Bridging the Gap: A Need for CS Educators' Expertise in Bringing GAI to High School Teachers

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ABSTRACT

We conducted a two-phase study with high school teachers and administrators to learn about their perceptions around the use of Generative Artificial Intelligence (GAI) in their classrooms. In phase 1, we interviewed (n=7) teachers who expressed openness about GAI use in their classrooms, but also concerns around academic integrity, misinformation and tech equity. We then developed a presentation about GAI and a set of lesson plan ideas that span Art, English and CS, leveraging our CS education experience, and attempting to address some of the concerns raised. This presentation and the lesson plans were delivered to high school teachers and administrators in Manitoba, Canada. In phase 2, we interviewed (n=7) teachers and administrators after they had a chance to review the lesson plan ideas. Six of seven participants in this phase were very positive about the potential use of GAI in their classrooms or schools, finding that the provision of specific lesson plan ideas from CS educators helped to alleviate some concerns around GAI misuse and led to plans for future use of GAI in high school classrooms.

CCS CONCEPTS

• **Applied computing** → **Education**; • **Social and professional topics** → **Computer science education**.

KEYWORDS

Generative AI, High School Teachers, Lesson Plans

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1 INTRODUCTION

With the introduction of OpenAI's ChatGPT in late 2022 [28], a diverse array of industries began operationalizing generative artificial intelligence (GAI) [14, 31], and global investments in AI have substantially increased [23]. The sheer number of available GAI tools has led to pedagogical discourse relating to the use of such tools in educational settings and what can be done to prepare students for future careers that will likely utilize this technology [26]. Although there is much emergent research on GAI in post-secondary settings [25], we contend that in-class use of GAI could begin in high schools, where students are beginning to develop higher-order thinking skills [3]. By actively using GAI as a learning tool in a wide range of subjects, students can begin learning the skills needed to critically evaluate AI responses and develop AI literacy [13, 18], while still achieving mandated curricular outcomes. Computer science (CS) educators at all levels can play an important role in this integration, as CS educators are ideally positioned to bridge the gap between the rapid technological advances of GAI and educational practices. However, ideation regarding the use of GAI in classrooms should involve teachers directly [5, 13, 26, 35]. By understanding the perspectives and challenges that high school teachers face when considering student use of GAI, CS educators can create resources that help teachers integrate GAI into their classrooms in ways that increase student learning and engagement, while also addressing concerns teachers have about GAI use.

This paper examines the potential use of GAI as a learning tool in high school curricula, from the perspective of high school teachers. We conducted a two-phase study in collaboration with a local school division in Manitoba in Canada to explore how to integrate GAI into high school classrooms, before and after providing instruction and lesson plan ideas. Phase 1 involved exploratory interviews with high school teachers to gather their preliminary insights on GAI. We then developed a presentation for teachers and administrators, highlighting potential pedagogical applications of GAI. This presentation included examples of lesson plan ideas based on Phase 1 interviews, demonstrating how GAI can be integrated as a learning tool. In Phase 2, we conducted follow-up interviews with teachers and administrators to evaluate their perspectives on GAI, focusing on their feedback about the lesson plan ideas and their intentions for future use of GAI in the classroom. We contribute results that show high school teachers are keen to learn how to effectively integrate GAI as tools for students to use in their classrooms and expect that the use of GAI in classrooms is likely to improve students' critical thinking skills, but are simultaneously wary of academic integrity and assessment challenges brought about by the new technology. Our results highlight the important role post-secondary CS educators can play in facilitating effective use of GAI in high school classrooms.

2 BACKGROUND & RELATED WORK

2.1 Diverse GAI Technologies

The swift advancement of natural language processing (NLP) and deep learning techniques in AI has led to the emergence of numerous sophisticated GAI models that are easily accessible to the public [28]. These GAI models rely on neural networks and machine

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learning techniques to generate content across many mediums, including text, images, and video. This content closely resembles human-authored content, and these systems can generate working software programs, polished essays, and realistic images.

While these AI models are most commonly accessible through chat-like web and mobile interfaces, they are also available via APIs used by corporations and various GAI products. As part of this study, we conducted an environmental scan of GAI products in order to discern which may be suitable for classroom use. We found that many AI tools, such as Perplexity [27] and My AI from Snapchat [30], rely on the AI models provided by companies such as OpenAI and Google. Therefore, it is crucial to differentiate between AI models and the *tools* that utilize these models. When discussing this technology with high school teachers, we referred to these tools as "composite AI tools", in order to communicate the distinction between the tools and the source models they leverage.

The environmental scan also revealed three aspects of GAI that high school teachers should consider before using this technology in the classroom. First, most AI tools require users to be at least 13 years old. Second, the data use policies are important, given that high school students may lack the technological literacy needed to discern what information should be shared with a GAI tool or how to exclude their information from being added to the corpus underlying the models. Third, laws relating to copyright and child privacy play an important role in choosing the right models and tools for high school students to use [22].

2.2 Canadian Perspectives on GAI

Recent research has explored high school teachers' and students' perspectives on the use of GAI in cross-curricular education. Ghimire et al. examined educators' perspectives on GAI at the post-secondary level and found a disparity between CS educators and educators from other disciplines in terms of sentiment, familiarity, and general usage [9]. This aligns with other studies showing that most Canadian teachers do not incorporate GAI into their lesson plans and are hesitant to adopt it [6, 36]. Interestingly, among the Canadian teachers who do use GAI, most have a positive outlook on the technology and believe it enhances student learning [36]. These findings are consistent with results from global studies [2, 33].

In contrast to their teachers, Canadian students are highly receptive to integrating GAI in their education, with nearly 60% reporting its use in their schoolwork in 2024, a 13% increase from 2023 [16]. The majority of these students believe GAI has positively impacted their education by saving them time and improving the quality of their work [16]. These statistics highlight a disparity in Canadian high school education regarding GAI: while students are using it consistently, teachers remain cautious or resistant.

Why, then, have teachers been slow to adopt GAI in Canada? One possible reason is that many educators view GAI primarily as an assistive tool [9], useful for generating assessment ideas and providing feedback, or as a technology relevant only to computing disciplines. Alternatively, some teachers may not use GAI due to a lack of exposure, experience, or time [36]. Canadian high school teachers manage multiple responsibilities beyond instruction, and as MacDowell et al. highlight, they have not yet received sufficient training to take on leadership roles in AI education [24, 36]. Information on how to integrate GAI into classrooms is inconsistent or absent, and few provinces provide guidance on its use in K-12 education [34]. Hoechsmann and Poyntz further emphasize how unprepared the Canadian education system was for the digital age, a challenge that has only been exacerbated by the rapid advancement of GAI technologies [12, 24].

2.3 GAI in Education

Numerous studies have explored how GAI can serve as a learning tool in post-secondary education, with significant contributions from computer scientists. Liu et al. investigated the integration of GAI in computer science education, specifically within the context of teaching introductory post-secondary CS classes, using a ChatGPT-powered assistive tutor to assist students with programming questions [21]. Hollands et al. developed and disseminated instructional materials for the "Day of AI," a global initiative designed to introduce AI literacy across various educational levels and subjects. Their approach provided teachers with resources to educate students on AI's role in society and its future implications in career and educational contexts. Their success in equipping educators worldwide demonstrates how AI and CS education specialists can support broader efforts to introduce AI to educators [13]. Further studies have examined how GAI could be used as a learning tool in lesson plans, encouraging K-12 students to use the technology to foster learning, creativity, and problem-solving [1, 11, 32], in addition to improving AI literacy [15, 37].

It is important to examine how GAI might be used in a cross-curricular manner. Grover suggests that AI education must center on the learners, embrace a diverse set of pedagogical approaches, and be integrated into subjects beyond CS [10]. This idea is echoed by Casal-Otero et al. who also argue that AI literacy requires a multidisciplinary approach and should be integrated into core subjects to enhance learning [5]. However, both Grover and Casal-Otero point out that it remains unclear how CS educators and researchers should prepare high school teachers for integrating GAI into their classrooms, a challenge this study aims to explore.

A study by MacDowell et al. examined how to introduce GAI to teachers in Canada, using a framework that highlights student AI literacy through cognitive, socio-emotional, and instructor-guided interaction [24]. Researchers implemented their framework in an upper-level undergraduate course for pre-service teachers. Teachers in the course were asked to co-author an open-access textbook about GAI and teaching while using GAI. Study results indicated the need for teachers to be trained on how to communicate and collaborate with GAI through hands-on, low-stakes experimental opportunities and the need to infuse AI education across all teacher education programs. They emphasize the importance of a shared commitment from key stakeholders in the educational sector, which we argue should include CS educators, to develop professionals with the AI literacy skills needed in the Canadian school system.

Xie et al. reported on a co-design study with high school teachers focused on creating cross-disciplinary AI education curricula [35]. Across five virtual sessions, these researchers worked with teachers to familiarize them with the technology and create lesson plans, examining how AI tools can enhance subject-specific learning about

AI. This is similar to our work, where we provided teachers with lesson plan ideas on how to use GAI within Art, English and CS classes and aimed to collect teachers' perspectives on the integration of GAI in their lessons. However, while Xie investigated teaching *about* AI though cross-disciplinary subjects, our focus is on leveraging GAI to enhance learning *within* various subjects. This is illustrated in our example lesson plan idea in Figure 1, which targeted curricular objectives focused on English language skills. Xie et al. found that teachers viewed AI tools as augmentative for students' creative skills, and some suggested that AI could enhance critical thinking within subject-specific frameworks. We build on this idea by centering the use of GAI in our lesson plans to leverage students' creative and critical thinking skills.

3 STUDY METHODOLOGY

Our study was conducted with the goal of understanding the benefits and challenges of integrating GAI in classrooms as a learning tool. We partnered with a school system in our region after that school system reached out to us, asking for a presentation and consultation about the use of GAI in high school classrooms. After discussions with the district, we developed a research plan that included interviews, a presentation, and the creation of lesson plan ideas. We submitted an ethics protocol to our institution to allow us to engage with teachers in the district and analyze the results for research purposes. In Phase 1, we conducted initial interviews with high school teachers. We then developed lesson plan ideas and prepared a presentation for high school teachers to provide background about GAI and showcase how GAI could be used in high school classrooms, with much of the content tailored based on analysis of Phase 1 interview responses. Phase 2 consisted of follow-up interviews with both teachers and administrators regarding the lesson plan ideas presented. This approach enabled collection of rich qualitative data which provided insights on participant perspectives about the integration of GAI in high school classrooms and the lesson plan ideas. Participants were not required to participate in both phases, though two teachers did.

3.1 Phase 1: Exploratory Interviews

The first phase of the study consisted of exploratory interviews with high school teachers from a high school in the partnered school division. A general email invitation to participate was sent to all teachers at the school, and a more personalized email was sent to teachers in the network of Author 1. Seven high school teachers participated in this phase, representing a diverse range of subjects, including Pre-Calculus Math, Applied Commerce, English, History, and Photographic Arts. Questions within this phase were broad in nature, asking teachers about their experiences of GAI, their perceptions of it as a learning tool, and their observations of student interactions with GAI. These questions were informed by a literature review of high school educators' use of GAI over the past decade. An important facet of these interviews was assessing educators' comfort levels with GAI in their classrooms and identifying which curricula were best suited to integrating the technology as a learning tool, in order to determine how and which courses to develop lesson plans for. These interviews were held on Zoom, and participants were compensated with CDN$20.

3.2 Lesson Plan Ideas

The second phase aimed at bridging the gap between the technical aspects of GAI and the educational expertise of the teachers by providing them with materials about how GAI can be used, and considerations when using GAI at the high school level. We developed a presentation to provide information about current GAI technology and a review of relevant literature, and presented it at a symposium organized for teachers within the division. The presentation was followed by break-out sessions where teachers could examine some lesson plan ideas we developed based on findings from Phase 1. Approximately 20 teachers and administrators attended the symposium.

3.2.1 Art, English and CS Lesson Plan Ideas. We created nine lesson plan ideas (three each for Art, English and Computer Science) as a starting point for high school teachers to explore the use of GAI as a learning tool. Each lesson plan idea included specific curricular objectives that aligned with provincial curriculum guidelines, a brief description of the idea, and an outline of how students would interact with the GAI. Additionally, the plans detailed possible deliverables and provided notes on what teachers might expect when implementing the lessons. Each lesson plan idea included suggested AI technologies tailored to the modality and interaction requirements, accompanied by example screenshots showing the student's perspective of the GAI interaction.

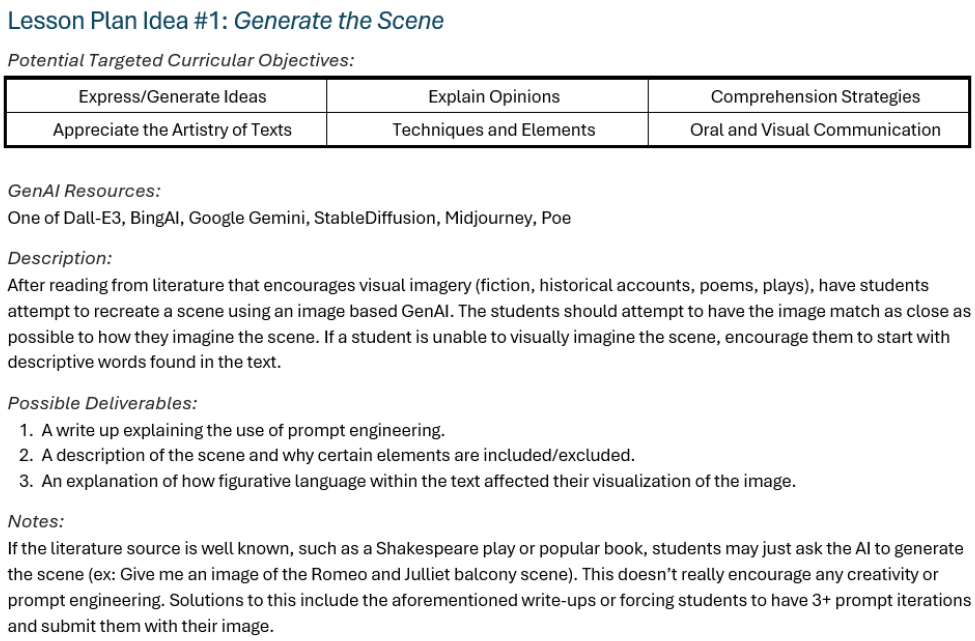
3.3 Phase 2: Follow-Up Interviews

The second phase of the study involved follow-up interviews focused on shared lesson plan ideas. Emails were sent out to participants who had attended the presentation, or who had completed the consent form after reviewing the lesson plan ideas shared on the researchers' website. Seven high school teachers and administrators took part in the second phase. Two of the seven had also participated in Phase 1 of the study. We included school administrators (n=2) in this phase so that we could learn more about their perspectives on how school division policies and practices may impact the integration of GAI in classroom learning.

We asked Phase 2 participants about the effectiveness of the lesson plan ideas and what kind of education and training they felt they needed regarding GAI. Questions in this phase aimed to evaluate whether our materials had made GAI more accessible. Critically, we also inquired about the teachers' plans and anticipated usage of GAI tools over the next two years. The interviews were held on Zoom, and participants were compensated with CDN$20.

3.4 Data Analysis

We performed content analysis [17] on both sets of interviews in order to generate summaries of responses and to highlight common perspectives among teachers with regard to the use of GAI in high school as a learning tool, while also tracking any notable outliers. The questions in both phases were designed to be neutral, avoiding any language that might lead participants toward a particular answer. Responses were categorized based on recurring themes rather than strict positive or negative sentiment. Unclear or missing responses were omitted from our findings.



Lesson Plan Idea #1: *Generate the Scene*

Potential Targeted Curricular Objectives:

Express/Generate Ideas	Explain Opinions	Comprehension Strategies
Appreciate the Artistry of Texts	Techniques and Elements	Oral and Visual Communication

GenAI Resources:
One of Dall-E3, BingAI, Google Gemini, StableDiffusion, Midjourney, Poe

Description:
After reading from literature that encourages visual imagery (fiction, historical accounts, poems, plays), have students attempt to recreate a scene using an image based GenAI. The students should attempt to have the image match as close as possible to how they imagine the scene. If a student is unable to visually imagine the scene, encourage them to start with descriptive words found in the text.

Possible Deliverables:
1. A write up explaining the use of prompt engineering.
2. A description of the scene and why certain elements are included/excluded.
3. An explanation of how figurative language within the text affected their visualization of the image.

Notes:
If the literature source is well known, such as a Shakespeare play or popular book, students may just ask the AI to generate the scene (ex: Give me an image of the Romeo and Julliet balcony scene). This doesn't really encourage any creativity or prompt engineering. Solutions to this include the aforementioned write-ups or forcing students to have 3+ prompt iterations and submit them with their image.

Figure 1: Example English Lesson Plan Idea Incorporating Generative AI Tools

4 RESULTS

Our study aimed to gather qualitative data about teachers' perspectives on the use of GAI in classrooms across various subjects. Results from Phase 1 highlight general sentiment on GAI and results from Phase 2 provide more specific details on topics such as teachers' current experience with GAI, perceptions of GAI as a learning tool, changes to education needed to accommodate GAI, and the effectiveness of the provided lesson plan ideas. Twelve unique participants included teachers from various subject areas and levels of experience with GAI, with seven participants interviewed in each phase (two participants engaged in both phases). All participants had received university education on teaching in a Western context, and gender demographics were split evenly between male and female, encompassing a broad age range.

4.1 Experience with GAI

We began Phase 1 by asking teachers about their GAI experience.

4.1.1 Usage Patterns. In Phase 1, three teachers had already used GAI in lesson plans, three had used it personally as a research tool, and one had not used it at all. In Phase 2, five teachers had already used GAI in some lesson plans, mostly as a tool for students to use for research, with only two having had students use GAI actively in a lesson to generate content submitted for assessment. P6 provided an example of when they used GAI in a lesson plan:

> One component of a business plan is an executive summary, and my students always have a difficult time writing it. So I said, "Okay, let's try this: You're going to go to ChatGPT, and you're going to put in a prompt along the lines of 'Create an executive summary of 5 to 8 sentences for this business,'... "

4.1.2 Training and Exposure. Various GAI tools were mentioned, with the most common being ChatGPT-3.5[1], followed by Google Gemini[2], Microsoft Copilot[3]. Notably, multiple participants mentioned that students' current GAI tool of choice was My AI, which integrates the ChatGPT AI model into the Snapchat app [30]. Five teachers mentioned they had participated in other professional development seminars about GAI, though these mostly revolved around using GAI to create assessments and instructional materials.

4.2 Perceptions of GAI as a Learning Tool

We asked teachers about their perspectives on students using GAI as an in-class learning tool. Participants generally had consistently positive views on the usage of GAI with a few concerns:

4.2.1 Should GAI be Used. In Phase 1, when participants were asked if GAI should be used as a learning tool in the classroom, all responded positively. The most common reason was that it will be used after high school, so it must be taught *in* high school to better prepare students for the real world, as expressed by P4:

> I don't want the kids to shortchange themselves by only using it, but I also don't want to rob them of the privileges of preparing them for the workforce.

Phase 2 teachers were asked whether they would integrate GAI into lesson plans in the future, while administrators were asked if they would encourage its use. All five teachers and one administrator

[1]ChatGPT-3.5 by OpenAI: https://chatgpt.com/
[2]Gemini by Google: https://gemini.google.com/app
[3]Copilot by Microsoft: https://copilot.microsoft.com/

said they would use or encourage GAI in lesson plans within the next two years, citing various reasons including the "wow factor", making learning material more readily available to students, and the tools' ability to complement other skill sets, as suggested by P6:

> It's unleashing the creativity that may have been suppressed in earlier years.

One administrator (P7) was hesitant, citing a need to understand the technology better in terms of classroom integration before recommending its usage:

> It's about me developing my own understanding of what the possibilities are and how we can use and interact with [GAI]. Once I develop my confidence and competency, I will feel more inclined to encourage others and help them grow their competency.

4.2.2 Concerns. A common concern among teachers was cheating and over-reliance on the technology. Teachers worried that students might use GAI solely to produce material for assessment without actually learning. Concerns about students submitting purely AI-generated work as their own came up in 12 of the 14 interviews. P1 of Phase 1 mentioned this when asked if they had any concerns:

> If they don't see it as a learning tool and instead view it as an easy way out, they won't care to understand, so then, what did they learn?

During Phase 1, when teachers were asked about their concerns, four mentioned that misinformation and information siloing were issues when incorporating GAI directly into lesson plans. This sentiment was not as strongly expressed in Phase 2, where teachers and administrators were more concerned about the steep learning curve for integrating GAI into some lesson plans, as noted by P7:

> There's going to be a learning curve where people have to learn how to interact with it appropriately. For teachers to be able to teach students how to interact with it appropriately, they also have to learn how to do so themselves.

This sentiment is further echoed by P5 who mentioned that teachers need time to experiment before integrating GAI into classrooms:

> I think there are tons of benefits, but people need playtime first. They need time to dabble, explore possibilities, and get curious.

Another major concern of teachers was the relationship between tech equity and the usage of GAI at the high school level. Teachers must make their lessons equitable for all students, so if a student is unable to use GAI, teachers would have to adapt their lessons and assignments to exclude the technology. This could happen if students do not have access to the technology at home, which could disadvantage students of lower socioeconomic status.

4.3 Critical Thinking and Assessment

Critical thinking and assessment were common concerns identified during our literature review, so we sought to understand teachers' views by asking them about these topics explicitly:

4.3.1 How GAI Will Affect Critical Thinking Skills. The majority of participants felt that critical thinking skills would be positively affected or remain at the status quo. However, two participants felt there would be a negative effect, citing over-reliance. Of the participants who believed that GAI would improve critical thinking skills, the most common reason was that prompt engineering and output evaluation involved measurable critical thinking skills, as indicated by an administrator of Phase 2:

> I think a great way to assess kids is through their ability to prompt engineer. A kid can demonstrate mastery of the subject if they can use the vocabulary properly in a prompt.

4.3.2 Assessment. All participants noted the need to examine how student assessment should change due to the ability of students to use GAI for homework assignments, and the difficulty of detecting GAI-generated work. For example, one Phase 2 participant noted:

> It's just the sense of urgency, in terms of changing our assessments, is very palpable right now.

Participants in both Phases expressed concern that assessment materials like essays and take-home worksheets were no longer "authentic" assessment strategies. Phase 2 participants, who were generally more experienced teachers, proposed some solutions for how assessment might change. One participant suggested that cheating and not cheating could no longer be viewed as binary options but rather as a continuum, with teachers choosing where to draw the line. Another participant suggested that GAI could align closely with the "student-centered" approach to education, where GAI is used by students to learn about specific topics of interest to them and fill skill gaps, with the process of interacting with GAI serving as the main source of assessment.

4.4 Feedback on Lesson Plan Ideas

All seven Phase 2 participants believed the lesson plan ideas clearly showed how GAI could be used in the classroom. Six participants, such as P1, felt that the lesson plan ideas helped alleviate some of the concerns around the usage of GAI and appreciated the role that CS educators play in introducing the technology.

> ... I think it is good to see the lesson plan ideas, because it's a new level of using AI...I think that's what the teachers are looking for, some credible source to educate them on it, because it's overwhelming and scary.

P4 felt that the presentation and lesson plan ideas should be introduced to other high school teachers, saying:

> I think it is an important thing to teach teachers about, and and for students to learn about and how to use it, and how to use it responsibly.

Four teachers noted that while valuable, some further development would be required before those lesson plans could be integrated. This included the need for a clear rubric and an entry point for students, such as prerequisite knowledge before engaging in the lesson. Additionally, four Phase 2 respondents suggested that a framework for how GAI could be used might be better than specific lesson plan ideas, allowing teachers to more easily adapt the material for different subjects and grade levels.

5 DISCUSSION

One of the major themes that emerged was concerns surrounding the impact of GAI on academic integrity. Teachers expressed concerns about cheating and over-reliance on AI-generated content, which they feared could undermine students' learning experiences; as echoed by other studies exploring educators' positions on GAI [8, 29]. There was some apprehension about the potential for misinformation and the general mystery of the technology which mirrors initial reactions by teachers in other studies [24, 35]. Our findings confirm the recommendations of Grover, Casal-Otero and MacDowell in that CS educators have a role to play in de-mystifying the technology and addressing teachers' apprehensions [5, 10, 24]. CS educators and researchers should support high school teachers in effectively integrating technology into the classroom by providing examples and frameworks that leverage GAI productively.

Despite these concerns, teachers generally had a positive outlook on integrating GAI into their classrooms. Nearly all participants indicated that GAI should be used as a learning tool or were planning to integrate it into their lesson plans within the next two years. This contrasts with findings from the Conference Board of Canada that shows Canadian teachers are *not* using GAI in their classes, and in many cases ban its use [36]. However, our participants' overwhelmingly positive attitudes towards GAI use in the classroom may be related to the lesson plan ideas presented and are in alignment with findings from other studies on educators' opinions regarding GAI in education [2, 33]. Some potential benefits noted by our participants included encouraging students' curiosity and class engagement, in addition to better preparing students for future careers where AI tools will be prevalent, matching benefits mentioned by teachers in other eduction systems [6]. Additionally, teachers generally felt that GAI would have a positive effect on critical thinking skills, suggesting that students who use GAI in high school may have better critical thinking and analysis skills when they reach university.

5.1 Assessment Adaptation

Another important theme of the study was the need for a shift in assessment at the high school level. Nearly every participant mentioned cheating as a primary concern for using GAI in the class. However, some teachers suggested that due to the likely permanence of GAI in society, assessment approaches will need to change. This theme matches post-secondary studies exploring the same issue [4, 7, 36]; however, due to the more intimate nature of high school, teachers at that level are afforded some opportunities not available to post-secondary educators. Instead of students subversively handing in an essay written by ChatGPT, a high school teacher could encourage a student to create a 'perfect' essay with the help of ChatGPT and hand in both the essay and the list of prompts used to reach that goal. As mentioned by one participant, GAI is uniquely positioned to provide insight into the thinking process of students. Future educationally-targeted GAI technology should leverage this fact and allow teachers to more easily monitor their students' prompting and interaction with the GAI model.

5.2 A Need For CS Education

The effectiveness of the lesson plan ideas shows that CS educators can play a crucial role in introducing GAI as a learning tool across various subjects, aligning with recommendations by Xie et al. [35], who stated that CS professionals must actively transfer their knowledge to teachers. Eight of our participants directly expressed the importance of expert involvement in teacher training. Similarly, our results support the recommendations by MacDowell et al. [24], who advocate for providing teachers with resources and hands-on opportunities to engage with GAI. Teachers in our study echoed this sentiment, with several highlighting that practical experience and guided experimentation would be the most effective ways to integrate GAI into their classrooms. Our findings indicate that a lack of formal training opportunities remains a significant barrier [19]. Addressing this gap through targeted professional development could enhance teachers' self-efficacy around classroom GAI use.

One way to address this need could be introducing frameworks on how GAI could be used in lesson plans, as suggested by a few of our participants and by the work of MacDowell [24]. Future studies could explore how CS educators can work with high school teachers on developing generalized frameworks for using GAI as a learning tool in classrooms across disciplines.

5.3 Ethical Considerations of GAI Tool Use

Integrating GAI into high school classrooms involves ethical considerations beyond academic integrity, including the necessity for well-defined school division policies, as insufficient guidance may affect teachers' willingness to adopt or reject the technology. There is a lack of transparency about how most GAI models work [20], so teachers and policymakers may not be aware of issues such as implicit bias, misinformation, and how (and where) information is stored. We found that most tools sub-license all user-generated input and output to the company that created the GAI tool. As these practices may not align with the privacy policies of school divisions, CS educators can help school divisions understand these practices and consider the ethical implications of GAI usage.

5.4 Study Limitations

Only one school division in Canada was sampled, and so the results may not generalize to other school divisions or geographies. Second, recruited participants likely self-selected into the study based on some level of interest in discussing GAI in education, possibly skewing the results to have a more positive outlook on GAI technology that is not representative of teachers as a whole.

6 CONCLUSION

Our results suggest that high school teachers are generally positive about integrating GAI into classrooms, recognizing its potential to enhance learning and critical thinking skills, despite concerns about academic integrity, misinformation, and tech equity. We found that providing example lesson plan ideas helped high school teachers better understand how GAI could be used in the classroom. Future collaborations between CS educators, researchers, and high school teachers could involve developing adaptable frameworks on how to integrate GAI as a learning tool, as well as studying how students experience using GAI in high school classrooms. Our study highlights the importance of collaboration between CS educators/researchers and high school teachers for the effective integration of GAI in high school education.

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