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**Research Article**

# USING LLMS FOR OUTCOME-ALIGNED COURSE DESIGN

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**ABSTRACT**

*This study explores how secondary school teachers in Ontario engage with generative artificial intelligence (GenAI) in their classrooms. Using a survey of 142 teachers and multiple focus groups, we examined GenAI adoption patterns and pedagogical applications. Findings indicate that 71% of teachers have used GenAI to enhance their lessons and 48% teach AI literacy to students, rates higher than those reported in comparable North American studies. Innovative applications documented include AI-powered escape rooms, personalized curriculum chatbots, text adaptation tools, AI-generated rubrics, and critical AI literacy activities. Focus group data further revealed that early-adopting teachers are combining multiple platforms strategically to maximize pedagogical impact. Though many teachers are engaging intentionally with GenAI, barriers related to professional development and curriculum alignment remain. These findings offer an early, grounded picture of GenAI in Ontario secondary classrooms and carry implications for school boards, curriculum writers, and teacher educators across the province.*

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## 1. Introduction

Generative artificial intelligence (GenAI) tools have been quickly introduced into K-12 classrooms around the world with little to no existing curricular guidance or teacher preparation (Holmes et al., 2022; Zawacki-Richter et al., 2019). Many K-12 teachers in Ontario were left to figure this out on their own through experimentation and innovation at the individual classroom level. The discussion is no longer whether these tools are being used in schools-they already are-but how Ontario teachers can be prepared and supported to use GenAI intentionally in their teaching practice.

Specifically, this study is guided by two research questions:

(1) What GenAI tools are Ontario secondary school teachers currently using, and at what rates?

(2) How are these teachers applying GenAI tools in pedagogically intentional ways in their classroom practice?

This paper provides a picture of the current landscape of GenAI adoption and application in classrooms, through a survey administered to 142 secondary school teachers across multiple Ontario school boards and subsequently refined through multiple focus groups. The focus of this paper is on two core aspects of teachers' experiences: their adoption patterns and their innovative applications in classroom teaching.

## 2.Background and Literature

The research base surrounding AI in education has grown exponentially in recent years, with scholars noting a persistent gap between available technological innovations and teachers' capacity to integrate technology meaningfully into their pedagogical practice (Luckin et al., 2016; Selwyn, 2019). Accordingly, much research advocates for pedagogy-first approaches to technology integration-that is, that technology be used to support the teaching of the subject matter rather than simply as a novelty (Mishra & Koehler, 2006). In differentiated instruction, GenAI tools show particular promise in scaffolding learning. GenAI tools, like other digital technologies, can adjust the reading level of texts, translate passages into various languages or support students struggling in comprehending more complex topics by providing simplifications or examples. This is in line with the Universal Design for Learning framework that provides flexible opportunities for learning (Tomlinson, 2014; Rose & Meyer, 2002). Moreover, research highlights that teacher beliefs and confidence about technology integration play a role, mediated by the availability of relevant, collaborative and hands-on professional learning opportunities (Darling-Hammond et al., 2017). By focusing on early-adopting teachers who have intentionally embraced GenAI tools, this study provides insights into what pedagogical use of AI looks like, which can lay a foundation for broader professional development across the province. Despite the growing body of research on AI in education, most existing studies are theoretical in nature, focus on higher education contexts, or draw on data from outside Canada (Zawacki-Richter et al., 2019; Crompton & Burke, 2023). There remains a shortage of empirical, classroom-level evidence documenting how secondary school teachers in Canadian provinces are engaging with GenAI in practice. This study addresses that gap by contributing ground-level data from Ontario secondary school teachers actively navigating GenAI integration in their classrooms.

## 3.Methodology

This study employed mixed-methods, exploratory design, combining quantitative survey data with qualitative focus group inquiry to examine GenAI use among Ontario secondary school teachers. An online survey was developed, piloted with three educators, and distributed to secondary school teachers across several Ontario school boards. This paper concentrates on the open-ended survey responses about teachers' engagement with and experiences using generative AI. One hundred and forty-two survey responses were analyzed. Participants were primarily secondary school teachers across multiple subject areas and experience levels; the

sample included teachers from urban, suburban, and rural boards. To further enrich the findings, we held two focus groups with secondary school teachers from various Ontario boards. This paper draws on Focus Group 2, which consisted of three teachers from different disciplines, along with researchers from the Faculty of Education at Queen's University. Participants were recruited voluntarily through distribution across several Ontario school boards, with no eligibility criteria beyond current secondary school teaching status.

Open-ended survey responses were analyzed using thematic analysis, following the approach outlined by Braun and Clarke (2006). Codes were developed inductively from the data using NVivo (version 14) and iteratively refined across the research team through ongoing discussion until consensus was reached. Focus group transcripts were analyzed using the same thematic framework, with particular attention to patterns of tool use, pedagogical intent, and perceived barriers.

To address trustworthiness, the study employed multiple strategies across four dimensions. Credibility was supported through member-checking and researcher triangulation across the team. Transferability is supported through thick description of participant contexts and classroom applications, enabling readers to assess applicability to their own settings. Dependability was addressed through an audit trail of coding decisions and iterative team discussion. Confirmability was enhanced through researcher reflexivity, with the team maintaining awareness of their positionality as education researchers and technology advocates.

This study received approval from the General Research Ethics Board (GREB) at Queen's University. Participation was voluntary, informed consent was obtained from all participants, and all data were anonymized to protect confidentiality.

## 4.Findings

### Adoption Rates

A significant proportion of surveyed teachers have already started using GenAI in their classrooms: 71% reported having used it to enrich their lesson plans, while 48% indicated that they were teaching AI literacy to their students. These rates are higher than reported in similar studies of North American teachers, which have ranged from 31% in the fall of 2022 to 53% in the fall of 2023 (Crompton & Burke, 2023), suggesting that Ontario teachers are embracing the technology at a faster pace. For context, the most recommended classroom technologies were portable laptops or Chromebooks (89 teachers), followed by internet access (76 teachers) and Canva (68 teachers). Among the GenAI tools listed in the survey, ChatGPT/Copilot was reported to be used by 22 teachers. Nevertheless, a large majority (81%) reported encountering some difficulties related to their teaching of GenAI in the classroom.

Focus group teachers confirmed this trend, illustrating how they had been using a combination of tools to maximize their effectiveness. One teacher mentioned: "*I find my best results are when I take something from Brisk, maybe or Notebook LM or Wayground and I throw them all together, I get so much more out of using different AI platforms together*". A tech education teacher described generating an outline for his unit on machine learning using

Brisk. The outline provided him with a solid foundation from which he could build the rest of his unit and related lesson plans.

### Innovative Classroom Applications

Among early-adopting teachers, innovative GenAI use varied. Notebook LM was used to create a simulated World War I escape room for students, where students would enter a simulation of trench warfare and respond to questions using a chatbot they interacted with. Another application involved building personalized chatbots in School AI for students to answer curriculum-based questions and get help on assignments outside of class. CAMI was leveraged to adapt the readability of texts for English as a Second Language (ESL) students, summarize lengthy readings for History or English classes and assist with translation for French immersion students. Students were asked to critically review AI-generated responses to identify bias and improve their own prompt-engineering skills. Moreover, several teachers used AI to assist in creating rubrics that could support students in understanding assessment expectations and improve the design and consistency of their assessments.

One teacher created a chatbot around a specific student's interests. When that student asked questions about the curriculum, they were answered through their favourite subject or topic to encourage engagement with the course content. Another example from the focus groups involved a teacher using Canva's AI image generation feature for students to create personal logos. The students then reviewed what the AI generated in relation to what they wanted to create and discussed this comparison, turning the process of generation into a critical literacy exercise. These are just some of the ways teachers have used GenAI tools to support their students' learning, highlighting how these tools are increasingly becoming integrated into the fabric of classroom teaching rather than serving as mere gadgets (Holmes et al., 2022; Luckin et al., 2016).

### Differentiation and Multimodal Uses

Additionally, survey responses and focus group discussions revealed that GenAI has been used by teachers to support differentiation, help engagement in remote learning environments and generate various multimodal teaching and learning materials. These include infographics, slideshows, interactive podcasts, videos and other multimedia content. The diversity and intention behind these applications suggest that at least some early-adopting teachers view GenAI as a tool for innovation in pedagogical practice rather than as a means of avoiding work (Holmes et al., 2022; Luckin et al., 2016).

## 5.Discussion

This study provides an early look at how teachers are utilizing generative AI in secondary classrooms across Ontario. The wide array of applications described-such as personalized chatbots, World War I escape rooms, text adaptation tools and activities centred around critiquing AI-generated responses-suggests that teachers are identifying valuable pedagogical applications for these technologies. To what extent these early adopter practices are representative of the broader teaching population is not yet known, nor are the long-term

impacts of these applications on student learning. Further research tracking a larger and more diverse range of classroom contexts over a longer period will be necessary to build a more comprehensive understanding.

These applications reflect the principles of the TPACK framework (Mishra & Koehler, 2006), in which effective technology integration requires the intersection of technological, pedagogical, and content knowledge, as well as the Universal Design for Learning framework (Rose & Meyer, 2002), which emphasizes flexible, student-centered approaches to engagement and representation.

The discrepancy between the 71% of teachers who reported trying GenAI and the 81% who reported encountering some challenges raises important questions. What are the specific problems that teachers face in practice, and how do they manage these challenges without clear pedagogical support or curriculum guidance? These are key areas for future exploration in research.

## Limitations and Future Research

This study has several limitations that should be noted. The sample consists of self-selected, volunteer participants recruited through school board networks, which likely over-represents early-adopting teachers who are already enthusiastic about GenAI. This sampling approach introduces potential bias, and results may not reflect the experiences of the broader Ontario secondary teaching population. The data are also self-reported, which introduces the possibility of response bias. Additionally, as a single-province study conducted at one point in time, findings may not generalize beyond the Ontario context or capture how practices are evolving. Future research should seek larger and more diverse samples across Canadian provinces, incorporate student perspectives, and track GenAI use and its effects on learning outcomes longitudinally. Studies examining the relationship between professional development quality and the depth of GenAI integration would also be a valuable next step.’

## 6.Conclusion

This study offers a first exploration of the applications of generative AI in Ontario secondary schools. As evidenced by the findings, a significant number of teachers have already begun using these tools with notable creativity and purpose. With the rapid evolution of GenAI, further research examining teachers' practices in diverse school contexts throughout Ontario will be essential for comprehending the impact of these technologies on teaching and learning in secondary and K–12 education more broadly.

## Artificial Intelligence Tool Disclosure

During the preparation of this manuscript, the authors used Claude (Anthropic) for the purpose of language editing and structural feedback. The authors have reviewed and take full responsibility for the content of the manuscript.

## References

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. International Journal of Educational Technology in Higher Education, 20(1), 22. https://doi.org/10.1186/s41239-023-00392-8

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. Learning Policy Institute.

Holmes, W., Bialik, M., & Fadel, C. (2022). Artificial intelligence in education: Promises and implications for teaching and learning. Center for Curriculum Redesign.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed: An argument for AI in education. Pearson.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017–1054.

Rose, D. H., & Meyer, A. (2002). Teaching every student in the digital age: Universal design for learning. ASCD.

Selwyn, N. (2019). Should robots replace teachers? AI and the future of education. Polity Press.

Tomlinson, C. A. (2014). The differentiated classroom: Responding to the needs of all learners (2nd ed.). ASCD.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—where are the educators? International Journal of Educational Technology in Higher Education, 16(1), 39.

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