNESCO Institute for Statistics. 2012. *International standard classification of education: ISCED 2011*. UNESCO Institute for Statistics, Montreal, Quebec.
- [28] National Center for Technology Innovation and Center for Implementing Technology in Education (CITED). [n. d.]. Integrating the arts with technology: Inspiring creativity. <https://www.ldonline.org/ld-topics/assistive-technology/integrating-arts-technology-inspiring-creativity>
- [29] Sarah E. Fox, Samantha Shorey, Esther Y. Kang, Dominique Montiel Valle, and Estefania Rodriguez. 2023. Patchwork: The Hidden, Human Labor of AI Integration within Essential Work. *Proc. ACM Hum.-Comput. Interact.* 7, CSCW1 (April 2023), 81:1–81:20. doi:10.1145/3579514
- [30] Aashish Ghimire and John Edwards. 2024. From Guidelines to Governance: A Study of AI Policies in Education. In *Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium and Blue Sky*. Andrew M. Olney, Irene-Angelica Chounta, Zitao Liu, Olga C. Santos, and Ig Ibert Bittencourt (Eds.). Springer Nature Switzerland, Cham, 299–307. doi:10.1007/978-3-031-64312-5_36
- [31] Andrina Granić. 2022. Educational Technology Adoption: A systematic review. *Education and Information Technologies* 27, 7 (Aug. 2022), 9725–9744. doi:10.1007/s10639-022-10951-7
- [32] Debbie Greh. 1991. Technologies and art education. *SIGCUE Outlook* 21, 1 (April 1991), 45–48. doi:10.1145/122326.122332
- [33] Greg Guest, Arwen Bunce, and Laura Johnson. 2006. How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field Methods* 18, 1 (Feb. 2006), 59–82. doi:10.1177/1525822X05279903 Publisher: SAGE Publications Inc.
- [34] Rebecca Heaton, Joo Hong Low, and Vernon Chen. 2024. AI art education - artificial or intelligent? Transformative pedagogic reflections from three art educators in Singapore. *Pedagogies: An International Journal* 19, 4 (Oct. 2024), 647–659. doi:10.1080/1554480X.2024.2395260 Publisher: Routledge _eprint: <https://doi.org/10.1080/1554480X.2024.2395260>
- [35] Bell Hooks. 2014. *Teaching To Transgress* (0 ed.). Routledge. doi:10.4324/9780203700280
- [36] The White House. 2025. Fact Sheet: President Donald J. Trump Advances AI Education for American Youth. <https://www.whitehouse.gov/fact-sheets/2025/04/fact-sheet-president-donald-j-trump-advances-ai-education-for-american-youth/>
- [37] The White House. 2026. The President's FY 2026 Discretionary Budget Request. <https://www.whitehouse.gov/omb/information-resources/budget/the-presidents-fy-2026-discretionary-budget-request/>
- [38] Xi Hu, Yiwen Xing, Xudong Cai, Yihang Zhao, Michael Cook, Rita Borgo, and Timothy Neate. 2025. Designing Interactions with Generative AI for Art and Creativity: A Systematic Review and Taxonomy. In *Proceedings of the 2025 ACM Designing Interactive Systems Conference (DIS '25)*. Association for Computing Machinery, New York, NY, USA, 1126–1155. doi:10.1145/3715336.3735843
- [39] Xiangen Hu, Sheng Xu, Richard Tong, and Art Graesser. 2025. Generative AI in Education: From Foundational Insights to the Socratic Playground for Learning. arXiv:2501.06682 (Jan. 2025). doi:10.48550/arXiv.2501.06682 arXiv:2501.06682 [cs].
- [40] Learning Policy Institute. 2025. An Overview of Teacher Shortages: 2025 [Fact Sheet]. <https://learningpolicyinstitute.org/product/overview-teacher-shortages-2025-factsheet>
- [41] Nicolas Ioannou, Maria Kasinidou, Anthi Ioannou, and Styliani Kleanthous. 2025. From Teachers to Students: Evaluating Canvas City as a Path to AI Literacy. In *Proceedings of the 30th ACM Conference on Innovation and Technology in Computer Science Education V. 1 (Nijmegen, Netherlands) (ITICSE 2025)*. Association for Computing Machinery, New York, NY, USA, 16–22. doi:10.1145/3724363.3729069
- [42] Harry H. Jiang, William Agnew, Tim Friedlander, Zhuolin Yang, Sarah E Fox, Michael S. Bernstein, Josephine Charlie Passananti, Megumi Ogata, and Karla Ortiz. 2025. Forging an HCI Research Agenda with Artists Impacted by Generative AI. In *Proceedings of the Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA '25)*. Association for Computing Machinery, New York, NY, USA, 1–4. doi:10.1145/3706599.3716302
- [43] Harry H. Jiang, Lauren Brown, Jessica Cheng, Mehtab Khan, Abhishek Gupta, Deja Workman, Alex Hanna, Johnathan Flowers, and Timnit Gebru. 2023. AI Art and its Impact on Artists. In *Proceedings of the 2023 AAAI/ACM Conference on AI, Ethics, and Society (AIES '23)*. Association for Computing Machinery, New York, NY, USA, 363–374. doi:10.1145/3600211.3604681
- [44] Hannah Johnston and David Thue. 2024. Understanding Visual Artists' Values and Attitudes towards Collaboration, Technology, and AI. In *Proceedings of the 50th Graphics Interface Conference (GI '24)*. Association for Computing Machinery, New York, NY, USA, 1–9. doi:10.1145/3670947.3670973
- [45] Reishiro Kawakami and Sukrit Venkatagiri. 2024. The Impact of Generative AI on Artists. In *Proceedings of the 16th Conference on Creativity & Cognition (C&C '24)*. Association for Computing Machinery, New York, NY, USA, 79–82. doi:10.1145/3635636.3664263
- [46] Caleb Kicklighter, Jinsil Hwaryoung Seo, Mayet Andreassen, and Emily Bujnoch. 2024. Empowering Creativity with Generative AI in Digital Art Education. In *ACM SIGGRAPH 2024 Educator's Forum (SIGGRAPH '24)*. Association for Computing

- Machinery, New York, NY, USA, 1–2. doi:10.1145/3641235.3664438
- [47] Joy Kim, Avi Bagla, and Michael S. Bernstein. 2015. Designing Creativity Support Tools for Failure. In *Proceedings of the 2015 ACM SIGCHI Conference on Creativity and Cognition* (Glasgow, United Kingdom) (C&C '15). Association for Computing Machinery, New York, NY, USA, 157–160. doi:10.1145/2757226.2764542
- [48] Lin Kyi, Amruta Mahuli, M. Six Silberman, Reuben Binns, Jun Zhao, and Asia J. Biega. 2025. Governance of Generative AI in Creative Work: Consent, Credit, Compensation, and Beyond. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems* (CHI '25). Association for Computing Machinery, New York, NY, USA, 1–16. doi:10.1145/3706598.3713799
- [49] Matthew Law and Rama Adithya Varanasi. 2025. Generative AI and Changing Work: Systematic Review of Practitioner-Led Work Transformations Through the Lens of Job Crafting. In *HCI in Business, Government and Organizations: 12th International Conference, HCIBGO 2025, Held as Part of the 27th HCI International Conference, HCI 2025, Gothenburg, Sweden, June 22–27, 2025, Proceedings, Part I*. Springer-Verlag, Berlin, Heidelberg, 131–152. doi:10.1007/978-3-031-92823-9_10
- [50] Hanqi Li, Ruiwei Xiao, Hsuan Nieu, Ying-Jui Tseng, and Guanze Liao. 2025. “From Unseen Needs to Classroom Solutions”: Exploring AI Literacy Challenges & Opportunities with Project-Based Learning Toolkit in K-12 Education. *Proceedings of the AAAI Conference on Artificial Intelligence* 39, 28 (April 2025), 29145–29152. doi:10.1609/aaai.v39i28.35187
- [51] Isabel Li, Ace S. Chen, Eric Rawn, Shm Garangano Almeda, Bjoern Hartmann, and Jingyi Li. 2025. Reimagining Misuse as Creative Practice: Impressions and Implications of Usage Norms on Digital Artists. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems* (CHI '25). Association for Computing Machinery, New York, NY, USA, 1–14. doi:10.1145/3706598.3714068
- [52] Jingyi Li, Sonia Hashim, and Jennifer Jacobs. 2021. What We Can Learn From Visual Artists About Software Development. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Yokohama, Japan) (CHI '21). Association for Computing Machinery, New York, NY, USA, Article 314, 14 pages. doi:10.1145/3411764.3445682
- [53] Jingyi Li, Eric Rawn, Jacob Ritchie, Jasper Tran O'Leary, and Sean Follmer. 2023. Beyond the Artifact: Power as a Lens for Creativity Support Tools. In *Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology* (UIST '23). Association for Computing Machinery, New York, NY, USA, 1–15. doi:10.1145/3586183.3606831
- [54] Juniper Lovato, Julia Witte Zimmerman, Isabelle Smith, Peter Dodds, and Jennifer L. Karson. 2025. *Foregrounding Artist Opinions: A Survey Study on Transparency, Ownership, and Fairness in AI Generative Art*. AAAI Press, 905–916.
- [55] Gennie Mansi, Sue Reon Kim, and Jessica Roberts. 2022. Ready, Set, Art: Technology Needs and Tools for Remote K-2 Art Education. In *Proceedings of the 21st Annual ACM Interaction Design and Children Conference* (IDC '22). Association for Computing Machinery, New York, NY, USA, 150–184. doi:10.1145/3501712.3529731
- [56] Andrew M McNutt, Sam Cohen, and Ravi Chugh. 2025. Slowness, Politics, and Joy: Values That Guide Technology Choices in Creative Coding Classrooms. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems* (CHI '25). Association for Computing Machinery, New York, NY, USA, 1–16. doi:10.1145/3706598.3713472
- [57] Kingsley Okoye, Haruna Hussein, Arturo Arrona-Palacios, Héctor Nahún Quintero, Luis Omar Peña Ortega, Angela Lopez Sanchez, Elena Arias Ortiz, Jose Escamilla, and Samira Hosseini. 2022. Impact of digital technologies upon teaching and learning in higher education in Latin America: an outlook on the reach, barriers, and bottlenecks. *Education and Information Technologies* 28, 2 (Aug. 2022), 2291–2360. doi:10.1007/s10639-022-11214-1
- [58] Srishiti Palani, David Ledo, George Fitzmaurice, and Fraser Anderson. 2022. “I don't want to feel like I'm working in a 1960s factory”: The Practitioner Perspective on Creativity Support Tool Adoption. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (CHI '22). Association for Computing Machinery, New York, NY, USA, 1–18. doi:10.1145/3491102.3501933
- [59] Anna Maria Piskopani, Alan Chamberlain, and Carolyn Ten Holter. 2023. Responsible AI and the Arts: The Ethical and Legal Implications of AI in the Arts and Creative Industries. In *Proceedings of the First International Symposium on Trustworthy Autonomous Systems* (Edinburgh, United Kingdom) (TAS '23). Association for Computing Machinery, New York, NY, USA, Article 48, 5 pages. doi:10.1145/3597512.3597528
- [60] James Prather, Juho Leinonen, Natalie Kiesler, Jamie Gorson Benario, Sam Lau, Stephen MacNeil, Narges Norouzi, Simone Opel, Vee Pettit, Leo Porter, Brent N. Reeves, Jaromir Savelka, IV Smith, David H., Sven Strickroth, and Daniel Zingaro. 2025. Beyond the Hype: A Comprehensive Review of Current Trends in Generative AI Research, Teaching Practices, and Tools. In *2024 Working Group Reports on Innovation and Technology in Computer Science Education* (Milan, Italy) (ITI&CSE 2024). Association for Computing Machinery, New York, NY, USA, 300–338. doi:10.1145/3689187.3709614
- [61] Isabella Pu, Prerna Ravi, Linh Dieu Dinh, Chelsea Joe, Caitlin Ogoe, Zixuan Li, Cynthia Breazeal, and Anastasia K. Ostrowski. 2025. “How can we learn and use AI at the same time?”: *Participatory Design of GenAI with High School Students*. Association for Computing Machinery, New York, NY, USA, 204–220. <https://doi.org/10.1145/3713043.3727057>
- [62] Eric Rawn, Jingyi Li, Eric Paulos, and Sarah E. Chasins. 2023. Understanding Version Control as Material Interaction with Quickpose. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (Hamburg, Germany) (CHI '23). Association for Computing Machinery, New York, NY, USA, Article 126, 18 pages. doi:10.1145/3544548.3581394
- [63] Mitchel Resnick and Brian Silverman. 2005. Some reflections on designing construction kits for kids. In *Proceedings of the 2005 conference on Interaction design and children*. 117–122.
- [64] Samuel Rhys Cox, Helena Bøjer Djernæs, and Niels Van Berkel. 2025. Beyond Productivity: Rethinking the Impact of Creativity Support Tools. In *Proceedings of the 2025 Conference on Creativity and Cognition*. ACM, Virtual United Kingdom, 735–749. doi:10.1145/3698061.3726924
- [65] Alec Rivers, Andrew Adams, and Frédo Durand. 2012. Sculpting by numbers. *ACM Trans. Graph.* 31, 6, Article 157 (Nov. 2012), 7 pages. doi:10.1145/2366145.2366176
- [66] Luca Scibetta, Francesco Ballarini, Chiara Ceccarini, Alberto Monge Roffarello, Catia Prandi, and Luigi De Russis. 2025. Towards Digital Well-being Education in High-School. In *Proceedings of the Extended Abstracts of the CHI Conference on Human Factors in Computing Systems* (CHI EA '25). Association for Computing Machinery, New York, NY, USA, 1–6. doi:10.1145/3706599.3720101
- [67] Richard Sennett. 2008. *The craftsman*. Yale University Press, New Haven, Conn.
- [68] Yiren Song, Shijie Huang, Chen Yao, Hai Ci, Xiaojun Ye, Jiaming Liu, Yuxuan Zhang, and Mike Zheng Shou. 2024. ProcessPainter: Learning to draw from sequence data. In *SIGGRAPH Asia 2024 Conference Papers* (Tokyo, Japan) (SA '24). Association for Computing Machinery, New York, NY, USA, Article 18, 10 pages. doi:10.1145/3680528.3687596
- [69] Franchesca Spektor, Sarah E. Fox, Somang Min, Grace Sarfo, Betsy Stringam, Christine A. Riordan, Hye Jin Rho, Ben Begleiter, and Jodi Forlizzi. 2025. Working Together: Algorithmic Management and Peer Relationships in the Hospitality Industry. In *Proceedings of the 2025 ACM Designing Interactive Systems Conference* (DIS '25). Association for Computing Machinery, New York, NY, USA, 3221–3234. doi:10.1145/3715336.3735704
- [70] National Core Arts Standards. 2014. *National Core Arts Standards Standards at a Glance · Dance · Media Arts · Music*. <https://www.nationalartsstandards.org/>
- [71] Yuying Tang, Ningning Zhang, Mariana Ciancia, and Zhigang Wang. 2024. Exploring the Impact of AI-generated Image Tools on Professional and Non-professional Users in the Art and Design Fields. In *Companion Publication of the 2024 Conference on Computer-Supported Cooperative Work and Social Computing* (San Jose, Costa Rica) (CSCW Companion '24). Association for Computing Machinery, New York, NY, USA, 451–458. doi:10.1145/3678884.3681890
- [72] Satoru Tokuhisa, Yusuke Kamiyama, and Takuji Tokiwa. 2015. Personal, Physical, Social, and Creative Contextual Design for Art Education: How to Achieve Fun in Art Education for Children. *Comput. Entertain.* 12, 1 (Feb. 2015), 2:1–2:20. doi:10.1145/2582193.2633443
- [73] Aira Jenica Torres, Jasper Mareece C. Alberto, Angel Pearl J. Guieb, Ayessa DR Paray, and Joseph A. Villarama. 2025. Language, Identity, and Ethics in AI-Driven Art: Perspectives from Human Artists in Digital Environments. *Language, Technology, and Social Media* 3, 1 (2025), 17–29. doi:10.70211/ltsm.v3i1.137
- [74] Cesar Torres, Sarah Sterman, Molly Nicholas, Richard Lin, Eric Pai, and Eric Paulos. 2018. Guardians of Practice: A Contextual Inquiry of Failure-Mitigation Strategies within Creative Practices. In *Proceedings of the 2018 Designing Interactive Systems Conference* (Hong Kong, China) (DIS '18). Association for Computing Machinery, New York, NY, USA, 1259–1267. doi:10.1145/3196709.3196795
- [75] Olga Viberg, Anna Mavroudi, Mohammad Khalil, and Olof Bälter. 2020. Validating an Instrument to Measure Teachers' Preparedness to Use Digital Technology in their Teaching. *Nordic Journal of Digital Literacy* 15, 1 (April 2020), 38–54. doi:10.18261/issn.1891-943x-2020-01-04
- [76] Shaun Wallace, Brendan Le, Luis A. Leiva, Aman Haq, Ari Kintisch, Gabrielle Bufrem, Linda Chang, and Jeff Huang. 2020. Sketchy: Drawing Inspiration from the Crowd. *Proc. ACM Hum.-Comput. Interact.* 4, CSCW2, Article 172 (Oct. 2020), 27 pages. doi:10.1145/3415243
- [77] Zhiqing Wang, Haoxiang Fan, Shiwei Wu, Qiaoyi Chen, Yongqi Liang, and Zhenhui Peng. 2025. Exploring the Usage of Generative AI for Group Project-Based Offline Art Courses in Elementary Schools. doi:10.48550/arXiv.2506.16874 arXiv:2506.16874 [cs].
- [78] Joshua Weinberg and Monica Chan. 2025. Experimenting with Generative AI Tools and their Implications: Insights from High School UX Educators. In *Proceedings of the 7th Annual Symposium on HCI Education* (EduCHI '25). Association for Computing Machinery, New York, NY, USA, 1–6. doi:10.1145/3742901.3742912
- [79] Etienne Wenger. 1998. *Communities of Practice: Learning, Meaning, and Identity*. Cambridge University Press, Cambridge, UK.
- [80] Blake Williford. 2017. SketchTivity: Improving Creativity by Learning Sketching with an Intelligent Tutoring System. In *Proceedings of the 2017 ACM SIGCHI Conference on Creativity and Cognition* (Singapore, Singapore) (C&C '17). Association for Computing Machinery, New York, NY, USA, 477–483. doi:10.1145/3059454.3078695

- [81] Benjamin Xie, Parth Sarin, Jacob Wolf, Raycelle C C Garcia, Victoria Delaney, Isabel Sieh, Anika Fuloria, Deepak Varuvel Dennison, Christine Bywater, and Victor R Lee. 2024. Co-designing AI Education Curriculum with Cross-Disciplinary High School Teachers. In *Proceedings of the AAAI Conference on Artificial Intelligence*. AAAI.
- [82] Yaxuan Yin, Shamyia Karumbaiah, and Shona Acquaye. 2025. Responsible AI in Education: Understanding Teachers' Priorities and Contextual Challenges. In *Proceedings of the 2025 ACM Conference on Fairness, Accountability, and Transparency*. ACM, Athens Greece, 2705–2727. doi:10.1145/3715275.3732176
- [83] He Zhang, Jingyi Xie, Chuhao Wu, Jie Cai, Chanmin Kim, and John M. Carroll. 2024. The Future of Learning: Large Language Models through the Lens of Students. In *Proceedings of the 25th Annual Conference on Information Technology Education (El Paso, TX, USA) (SIGITE '24)*. Association for Computing Machinery, New York, NY, USA, 12–18. doi:10.1145/3686852.3687069
- [84] Ru Zhang, Hyemin Lee, RongHui Wu, Wei Yang, and Younghwan Pan. 2025. Is the impact of artificial intelligence generation tools on improving art education positive or negative? Perspectives of professors and students. *Interactive Learning Environments* 0 (2025), 1–32. doi:10.1080/10494820.2025.2490173 Publisher: Routledge_eprint: <https://doi.org/10.1080/10494820.2025.2490173>.
- [85] Tiffany Zhu, Kexun Zhang, and William Yang Wang. 2024. Embracing AI in Education: Understanding the Surge in Large Language Model Use by Secondary Students. arXiv:2411.18708 (Nov. 2024). doi:10.48550/arXiv.2411.18708 arXiv:2411.18708 [cs].
- [86] Amit Zoran. 2015. Hybrid craft: showcase of physical and digital integration of design and craft skills. In *ACM SIGGRAPH Art Gallery (Los Angeles, California) (SIGGRAPH '15)*. Association for Computing Machinery, New York, NY, USA, 384–398. doi:10.1145/2810185.2810187